



THE IMPACT OF TECHNOLOGY ON HUMAN LABOUR PRODUCTIVITY IN ORGANISATIONS IN KENYA

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Abstract

The technological wind blowing across the entire world has meant that no organization is left behind. Technology has been applied in various ways in the agricultural sector which include: fertilizer applications, spraying, weeding, storage and harvesting with the aim of improving quality, quantity and production of the end products. Tea firms are embracing new technology through implementation of mechanical tea harvesters, replacing hand picking. In spite of the anticipated benefits that have been associated with this form of technology, there is however no clear picture on how it is impacting on the firm and the employee productivity. This study therefore sorts to establish the effects associated with the implementation of mechanical tea harvesters on employee productivity using one of the tea estates in Kericho County as a case study. It adopted a case study design. Both purposive and simple random sampling techniques were used to select the respondents. Stratified sampling was also used to categorize workers into managers, supervisors and tea pluckers who provided the information. A target population of 213 and sample size of 107 participants was used. Questionnaires and Interview schedule were used to collect data. Data collected was coded and presented by use of descriptive statistics such as frequency tables, pie charts, bar graphs and Percentages. From the research findings it emerged that the introduction of the machines has generated both positive and negative attributes to the firm and to the employees. Specifically, it has led to, reduction of labour cost, increased production in tea estates and improved wages. The direct emission of smoke, noise and loss of employment opportunities generally appeared to be major negative attributes to the employees. The beneficiaries of the study are; the tea companies in adopting technologies, the government when making policies and trade unions when negotiating for the wages of the employees. From the study findings, stakeholders can utilize the information to enhance development of the technology without impacting negatively on human resource.

Key Words: Technology, Human Labour, Productivity, Organizations.

Introduction

Globalization is driven by several factors which include: advances in technology, accelerated production, increased mobility of people and products, liberalization of capital markets and the global harmonization of the regulatory environment [Ball et.al, 2004]. World Bank [2006], technology has transformed the world. Its potential for reducing poverty and fostering growth in developing countries has increased rapidly. Machines such as computers have improved services and productivity in public and private organizations.

The transfer and adoption of technology in tea sector is of paramount importance to assuring a reliable supply of high quality products at prices that are both profitable to producers and reasonable to consumers [Eisa, 1993]. Therefore there is need to enhance productivity in all sectors by adopting new technological advancements for the realization of high yields. According to him, the impact of technological innovations on agricultural output has varied from country to country, region to region and sometimes from crops to crops.

Agricultural technologies and knowledge have been largely created and disseminated by public institutions. Biotechnology for agricultural production has developed rapidly and the world economy has become more globalized and liberalized. Any organization in this century expects to get more value from their investments. This has made both the agricultural and industrial organization to embrace technology in their production processes. Pablow [1995] described the way in which mechanization of tea cultivation has evolved over 25 years in Argentina. The changes that were being implemented are now being experienced in several less developed parts of the world sparking interest in the mechanical harvesting of tea.

The Kenya government has underlined the importance of agricultural research by establishing statutory organizations charged solely with undertaking research in this sector for instance, the establishment of the Kenya Agricultural Research Institute. There are organizations which carry out research on specific crops such as, Coffee Research foundation, Tea Research Foundation and others. Modern technology influences Agricultural production through changes in efficiency, product characteristics and production risks.

In Kenya tea plucking machines were introduced in 2006. It was due to the need to enhance productivity in the tea estates which was in response to the government's call for Industrialization and improvement in the agricultural sector. [James Finlay & Sotik company, 2007]. It is now 30years down the line since the idea of mechanization of tea harvesting has been tried but little has been achieved. The research tried to find out the challenges in the field that hinders full mechanization of tea harvesting in the Tea Sector.

Kenya Tea Development Authority has been among the leading companies that employ many people in Kenya. The introduction of Tea Plucking Machine is seen as a threat to employment especially to the unskilled employees. Introduction of tea plucking machines is seen to be contrary to the government policy contained in the Economy

Recovery Strategy for Wealth on Employment Creation which was introduced when NARC government took over in 2002, which promised to create 500,000 jobs every year. [Daily Nation, 2006].

The government policy for Vision 2030 is to embrace technology in all sectors. Agricultural sector is embracing Technology in Tea harvesting in order to improve production and to reduce labour cost but there seems to be a lot of resistance from the employees and their trade unions as they fear retrenchment. There is also no clear picture on how it is impacting on the firm and the employees.

Background

Machines are Replacing Human Labour

Chabra [2000], due to influence of technological development, organizational complexities are growing. The impact on the work, working methods, work rules, tools, equipment etc is inevitable. Jobs have become more complex and need specialized skills and professions. People make mistakes, machines do not. People get tired and cranky, machines do not. People are erratic and unreliable, machines are not. People think and act slowly, machines do not. People have very definite limitations of endurance and concentration, machines do not. These human short-comings mean that every modern system is designed to minimize or exclude human intervention; so just as horses became obsolete and were phased out of the workplace, so have the people [Phiph, 2010].

