IOSR Journal of Business and Management (IOSR-JBM)
e-ISSN: 2278-487X, p-ISSN: 2319-7668. Volume 21, Issue 1. Ver. I (January. 2019), PP 36-55
www.iosrjournals.org

The influence of Knowledge Application on Sustainability of Sugar Companies in Kenya

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Abstract: *The Kenyan sugar companies, as many other companies globally, since 1959 have utilized Knowledge Management Practices (KMPs') to dynamically change knowledge so as to improve their growth and sustainability; however, they have realized disappointing outcomes because their progress continuously decline and the companies plummet under debt burden. As majority of the firms downsize on the number of their employees, others appear on privatization lists since they are on the verge of collapse; in the period when local demand for sugar is constantly higher and unmatched with the production level. This has instigated the upsurge of imports of sugar from 4000 metric tonnes in 1984 to 249,336 in 2001. Researches have been done on KMPs' with intention to slot in progress in operations, but few have completely deemed the influence of knowledge Application on sustainability of organizations, especially in the Kenyan sugar subsector. The purpose of the research was to determine the influence of Knowledge application on sustainability of sugar companies in Kenya. The study used null hypotheses to test the objective. A sample of 250 respondents was studied using descriptive survey. Both descriptive and inferential statistics were applied in the analysis of data. The report of this study is expected to bring improvement in the growth and sustainability of the companies, as well as supplementing of existing literature for reference by future researchers. The descriptive analysis revealed that Application of knowledge impact on sustainability of Sugar companies in Kenya, evident from the high mean score=3.43 and standard deviation=1.24). The study reveals from its inferential analysis Table 4.16 that Knowledge application registers r=.542 and a p-value of .000 at 95% confidence interval indicating a strong positive correlation and ANOVA Table 4.7 showing [F (1, 248) = 103.423, p < .05)] further confirms that it is a significant predictor of sustainability of Sugar companies. Based on the results, the study concludes that the government should remove the administrative logjams in the approval of the companies' diversification programs to fast track knowledge application by inspiring sugar companies into creativity and innovation; the management of sugar companies to instigate KMPs' that permit group discovery and novelty by setting up of cooperative culture and implementing group-oriented reward system. The study recommends that the companies should implement knowledge management reward based system to inspire knowledge utilization in influencing growth and sustainability of sugar companies in Kenya.*

Key words*: Knowledge Management Practices, Sustainability*

Date of Submission: 26-12-2018 Date of acceptance: 11-01-2019

I. Introduction

Efficient Knowledge Management Practices (KMPs') such as creation, sharing, attainment and implementation of knowledge are indispensable in the functioning and sustainability of any organization across the world.

1.1: Global perspective

America, just like the rest of the whole world, was radically transformed at the close of the 20th century by capitulating to the needs of the period of knowledge, alongside the rise of industrialization. Their growth relied on the contemporary knowledge economy- the degree of imparting of knowledge (PPI, 2008). It is a key aspect in economic, social as well as the ecological aspects (Wagner, 2005) alongside the customs of a company that affect an organization's competitive advantage, hence its sustainability.

In developed and developing countries such as Italy, Pakistan and Malaysia, the study of KM conducted amid international and medicinal companies indicated that it was connected with enhanced performance (Rizwan and Mohamud, 2012). Other isolated studies such as Susan & Kasim (2010) on significant

role of KMPs' on organizational performance revealed that that the processes are important determinants of organizational performance.

Mills & Smith (2011) also in examining the effect of KM Processes (structures and acquisition) in their study also revealed direct relationship to organizational performance. Dingsoryr (2002) conducted studies in Norway, and revealed that KMPs' are able to shape performance as well as growth. Knowledge management should therefore help corporate management to cut down on organization layers, increase flexibility of enterprise and contribute to sharing infrastructure (Huosong Xia, Kuanqu, Du and Shuquin, Cui, 2003).

In their study of KMPs' from the perspectives of organizational capability, Gold et al., found that KMPs' are vital drivers to organizational effectiveness, while Lee and Choi, (2000) in their study that examined correlation between KMPs'(sharing) and organizational creativity, concluded that sharing are significant predictors for organizational innovation which is a basis for organizational growth and performance.

1.2: Regional perspective

In Nigeria, IFAD (2007) pointed out that KM became one of the key deliverables for corporate actions that enhanced organizations dramatic transformations in agriculture and industry, and served as a means of alleviating poverty amongst the poor Rural Nigerians.

This means that Knowledge enables man to develop flexible behaviour in understanding and adjusting to the world around him as well as transforming it to suit his needs and that it is capable of helping humans become subjects rather than objects of change (Scaruffi, 2003).

According to Prusack & Leissers, (2010) and Ahmed *et al* (2002) adoption of prudent KM based competencies in firms human capital should lead to companies' efficient utilization of resources, reduction of wastages, improved competitive edge, wider market share, profitability which are elements of growth and sustainability. In China, Egypt, India and Mesopotamia, KMP (knowledge acquisition) made it possible for people to make better their environment, adapted to it and lessened its effect on their civilization (Jean, 2010). Knowledge management practices (KMPs') which this study focused includes knowledge sharing in addition to challenges faced by organizations in implementing KMP as intervening variables.

1.3: Historical perspective Sugar Companies in Kenya

The institutionalization of sugar industry in Kenya was a result of the Asian efforts in 1902, which led to the growth of sugarcane, a kind of crop that was previously dominantly grown by white settlers, to be for both domestic use and for export (Migot-Addhola, 1984); Odada, (1986**).** Mumias was the first industry to be established, in the year 1922, in Kisumu. The second to be established was Ramisi (currently known as Kwale International Sugar Company limited (KISCOL)) situated at the Coast, in 1927 (Wanyande, 2001). Others were also set up, which were owned by the state, which include Muhoroni (1966), Mumias (1973), Chemelil (1968), Nzoia in 1978 and South Nyanza Sugar Company (SONY) in 1979. These were set up under Sessional Paper no. 10 of 1965 with the objectives of quickening the development of the economy, rectifying regional imbalance, establishing opportunities for jobs and employment, fostering indigenous entrepreneurship and promotion of foreign investments (Odek et al., 2003)

Afterwards, more sugar companies that were privately owned sprang up, such as the West Kenya (Kabras) in 1981, Butali in 2004, Soin Sugar Company in Kericho (2006), Transmara in 2007, Sukari companies Ltd in 2009 and Kibos Sugar and Allied Companies in Kisumu. So as to accomplish the aforementioned goals, sugar industry growth became a political matter; hence sugar became a political product (Odek et al., 2003). The national assembly agreed to offer monetary and technical support to the industry in 1965 so as to smoothen the accomplishment of the government's agendas, making sugar be further considered as both a strategic and political commodity.