Norbert [1940], a pioneer of computing, forecast that this new technology would destroy enough jobs. Some multinational in Kenya operating in the tea sector are still increasing the mechanization of tea picking without agreeing with the union or even bothering on consequent job losses. Already 50,000 jobs have been lost and a further 30,000 are threatened while government is co placement [Nation, 2009].

In every field of Human Resource, smart machines are making improvements by supplanting workers. Jet planes are flown by computers, there is no need for a navigator, and the result is superior to any human effort. The weapons systems that protect warships need to react so quickly that any human intervention disables their effectiveness. The whole system operates without the use of a single person. The possibility of the loss of employment was first realized during the onset of the machine age. The invention and application of the steam engine heralded the industrial revolution. It dramatically extended the power and ability of the community. No longer was human strength and endurance the limiting factor in achievements.

Machines could be constructed to work harder faster cheaper and more reliably than any group of people. However the initial implementation of machines meant mass unemployment and their use was bitterly opposed. People felt that such innovations were permanently robbing the community of jobs. The Luddite movement spontaneously formed which protested this change and attacked the new machinery along with its owners [Atkinson, 2010].

Impact of New Technology on Trade Unions in Kenya

In today's highly competitive business world, every organization is competing for limited opportunities by seeking to get competitive advantage over rivals and for them to be effectively competitive. For an organization to get readily available and accurate information about itself, it has to install new technology such as computers which as suggested by Forester [1988], introduction of machines in organizations negatively affect Trade Unions. For instance, one Tea Plucking Machine can perform a duty of 27 people a day.

Forester [1988], argues that machines are replacing paper work, improving productivity, customer service and job satisfaction. He goes further to state that technology automates jobs thereby rendering the former job occupants jobless hence impacting negatively on trade unions in terms of membership.

In the year 2006, the Central Organization of Trade Unions [COTU] threatened to mobilize its members into civil action if multinational tea plantations go ahead and start using tea-plucking machines. The Ministry of Labour has asked the companies to desist from deploying Tea Plucking Machines until after talks between the companies, Trade Unions and the ministry of labour on the issue and then come up with a way forward. Tea plantations have often voiced their desire to deploy Tea Plucking Machines in an effort to curb rising labour costs. [Nation, 2006].

Union leaders across the country rejected the implementation of Machines. For instance some officials complained that nearly 3,000 children dropped out of primary schools in tea estates in Nandi and Tinderet districts in the year 2010 after their parents' jobs were taken over by plucking machines. According to Kenya National Union of Teachers Secretary in the area Boniface Tenai, schools built in tea estates are run by multinational companies have got very few pupils [East African 2011]. However, Operations Manager of Eastern Produce Tea Company Jacob Kata accused Union leaders of thwarting the company's effort to reduce costs. Large scale tea companies resorted using the Machine because the new Technology was cheaper to human labour [Nation 2009].

Effects of Mechanical Tea Harvesters on Employee Productivity

Technology has automated many of the critical processes in the industry as well the household. The electronic gadgets that have entered the homes of the ordinary people have saved them from the daily household work. The automobile industry and technology are interwoven. Machines have automated many of the crucial industrial processes. They are now taking up many of the mundane jobs that were once executed by human workers. Technology has evolved to an extent where machines can perform tasks that are physically inaccessible to man. The use of advanced technologies has proved helpful in life-risking jobs such as mining and space exploring [Phiph, 2010].

Employment in any industry is impacted by new technology whose objective is to increase productivity. The initial result of such technological introduction is the reduction of workers to some extent. The introduction of any technology has various consequences. These occur in the environment, to existing and future technological developments, financial and social systems in which the new technology is embedded. Some studies have indicated that the introduction of advance technology have resulted in higher wages. US statistical brief [1993],

Training of the employees on the use of machines and maintenance has led to improved skills and expertise knowledge. This is what Sagimo [2002] emphasized. According to him, training is a continuous process right from the initial induction at entry, through education and training in specific skills, to the security of maximum effectiveness in managerial and senior administrative position. Sagimo stresses the need for training employees at all levels.

The use of machines would render workers jobless which would be contrary to the government policy contained in the economy recovery strategy for wealth on employment creation which promised to create 500,000 jobs every year. The government ruled out the full mechanization of tea picking by multi-nationals firms because it threatens 80,000 jobs. Kulundu [2006], directed that minimal use of the machines by the firms be maintained and not to allow the firms to fully mechanize the tea picking process. He said that it will be disastrous if fully implementation is done because it will lead to massive layoffs, which will in turn lead to increase poverty levels [Daily nation; 2006].