The companies span across the whole country, covering the Western Kenya, Rift Valley and Coastal regions; in places which lie along similar conditions in land geometry, altitudes of 1600m above the sea level, hot climate with a range in temperature of 21℃ to 27℃, with a consistent and dependable rainfall pattern of a minimum of 1270mm per year, and a rich geographical topography of deep and well drained alkaline soils having a pH of 4.8 to 8.5 which promotes growing of sugar cane.

The government, as well as other important stakeholders such as the Kenya Sugar Board (KSB), Sugar Development Authority (SDA) and other consulting organizations also aided the sugar sector, founded via the 1966 Parastatal Act of Parliament with monetary and physical services so as to improve their performance and realize maintainable growth. The government moreover, in 2003, established a unit to tackle the Crisis 1 that faced the sugar industry, which made proposals that set in motion further support in finance for companies that were upgrading.

With the carrying out of amends in the structure of the team players and contribution of other stakeholders in the industry including the KSB, and the SDA, the government foresaw a fast thriving of the

companies, to indicate the starting of development of subsidiary companies in Kenya, offer more job starting opportunities,maintain the local sugar demand, so as to meet the country's portion of allocation of export.

In spite of all this, sugar companies' continual achievement falls below what the public expects. The state of the country plummeted as demands by locals exceeded the level of production, which led to amount of imports of sugar rise for 4000 tonnes 249,336 tonnes, between 1984 and 2001. The sugar was imported from the COMESA region alongside other countries producing sugar: Brazil, UK and Mexico (KSB, 2007). This condition forced them to have more attention and debate in the Kenyan parliament (Wanyande, 2010) since the drop in the level of production closed Kenya's dream of realizing sustainability and sustainability in the sugar industry; and some of the factories were taken for receivership: Muhoroni and Miwani.

1.2: Statement of the Problem

Knowledge is considered to be the core of the global economy (Carbaugh, 2007), and efficient Knowledge Management Practices (KMPs') more so application of knowledge by organizations is important in their sustainability in the world (Acier, 2006). For over sixty years since it was introduced in management in 1959 (Drucker, 1959; Kellogg, 1986), Sugar companies have shared knowledge resources in individuals as well as in groups to improve their performance and sustainability, only to continually have dwindling outcomes. They have continued to realize poor performance, and a company such as Muhoroni, in 2010, placed under partial receivership; and Miwani in full receivership. The remaining companies such as Nzoia, Chemelil and Sony have continued to suffer under dismal performance thus bringing them under keen attention and debate in the Parliament of Kenya (Wanyande, 2010) and were shortlisted for privatisation.

The situation of the country worsens, with no reduction of the deficit of 200,000 metric tonnes as local demands continue to surpass the rate of production; causing quantities of sugar import rise from 4000 tonnes in 1984 to 249,336 tonnes in 2001 from COMESA and non-COMESA region sugar producing countries which include Brazil, UK, Mauritius and Mexico (Odek, 2003; KSB, 2007). To date, the companies have not generated adequate surplus, both for its local and export needs, nor have they instigated their plans on continued growth approaches; instead they are retrenching their employees in the industry, due to burdens of debt and financial constraints (KSB, 2005; KSB, 2010).

The country continues to witness inadequate performance in the production of sugar with a distressing loss of foreign exchange on increased imports of sugar, loss of employment to workers and cutback of industrialization schemes that may otherwise influence growth and sustainability of the industry.

The country's hopes therefore hang in disequilibrium considering that its poor performance is weakening its dreams for probable growth and sustainability. Whereas researches done in Italy, Pakistan and Malaysia, amid international and pharmaceutical companies reveal that there was a relationship between KMPs' and improved performance (Rizwan & Mohamud, 2012), others conducted in Norway by Dingsoryr (2002) likewise reveal that KMPs' has the ability to effect performance and growth.

The question of sustainability consistently remains unanswered; as these investigations did not conversely show that KMPs' application could as well lead to sustainability of an organization. Specifically, these investigations were conducted on international and pharmaceutical companies; and little study appear to have been conducted in the Kenyan sugar companies concentrating on the relationship between Application of Knowledge and sustainability of the companies. It is upon these claims that this study is set to objectively explore the influence of Knowledge Application on sustainability of the Kenyan Sugar companies', using descriptive survey.

1.3: Specific Objective of the study

To establish influence of Knowledge application on sustainability of sugar companies in Kenya.

1.4: Research Hypothesis

H03: Knowledge application has no statistical significant influence on sugar companies' sustainability in Kenya.

1.5: Significance of the Study.

The County governments embrace suggestions by the study to allocate funds so as to advance human capital resources in the sugar companies, to realize the aims which led to their establishment in 1966 and the economy's sustained growth in production of sugar. This study's report is anticipated to upsurge supply of valuable literature for reference by researchers who may in future, venture into studies in correlated field.

Lastly, it is also visualised that research will provide Management of sugar corporations with helpful knowledge management-based practices and learning principles which could well be implemented in addition to physical and touchable capital resources to nurture collaboration for improved performance, growth and sustainability of the industry.

II. Literature Review

2.1: Theoretical Review

Two theories that are associated to this study include the Human capital theory and intellectual capital theory.

2.1.1: Human Capital Theory

Human capital means knowledge, skills and capability of individual employees that permits their provisions of solution to customers (Tapsell, 1998). The theory was coined by an American economist, Theodore W. Schultz in 1960. The theory was reviewed in the study of intellectual capital by the Economics Institute of Washington DC, that broadens its worth beyond an institution or a firm to the nations that "the economic value of the nation depends more on its knowledge assets and problem aptitude than it does upon the market value of the firms commercial output" (Di Steffano and Kalbaugh, 1999). It states that an institutional growth is dependent on an aggregate knowledge and skills in its workforce. It is relevant to this study because it points out that for an institution to grow and sustain its structures, wealth and people, it must invest heavily in its human capital and continue to improve on it by sound KMPs' practices.

Grant (1991) also argues from resource based point of view that the source of a firm's competitive advantage lies in its human capital and their knowledge and not how it positions itself in the market. Schultz and Grant's perspectives are unrealistic because the firms' aggregate knowledge assets and its position in the market are complementary and vital to its performance, economic, ecological and social sustainability.

2.1.2: Intellectual Capital theory

According to Dzinkowski (2000) Intellectual Capital Theory (ICT) describes a stock of capital knowledge based equity which a company possesses that may be end result of Knowledge transformation process or knowledge itself that is capable of transforming into intellectual property of the firm. Intellectual capital thus may be broken down into three areas, human capital, structural capital and customer capital. Human capital is comprised of knowhow, competence, skills and capability of human members of the firm. Structural capital is comprised of the capability that is developed to meet market requirements such as patents and trademarks, process improvements methodologies to improve effectiveness and profitability of the firm while Customer capital on the other hand includes communication between external and internal entities of the organization such as customer loyalty, good will and stakeholder's relationships.

According to Edvison & Malome (1997), the above three variable capital components correlate to deliver value to customers making organizations to cut competitive edge and built value platform that makes it sustainable.

The value platform may be illustrated as follows:

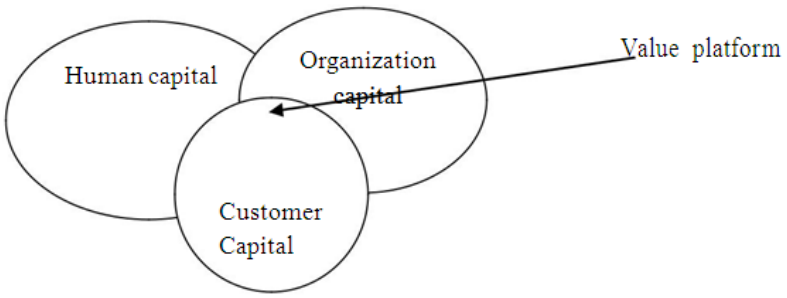

Figure 2.2: Value Platform Model
Edvison and Malome (1997).

Value platform articulates that the intersection of the three capitals, creates value that is fundamental to corporate sustainability. From the forgoing theory, it's worth noting that the benefits of investing in KMPs' are intuitive and should be authentic to proactive managers that are attempting to compete in the 21st century and beyond to realize that KMPs' (knowledge application) is fundamental since it brings benefits to individuals, organizations and Community of practice.

For individual Employees, KMPs' helps workers in enhancing their job performance, saving of time through better decision making and problem solving, enable individual workers build a sense of community bond within the organization. Knowledge acquisition helps to keep employees professionally relevant and up to date and provide employees with challenges and opportunities.

Ovaska et al (2009) asserts that for Community of Practice, the sharing of companies' knowledge assets serves as a foundation for collaboration which is significant in developing professional skills, promoting peer to peer mentoring through knowledge strategy, facilitates effective networking, collaboration and development of a corporate culture.

According to KPMG (2000) for Organizations, embracing appropriate KMPs' helps to drive strategies helps not only in enhancing problem solving, diffusing desirable corporate culture and best practices but also improving product and service quality. KMPs' (Knowledge creation, sharing, application and conversion) may help organizations in innovation, improving customer service and commercialisation of new products. While Knowledge sharing facilitates cross fertilization of ideas, application and conversion increases innovation which is fundamental in corporate sustainability.

Importantly, the theory is also relevant in that it provides insight that knowledge application in particular is key KMPs' besides creation, sharing and conversion in improving on organizations' responses to market challenges (KPMG, 2000; Taminian, Smit & Delanse, 2009), the attainment of customer capital enables it to remain competitiveness and drives it towards sustainable goal.

The relevance of ICT theory also lies in its recognition to sum of firms' knowledge which is a key factor in production. The theory also considers Customer capital which is an important element of performance and sustainability. Capturing Customer capital also involves reaching the community through corporate social responsibility which also contributes to social sustainability. Therefore for an organization to achieve sustainability, it has also to direct its KMPs' towards society through social responsibilities and improving its environment controls. According to Edvison and Malome (1997), if a firm which does not have efficient KMPs' will not position itself to the market, will lack competitiveness, compromise its survivability.

2.1.3: Conceptual framework

Fig.2.2 is an illustration of a conceptual framework that shows the relationship between Knowledge application as independent variable and Organization Sustainability on the other hand as dependent variable.

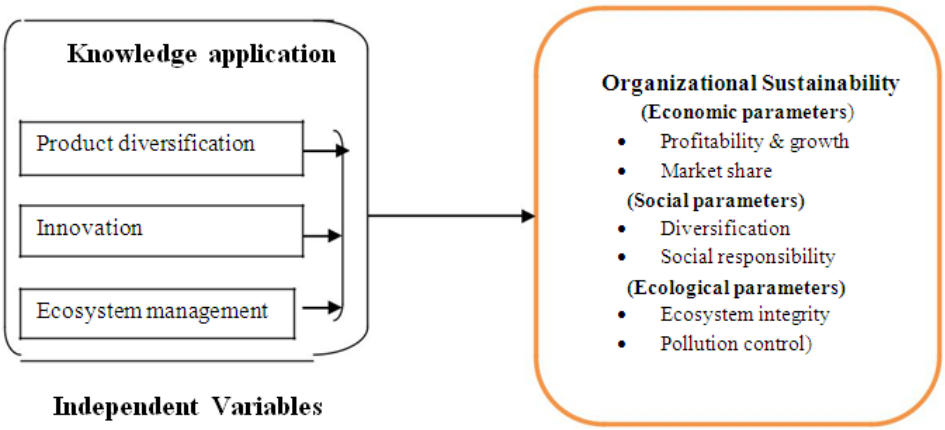

Figure 2. 2: Conceptual Framework

The framework has been developed from the suggestions of Islam & Clerke (2005), Sharma & Buud (2003) and Guest (2010) and blended by suggestions of Fugate *et al*.,(2009), Cho *et al.*, (2008) and Verfaille & Bidwell (2000) which measures sustainability against Triple Bottom Line (TBL) parameters such as economic, Social and ecological factors as illustrated by the diagram.