Mart [1995], an economist from United States said that since the beginning of the industrial revolution. People have predicted that machines would destroy jobs. He pointed out that by investing in machinery, factory owners would create a vast army of unemployment. Esther [2007], reported that the Kenya Tea Growers Association started using tea plucking machines in many plantations and this angered the Kenya Plantation and Agricultural Workers Union, who threatened to go on strike.

Philiph [2010], pointed out that Machines do not create jobs, they definitely eradicate the need for human effort. The fact that the engines of the industrial revolution created jobs was a reflection of their shortcomings, they were clumsy and stupid. Exploiting their potential meant employing people to make up for these inadequacies. But this did not mean that mechanized systems would always be dependent on human assistance. The development of artificial intelligence and advances in mechanical miniaturization have overcome these shortcomings, automation has stopped generating jobs since 1980.

Weiner [1940] asserts that technology would destroy enough jobs. However blauer [1960] view technology as upgrading of skills, occupational status and continuing diversity. On the other hand, the government policy is to embrace technology in all sectors at the same time creating employment and that is why there is dilemma in the firms on the best ways of introducing the machines without much resistance.

Research Methodology

Research Design

The study adopted a Case Study Design which seeks to describe a unit in detail, in context and holistically. It is an intensive, descriptive and holistic analysis of a single entity [Wilis et al, 2009]. The design was found to be appropriate because the research was conducted in a small area and the results were used to make general comments for all Tea Estates. It also allowed the use of research instruments like the questionnaires and interviews schedule which were used to collect data for the study.

Target Population

This refers to a group of individuals, persons, objects or items from which samples are taken for measurements [Kothari, 2006]. The study targeted employees in one of the Tea estates in Kericho, who are involved in the use of the Machines which included: 204 Tea Pluckers, 8 Supervisors and the Estate Manager making a total of 213 participants. The strata are shown in the Table 1.

Table 1: Target population

Strata	Target population
Tea pluckers	204
Supervisors	8
Manager	1
Total employees	213

Source; Personnel Division: May 2014

Sampling Procedures and Sample Size

According to Webster [1985], sampling is the act, process or technique of selecting a representative part of a population for the purpose of determining parameters or characteristics of the whole population. The study employed three sampling designs; Purposive, Stratified and Simple Random Sampling.

Table 2: Sample Size of Respondents

Strata	Target population	Sample size
Tea pluckers	204	102
Supervisors	8	4
Managers	1	1
Total	213	107

Source; field May 2014

Data Collection Instrument and Procedures

The study made use of Questionnaires and Interview Schedule. These are; Tea pluckers Questionnaire, Supervisors' Questionnaire and Manager's Interview Schedule. The above instruments were used to supplement each other and to give a deeper and wider exploration into research perspective. This is in harmony with what Mugenda [1999] said that research instruments are the means by which primary data is collected.

The data collected were organized, coded and analyzed using descriptive statistics such as frequency tables, pie charts, bar graphs and percentages. These methods enabled me collect data and explain phenomena more deeply and exhaustively. The study generated both quantitative and qualitative data. Kombo and tromp [2006] define data collection as gathering of specific information to prove or refute some facts. The researcher used note-taking method to record data during interview. Pilot testing was done where the responses of the items were checked against the research objectives.

Discussion of the Findings

The objective of the research was to establish the effects of a new technology for plucking tea, Mechanical Tea Harvesters (MTH), on human labour productivity in the Tea Estate. The researcher determines the correlation of implementation of mechanical tea harvesters on employee productivity.

Table 3 : Correlation of Implementation of Mechanical Tea Harvesters on Employee Productivity

		MTH has led to improved skills	MTH has led to reduction of labour cost	MTH has led to increased production	MTH has led to improve living standards of employees
MTH has led to improved skills	Pearson Correlation	1	.086	.164	.088
	Sig. (2-tailed)		.388	.099	.381
	N	102	102	102	102
MTH has led to reduction of labour cost	Pearson Correlation	.086	1	.333**	.230*
	Sig. (2-tailed)	.388		.001	.020
	N	102	102	102	102
MTH has led to increased production	Pearson Correlation	.164	.333**	1	.044
	Sig. (2-tailed)	.099	.001		.661
	N	102	102	102	102
MTH has led to improve living standards of employees	Pearson Correlation	.088	.230*	.044	1
	Sig. (2-tailed)	.381	.020	.661	
	N	102	102	102	102

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

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

Source; Field data may 2014

Implementation of Mechanical Tea Harvesters has a positive relationship on the reduction of labour cost with r-value of 0.333. This is evident from the managers interview that one machine perform a duty of 30 people per day with production of 600kgs translating to 200kg per worker per day, compared to hand plucking that results in 34kgs per worker. So in the long run, the use of machine is more effective than manual harvesting of tea [Figure 4.2.6].