2.2: Knowledge Application

Knowledge application influences organizational sustainability through product diversification, product innovation and ecosystem management.

2.2.1: Product diversification

Knowledge application is a process by which firms transform knowledge into new products and services (Wilson, 2007). It is the practical use of knowledge into new products, context or situations that centre on organizations' products, processes and services (Bhatt, 2001; Tiwana, 2003). Knowledge application thus provides the firm with product benefits in which it direct costs and savings, reduce wastages and increase sales.

Tussler, (1998) and Ulrich, (1998) also confirm that a firm's competitive advantage directly depends on their capability to gather and use knowledge resources effectively.

These scholars concur on the arguments that it's a firms' knowledge other than its physical assets and financial resources that is key to its competitiveness from which sustainability is scaffold. Markus (2001) also suggests that sources of competitive advantage reside not in knowledge itself but in the application of knowledge.

Application of knowledge may therefore give an organization strategic benefits and necessitate customer repeat buying behaviour, attraction of new customers and as well increasing its market share (Robinson et al .,2004). Since trade liberalization emerged as an important issue, markets have been opened equally to small and large scale sectors and non- responsive firms to changes in knowledge risk being faced out of production. Wajaktrakal, (2005) also argued that firms can achieve monopolistic and oligopolistic advantages to make them competitive and sustainable by developing and applying their knowledge capabilities effectively.

2.2.2: Innovation

According to Tan et al., (2003) Knowledge Application should help a firm to innovate new products and services which (Lew & Sinkorics, 2012) further argued would give such firms competitive advantage. This is what Blake (1998) had reasoned that knowledge management through efficient application mechanisms would enable an organization to capture its collective expertise and disseminate it to whenever it could achieve the biggest payoffs. Li & Tsai, (2009) on the other hand assert that efficient use of knowledge should help a firm to innovate products of unique characteristics that are difficult to imitate by other firms in order to achieve competitive advantage.

Other scholars such as Rios- Morales & Brenman, (2009) also believed that innovation is an indirect outcome of knowledge application that can support competitive advantage. According to Plessis, (2007) Huang & Li, (2009) innovation has profound effect on organizations' performance, survival and competitiveness.

Yet innovativeness is not possible without efficient knowledge application. The research conducted in a manufacturing industry in Croatia suggests that knowledge management positively affect organizational outcomes of a company's innovation, product improvement and employees' improvement (Kiessling *et al*., 2009). Erickson & Rothberg, (2009) also pointed out that when firms apply their knowledge efficiently in their production processes, they will emerge superior and achieve competitive advantage. This implies that organizational sustainability may be difficult to achieve without efficient knowledge application.

While Zack *et al*., (2009) confirms that the study of KM influences various aspects of organizations economic performance, Westerberg (2008) adds that organizations engaged in innovation and exploration as a result of efficient management of its' Knowledge resources perform better. Henderson, (2011) on the other hand further posits that firms can adopt KM practices of their physical and intangible assets to achieve sustainable development within the context of their competitive advantage.

On the other hand Ming Yu, 2000; Syed-Ikhsan & Ranland, 2004, suggested that adoption and implementation of KM practices in capturing, sharing best practices, delivering competitive intelligence and managing customer relationship are fundamental in managing an organizations competitive environment.

2.2.3: Ecosystem management

DETR (2000) posits that organizational sustainability is also dependent on efficient use of knowledge assets to protect the environment, prudent use of available natural resources and maintaining high and stable level of economic growth and employment. Kim (2011) in his study of effect of KM on performance of public organizations in Virginias' 23 local CPS Departments in an online survey failed to acknowledge that Knowledge sharing had any crucial role in influencing performance of CPS programs. His argument was contradicted by Radwan *et al*., (2012) in their study of knowledge adoption and performance amongst 13 pharmaceutical firms in Jordan using survey which found that there was positive relationship between (communication) knowledge sharing and performance in influencing product innovation and profitability.

2.2.3: Sustainability

According to Bruntland Commission of 1987, WCED,(1987) World Bank,(2005), Kuckartz &Wagner,(2010) Sustainability means "meeting the demands of the present society without compromising ability of future generations to satisfy their own needs by responding to current economic and social environmental challenges". The purpose of sustainability is to improve economic environment and social performance of companies (Bos Brouwers, 2010) to enhance their survivability and make them self-supporting. A sustainable company is one that offers product and services that fulfil the societal needs while considering its ecological, social and economic impacts on earths' inhabitants and without compromising the needs of its future generations (Azapagic & Perdan,2000; Welford, 2000).

DETR, (2000) further argued that sustainability is all about ensuring better quality life for every one now and for generations to come through social progress while meeting people's needs, protecting environment, ensuring prudent use of natural resources and maintaining stable economic growth and empowerment.

Roy, (2003) argued that the essence of sustainable development is determined by the people and is attributed to changes of people's attitudes and habits. According to Hennicke, (2000) organisational sustainability could be measured using economic, social and ecological parameters the achievement which anchors on firms prudent KMP and a country's political good will.

The bottom line of sustainable development is to develop capacity to help the poor to maintain and improve their natural capital (natural resources) while developing their human capital (human resources) and manmade capital (investment infrastructure, social capital, cultural bases and political systems) that makes society function, (Cellisr & Jean- Louis, 2004). Precisely sustainability issues are focussed on making organizations self reliant in their social, economic and ecological growth and developments.

III. Methodology

3.1: Research Design

Design is a scheme or plan that is used to conduct the study to generate answers to research questions (Noum, 2007; Orodho, 2003). Design is often chosen and used in research process to provide a basis upon which the study is configured and in which all aspects of research are linked to provide meaning (Kothari, 2008; Laurel, 2011). This study used descriptive survey design to collect data from all the functional state owned sugar companies in Kenya. The relevance of research design is to provide direction of what methodology is to be used to collect and analyze data to answer research questions.

The choice of descriptive survey for this study was based on its suitability in an extensive study of this kind and its economy of time and cost in research process (Osoo & Onen, 2005). According to Machenzie & Knippe (2006) descriptive survey leads to application of qualitative and quantitative methods hence the use of descriptive as well as inferential statistics which involved the testing of hypotheses. In the exercise, questionnaires, interview guides were employed to collect, analyse and interpret the state of affairs/ provide answers to research problems.

3.2: Population and Sample of Study

This study targeted a population of 1200 managerial employees of all the operational state owned sugar companies in Kenya. A target population for the study is what Sekaran & Bougie (2010) defined as the entire group of people, events or things with common observable characteristic that researcher is interested in and wishes to investigate.

From this, a sample of 300 respondents was arrived at using Yamane's (1967) formulae at 95 % level of confidence with 5.0 margin of error as given by;

$$n = \frac{N}{1 + N\,(e)^2}$$

Where: N - population sample; n - sample size; e - level of precision (confidence)

This obtained Sample size translates to 25%of the population, which was considered representative and adequate to minimize the likely error in generalizing findings of the study, since it is over 10% (Saunders et al., 2005).

The sample was distributed as below:

Table 3.**2: Population Sample, Managerial Staff and Sample Size distribution**

Sugar Companies	Sample Population	Managerial Sample	StaffSize(n)
Mumias	1860	300	60
Sony	1700	280	60
Muhoroni*	800	180	60
Nzoia	1685	270	60
Chemelil	795	180	60
Miwani **	-	--	
Total	**6840**	**1200**	**300**
Source: Companies HR Depts., (2016)			
* Partial receivership	** Full receivership.		

3.3: Sampling Technique

The study adopted purposive sampling technique which made it focus on respondents with reliable experience especially at the company who meets the purposes of the study. This sampling technique has also been chosen because its cost and time saving to use in gathering data (Oso & Onen, 2005). According to Mugenda & Mugenda (2003) and Kumar (2011) sampling is a process of selecting a few respondents (sample) from a bigger group (sampling population) to become the basis of estimating or predicting the prevalence of unknown piece of information situation or outcome regarding a larger population in the study. Purposive technique is relevant and popular with studies that sought information from specific individuals (Kinoti (2009)), the reason choice of these techniques of sampling were made.

3.4: Data Collection Instruments.

This study developed and used structured (Open-ended) and semi-structured questionnaire (Closed-ended) as well as Interview Schedule which were self-administered. Structured questionnaires restricted respondents to hypothetical views of the researcher and were styled using a 5- likert scale.

The study used both primary and secondary techniques to collect data. Semi structured (closed ended) questionnaires were used in the study because of their suitability in encouraging clientele responses (Pettit and Frances, 2000).

Open and closed ended questionnaires were constructed and administered with the assistance of "collectors" to a sample of respondents who aided in soliciting of primary data, (Orodho, 2003). Significantly the choice of questionnaires was based on the fact that they required little time, low cost of training for research assistants to administer and less cost of administration generally (Vinten, 1995). They were also suitable for this study since they were easy to analyse, probed interviewee's independent views, gave respondents freedom, spontaneity of answers and eased the testing of hypotheses (Vinten,1995). According to Onderi and Makori (2012) these instruments derive their significance also in diversifying responses and reducing clienteles' question fatigue.

Interview schedule comprised of semi structured interview questions were also used to interview 20 managers from the companies. This was in line with Mason (2010) who acknowledges that a sample of between 10-20 respondents is ideal for qualitative interview. Easterby- smith *et al*., (2002) posited that interview schedule makes it easy to comprehend constructs used by interviewees as a basis for their opinion and beliefs on issues. Interview guide was appropriate for this study since it enabled he researcher to check against ambiguity and inadequacy in the main instrument (Igwe, 2005).

3.6: Data Collection Procedure

Both categories of data, primary and secondary were collected for the study. The primary data were collected through the administration of questionnaires and interview guide. In administering the instruments, the researcher ensured compliance to ethical principles requiring keeping the identity of respondents in anonymity and putting to use gathered data to its predetermined academic purpose (Gatara, 2010; Hoyle *et al.*, 2002). He also ensured that he received letter of permission to conduct research form NACOSTI. Guided by the same principles, the researcher ensured that he received informed consent of the respondents after providing them with the pertinent information about the study and in particular, its purpose. The researcher also ensured that respondents participated freely in the study without coercion and were made free from any physical and mental injuries as their rights and dignity were respected (Hennik *et al.*, 2001).

3.7: Pilot Study

Pilot study made it possible for the researcher to pre-test the instruments to ensure that they were suitable so that they justify the claims on what they were able to measure (Saunders *et al.*, 2008). It also enables the researcher to re-align the instruments to study objectives so that their outcome could answer the research questions.

Mugenda and Mugenda (2005) also portend that a pilot study is a small scale preliminary study conducted in order to evaluate feasibility in an attempt to improve upon the study design prior to performance of a full scale one. Consequently, this study will ensure reliability and validity of the instruments as follows;

3.7.1: Reliability

According to Kerlinger (1986), reliability is the absence of errors of measurement or the accuracy of measuring instrument. To ensure reliability, the instruments were pilot tested and re-tested (test re-test method) and measure of internal consistency of the items in each sub-scales of the questionnaire were used and these permitted necessary modifications on the instruments. The correlation between scores on the identical tests given at different times operationally defines its test-retest reliability (Oso and Onen, 2005).

Using the test-retest method, questionnaires were self-administered to the same group at two time intervals of a period of one month and correlation between scores were computed using Pearson's Product

Moment formula;

$$r = \frac{N\sum xy - (\sum x)(\sum y)}{\sqrt{\{N\sum x^2 - (\sum x)^2\}\{N(\sum y^2) - (\sum y)^2\}}}$$

Where;

N is number of respondents; x is test 1; y is test 2 and ∑ is summation.

The correlation value which was computed between the scores at the two different times gave r-coefficient value 0.811 which according to Orodho (2008) and Field (2009) is considered high enough to authenticate the instruments' reliability and suitability. This is contained in Table 3.2 below.

3.7.2: Internal Consistence of the Items

Internal consistency concerns the reliability of the test components; For a test to be internally consistent, estimates of reliability were based on the average inter-correlations among all the single items within a test (Kumar, 2011). To ensure this, Cronbach's alpha (α) using SPSS coefficient was used in this study.