Figure 1: Photograph showing Manual Harvesting of Tea



The man in figure 1 above plucks tea manually and the maximum he can harvest is 33kg per day compared to 200kg that can be harvested by machine per day. The results are in harmony with what Forester [1988] said that machines are replacing paper work, improving productivity, customer service and job satisfaction. He also stated that technology automates jobs thereby rendering the former job occupants jobless.

Implementation of Mechanical Tea Harvesters has led to increased production with r-value of 0.333. The main reason for introducing machines in tea estates was to reduce labour cost and increase production. Increase in production has been obtained through increased number of kilos harvested per day. An increase of 166kgs per employee is recorded daily and this shows that there is improved production of tea leaves in tea estates.

Implementation of Mechanical Tea Harvesters has a positive relationship on living standards of employees as shown by $r = 0.23$. The use of machines has led to improved earnings due to high production per employee. According to them, before the introduction of MTH machines one employee targeted an average of 34kgs per day but after the introduction of machines, one employee harvests up to an average of 200kgs per day. This means that their wages and salaries improved and can afford to live a better life because of high earnings resulting from increased number of kilograms harvested per day.

Mechanical Tea Harvesters have led to improved skills were not significant as per the analysis. This could be because tea harvesting is more of manual work than reasoning. But according to the managers, all the employees must undergo training before using the machines. They are taken through induction workshops on the basic use of the machines. They are trained on simple operations especially maintenance and precautions when using the machines.

Sagimo [2002] emphasized that training is a continuous process right from the initial induction at entry, through education and training in specific skills, to the security of maximum effectiveness in managerial and senior administrative position. Sagimo stresses the need for training employees at all levels. Other effects of Mechanical Tea Harvesters given by the employees include the following; High number said that implementation of MTH has led to loss of jobs opportunities among many people. Interview from the managers also supported this in that when implementation of MTH was done, employment was freezed and employees who were not using machines were deployed to new farms.

High number of employees also responded that implementation of MTH machines has led to health hazards to them. This is evidence by the manager responses during interview that the machines are too heavy (34kg) they produce a lot of smoke and they are noisy and that some employees cut their fingers if they do not carefully handle the machines. These make the employees to retire early or ask for sick off frequently.

Analysis of Manager's Responses on the Effects of MTH on the Employees

The manager revealed that the introduction of MTH led to improved living standards to the employees. He explained that;

For those who are using the machines, they feel more special than the rest. They are provided with personal protective equipments such as gumboots, water proof suit, gloves, earmuffs, shoe polishes and soaps. They are taken for medical examination regularly and are also given a bonus of ksh 25 each on attainment of maximum target of 600kg and any extra kilogrammes is paid kshs 1.38 per kilogram on top.

All the machines operators must undergo quarterly in-service training and there is a specialist training for new employees every year. This has led to improved skills and expertise in the employees on the use of MTH. They are also provided with lunch. The use of machines led to high productivity of plucked leaves hence high returns or salaries for the employees. There is also a tractor that collects the plucked leaves from the farm as opposed to hand plucking where the workers have to carry the leaves to the leave shelter.

However the managers revealed that the machines have some negative effects on the operators. They pointed out that;

.....Minor accidents like fingers being cut by machines when they are mishandle,

Inhalation of smoke produced by the machines as they are driven by petrol, coldness during rainy season and night plucking. The machines are too noisy which may cause hearing problems, they are too heavy (34kg) and that most of the operators complain of being weak after work.

In most estates, the operators were positive on the implementation of the MTH because it has led to high individual production hence high wages unlike manual plucking. The perception that the tea pluckers are unskilled has been demystified because most of them are from four leavers.

Conclusion

The introduction of the new technology, MTH, in some tea organizations has improved productivity. Training of the employees on the use of machines and maintenance has led to improved skills and expertise knowledge. Sagimo[2002] emphasized that training is a continuous process, right from the initial induction at entry, through education and training in specific skills, to the security of maximum effectiveness in managerial and senior

administrative position. The employees are motivated because they are provided with incentives such as lunch, gumboots, water proof suit and soaps. They also feel recognized because they do not transport the plucked leaves but instead there is a tractor that goes round to collect the plucked leaves.

However, resistant from a number of employees and trade unions are against the replacement of workers by the machines. Other challenges that the workers have encountered include minor accidents on fingers, inhalation of smoke, hearing problems caused by noisy machines and that the machines are heavy. Human being resist change because of fear of security of the job, thus there is a need to educate workers on the alternative opportunities as the use of modern technology is unavoidable.

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