Table 3.2 Internal Consistence: Cronbach's Alpha Results for the Questionnaire

Scale	No. Items	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items
Knowledge Application	7	.778	.719
Sustainability of Sugar Companies	5	.730	.643

Table 3.2 show that the internal consistent for all the subscales in the questionnaire were adequate enough for the study. For example, the subscale knowledge sharing which consisted of 8 items had the highest Cronbach's Alpha (α) =.765. According to Orodho (2008), Cronbach's Alpha coefficient of value > 0.7 is of adequate internal consistency. Therefore, these findings show that the questionnaires were generally suitable for data collection; because they adequately measured the constructs for which they were intended to measure.

3.7.3: Validity

This is the extent to which the instruments are expected to measure the content, probe issues and produce results they are expected to generate. To justify validity of the instruments the researcher re-examined the questionnaires and removed ambiguities so that questions were realigned to the objectives of the study.

This study also applied Content Validity Index (CVI) formula to measure and determine validity of the instruments.

$$CVI = \overline{\quad\quad}$$

Where; NrV - Number of questions rated as relevant.

TniQ - Total number of the items in the questionnaire.

Using Content Validity Index (CVI) formula the numbers of questions rated as relevant were divided by the total number of items in the questionnaire and this gave a CVI of .811. Since the CVI was (above)

> 0.7 which is the acceptable minimal threshold adequate validity according to Hair *et al.,* (1998), it was concluded that the instruments were of adequate validity levels.

3.5: Data Processing and Analysis

This study used both quantitative and qualitative approaches involving both descriptive and inferential statistics in analysing data. These involved the philosophical orientation that identified linkages between independent (IV) and the dependent variables (DV) which accordingly entailed interpretation of data and formulation of explanations of facts using inductive reasoning (Cooper & Schindler, 2003; Kothari, 2008).

Pearson's Coefficient correlation technique was used in the analysis due to its ability to test the hypotheses on the nature of influence of independent variable on dependent variable (Cooper & Schindler, 2003; Kothari, 2008). The primary data that were collected were coded to ease the analysis (Mugenda & Mugenda, 2003).

Finally the intervening variables were also regressed on independent variables to determine the moderating effects on them (Aiken & West, 1991). The regression Analysis was used due to its ability to test the nature of influence of independent variable on dependent variable (Cooper & Schindler, 2003; Kothari, 2008).

The following regression model was thus developed and adopted to regress dependent variables against the independent variables, intervening variables against independent variables (Baron & Kenny,1986) to determine their effect on dependent variable and hence make prediction on the future of the organization.

The following model was thus used to analyze the above objective

Model 1:

It is a regression of the dependent variable and the independent variables

$Pj = a + \beta\ 1X1ij + e$..... (1)

Where: P = Organizational Sustainability j

X = KMPs' measured by (KAj; KSj KAppj and ICj) in which KAj = Knowledge acquisition j

KSJ = Knowledge sharing j

KAppj = Knowledge application j

ICj = KMPs' implementation

i and j represent the variables and organizations respectively e = error term

β 1 = regression co-efficient.

IV. Results And Discussion

4.1: Introduction

Questionnaire return rate (QRR) was 83 % was registered. This was considered high enough to guarantee reliability since it was well above 50% (Baibbe, 2002), with only 17 % non-questionnaire return rate (NQRR). This is presented in Table 4.1.

Table 4.1: Summary of	**Rate of Response**		
Respondents	Questionnaires	Questionnaires	Return rate
	administered	returned	(%)
1200	300	250	83.3

Source: Survey data (2016)

Out of 300 questionnaires administered to the employees250 of them were returned for data analysis, which translates to 83.3% response rate. According to Oso and Onen (2011) an acceptable response rate for survey questionnaires administered personally by the researcher is achieved when the questionnaire return rate is at least 80%. This was achieved because the instruments in this study were personally administered by the researcher to the respondents.

4.2.2: Respondents' Gender Distribution

The gender of the respondents was summarized, as in Table 4.2.

Table 4.5: Respondents by gender

Gender	Frequency	Percentage
Male	230	92.0
Female	20	8.0
Total	250	100.0

Source: Survey data (2016)

Table 4.2 indicates that 250 respondents involved in the study were comprised of 230 (92%) males and 20 (8.0%) females.

This implies that there is poor gender representation in the appointments since it does not reflect affirmative action rule which require at least 30% representation of either gender in a public organizations.

4.2.3: Respondents by Age

Table 4.3 shows the age distribution of the managerial employees of the state owned sugar companies in Kenya as represented by the ones who were sampled for the survey.

Table 4.6: Distribution of Age of the Respondents

Age (Years)	Frequency	F (%)	Cumulative %
24-34	75	30.0	30.0
35-45	113	45.2	75.2
46-56	57	22.8	98.0
> 56	5	2.0	100.0
Total	250	100.0	

Source: Survey data (2016)

It is evident from Table 4.3 that a significant proportion, 113 (45.2%), of the employees of the state owned sugar companies in Kenya are in the age group of 35-45. Only 5 (2.0%) and 75 (30.0%) were aged above 56 years and under 35 years, respectively. This implies that majority of the managerial employees are people who are still youthful are amenable to implementation of knowledge management practices that are geared towards achievement of sustainability in the sugar companies.

4.2.4: Respondents Work Experience

Table 4.4 shows the distribution of the managerial employees work experience in terms of years.

Table 4.7: Respondents by work experience in the company

Years	Frequency	F (%)	Cumulative %
0-5	63	25.2	25.2
6-11	75	30.0	55.2
12-17	105	42.0	97.2
>17 years	7	2.8	100.0
Total	250	100.0	

Source: Survey data (2016)

The findings of the study revealed that majority of the managerial staff of the state owned sugar companies are of adequate work experience, as reflected by a proportion 105 (42%) of the employees who took part in the survey who had 12-17 years of work experience.

This means that many of the employees were capable of effectively implementing improvements and quality strategies for the companies' sustainability. Similarly, some 5 (3%) of its workforce had served for over 17 years and may have been retained due to their knowledge that enable them to provide the perquisite technical orientation and induction to the newly (0-5 years) recruited staff constituting 63(25.2%) of the managerial staff.

4.2.5: Respondents' Marital Status

The marital status of the managerial employees the operational state owned sugar companies who sampled for the study was shown in Figure 4.1.

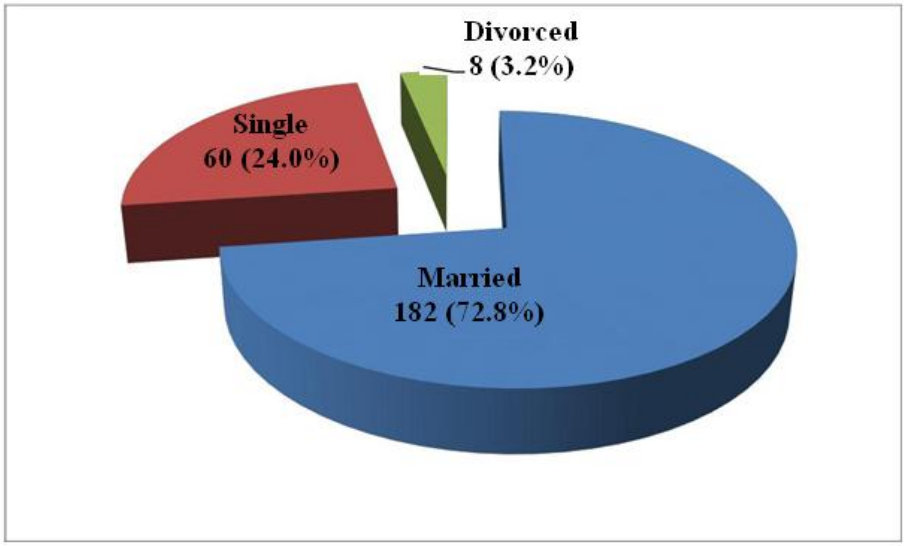

Figure 4.1: Respondents Marital Status

It was revealed by the exploratory data analysis that many 182 (72.8%) of the managerial employees in the sugar companies were married. This could imply that many of the managerial staff were responsible and could be able to demonstrate commitment to the strategic goals of the organizations. Only 60(24%) and 8(3%), who were single and divorced respectively, could suffer job-family role conflicts and psychological stress.

4.2.5: Respondents' Academic Qualification

The summary of respondents' academic qualifications was summarized in Figure 4.2. This information was considered vital for this study because academic qualification is perquisite quality of employees in regard to their capability of implementing KMPs'.

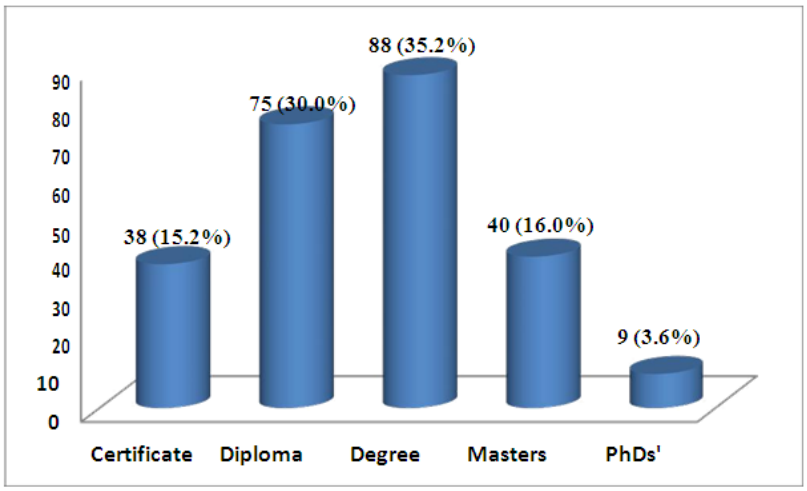

Figure 4.2: Distribution of Respondents' by Qualifications academic.

Figure 4.2 indicates that the sampled managerial employees of the state owned sugar companies were comprised of nearly a fifth 49 (19.6%) who were holders of Masters or PhDs' degrees. Those who held bachelor degrees were 88translating to 35.2% of management team and 75(30 %) held Diploma in academic qualifications. This finding implies that most of the employees had adequate managerial qualification for effective supervisory roles to steer the industry towards effective performance and sustainability. However, it emerged that 38 (15.2%) of the employees only had certificate academic qualifications. The implication of this finding is that the companies ought to develop skills and competencies of their junior managerial staff in sugar technology through scholarship and internship training in world leading sugar producing countries such as Brazil, South Africa and Mauritius.

4.3: The Level of Sustainability of Sugar Companies in Kenya

The study investigated the level of sustainability in sugar companies in Kenya. This was necessary because it was the dependent variable. The managerial employees were presented with five-itemed-Likert-scaled questionnaire whose constructs were based on the indicators of sustainability. The respondents were to rate their level of agreement on the statements from strongly agree to strongly disagree. The indicators of sustainability explored included; improved growth of the industry, product diversification, institutional infrastructure development, withstanding competition and expansion of product market.

The findings are presented and discussed from Table 4.5.

Table 4.5: Descriptive statistics: Sustainability of Sugar Companies (n=250)

Item statement	SA	A	N	D	SD	Mn	Std. Dev.
There has been improved growth of this company over the years as reflected in its ability to assist the community maintain and improve their natural resources.	37 (14.8%)	123 (49.2%)	50 (20.0%)	14 (5.6%)	26 (10.4%)	3.24	0.65
Our company has registered expansion of product market in	44 (17.6%)	106 (42.4%	32 (12.8%	38 (15.2%	30 (12.0%)	3.92	0.95
This company has made tremendous infrastructure	93 (37.2%)	71 (28.4%	6(2.4%)	60(24.0 %)	20 (8.0%)	3.41	1.26
There has been product diversification signifying	58 (23.2%)	100 (40.0%	22 (8.8%)	25 (10.0%	45 (18.0%)	3.74	1.12
The company has made efforts to withstand competition resulting from liberalised	61 (24.4%)	89 (35.6%)	34 (13.6%)	41 (16.4%)	25 (10.0%)	2.87	1.08
Total Average Mean						**3.43**	**0.85**

Key: SA-Strongly Agree, A-Agree, N-Neutral, D-Disagree and SD-Strongly Disagree
Source: Survey data (2016).

From the findings of the study, it is evident that the sugar companies in Kenya have moderate (mean=3.37; standard deviation=0.83) sustainable, with the managerial employees whose views were taken rating indicators of sustainability between 2.87 to 3.92, as shown in Table 4.5

It emerged that nearly two thirds 160 (64.0%) of the respondents accepted that there has been improved growth of their company over the years, which they argue was reflected in their company's ability to assist the community in maintaining and improving their natural resources. This finding of the study concurs with DELTA (2000) who had argued that sustainability is all about guaranteeing quality life through social progress while meeting people's needs, protecting environment, ensuring prudent use of natural resources and maintaining stable economic growth and empowerment. Similarly, 150 (60.0%) of respondents affirmed that their company had registered expansion of product market in the recent years.

In addition to expansion of product markets, the findings of the study established that there has been product diversification in the sugar companies signifying growth of the companies, as indicated by 158 (63.2%) of the employees who took part in the survey. Only 40 (16.0%) of the respondent did not believe that their company had registered any significant improvement.

However, it was established that many of the sugar companies have made efforts to withstand competition resulting from liberalized market.

This was confirmed by 150 (60.0%) of the managerial employees who believed that many of the sugar companies have tried to counter the effects of liberation of the sugar market. These findings are supported by Lu, Wang, Tung & Lin (2010) who believe that firms facing stiff competition ought to increase their value creation processes to attain competitive advantage.

On the contrary, some respondents believed that their company had not acquired adequate level of sustainability. For example, whereas majority of the respondents believe their company enjoy product diversification which signifying growth of the company, 70 (28.0%) of the managers who took part in the survey rejected the assertion that their company enjoy product diversification. On the same note, 69 (26.4%) of the respondents said their company had not made enough efforts to withstand competition occasioned by the liberalization in the sugar industry. In fact, 68 (27.2%) respondents alluded that their company had not registered any expansion of product market in the recent years.

4.6: The Influence of Knowledge Application on Sustainability of Sugar Companies in Kenya.

The third objective of the study was to establish influence of knowledge application on sustainability of sugar companies in Kenya. Seven-itemed Likert scaled questionnaire was used to explore the views of the managerial employees on the influence of knowledge application on sustainability. The respondents' views on various knowledge application indicators were summarized in percentage frequencies and were presented in Table 4.16.

Table 4.16: Descriptive statistics: Knowledge application and Sustainability(n=250)

Item	SA	A	N	D	SD	MeanStd.
Ka1	99(39.6%)	83(33.2%)	16(6.4%)	32(12.8%)	20(8.0%)	3.841.29
Ka2	110(44.0%)	63(25.2%)	16(6.4%)	30(12.0%)	31(12.4%)	3.761.43
Ka3	25(10.0%)	132(52.8%)	25(10.0%)	38(15.2%)	30(12.0%)	3.341.20
Ka4	38(15.2%)	146(58.4%)	15(6.0%)	27(10.8%)	24(9.6%)	3.591.16
Ka5	45(18.0%)	65(26.0%)	10(4.0%)	105(42.0%)	25(10.0%)	3.001.34
Ka6	32(12.8%)	143(57.2%)	25(10.0%)	31(12.4%)	19(7.6%)	3.551.10
Ka7	26(10.4%)	67(26.8%)	24(9.6%)	125(50.0%)	8(3.2%)	2.911.14
		Total Average Mean				**3.431.24**

Key: SA-Strongly Agree, A-Agree, N-Neutral, D-Disagree and SD-Strongly Disagree
Source: Survey data (2016).

Table 4.16 reveals that knowledge application had a high (mean score=3.43 and standard deviation=1.24) influence on sustainability of sugar companies in Kenya, with all the indicators rated high (average mean ranging between 2.91 and 3.84).

The findings of the study established that efficient utilization of knowledge resource in developing new products accounted for high mean=3.84, standard deviation=1.29) of influence in contributing to sustainability of an organization, with a majority of 182 (72.8%) of the managerial employees who took part in the survey confirming that their company's growth are largely attributed to its efficient utilization of Knowledge resources in developing new products.

On the same note, nearly seven out of ten 173 (69.2%) of the respondent agreed that their company recognizes employees' level of knowledge application in product innovation during compensation and some 157 (62.8%) of the respondents also confirmed that they apply knowledge in product designs which has resulted to wider market. With new products and innovations companies enjoys direct benefits of direct cost savings, reduction of wastage and increase in sales.

On the same vein, the findings of the study show that many of the managerial employees agree (mean =3.34; standard deviation=1.20) that for the companies to fetch a wider market, they have to use their knowledge to design, re-design and innovate new products. This finding concurs with Zack *et al.,* (2009) who indicates that efficient knowledge management (application) is capable of influencing various aspects of organizations financial performance.

Knowledge application is capable of influencing the company's profitability and growth, which are prerequisite parameters of sustainability.

This implies that for affirm to perform better it has to engage its knowledge resources in creating products and ideas that are able to give it a competitive edge in the market, generate financial benefits with which it can address social responsibility initiatives such as ecosystem integrity. This finding concurs with Robinson *et al.,* (2004) who indicated that efficient application of knowledge gives an organization it's strategic benefits that necessitates its increased market share. The findings also support Li & Tsai (2009) and Tan *et al.,* (2003) that knowledge application should help a firm to innovate new products which Lew

& Sinkorics (2012) further argued give a firm its competitive advantage. This finding concurs with Tussler

(1998) and Ulrich (1998) who portends that firms' competitive advantage directly depends on their capability to gather and use resources effectively. Similarly, the finding also supports Markus (2001) who indicated that the sources of a firms competitive advantage resides not in knowledge *per se* but in the application of knowledge itself.

It emerged from the findings of the study that knowledge application has recognizable bearing on ecosystem integrity (mean=3.55; standard deviation=1.10). A significant majority of 175 (70.0%) the managerial employees who were sampled for the study asserted that knowledge application is capable of influencing sustainability by enhancing organizations' ecosystem management, as reflected in their company. This finding supports DETR (2000) who pointed out that organization is dependent on its knowledge resources in protecting its environment which is vital for achievement of its stable economic growth and ecosystem integrity, which eventually leads to sustainability of the organization.

As regards companies' infrastructure, the findings of the study show that knowledge application has led to its development, as affirmed by184 (73.6%) of the respondents who held that development of infrastructure is highly dependent on the application of knowledge and skills necessary to infrastructure development.

On the contrary, there was a sharp division of opinions among the sampled employees on whether or not knowledge application has made the company to withstand competition resulting from liberalized market. Whereas, 93 (37.2%) of the respondents agreed that knowledge application made their company to withstand competition resulting from liberalized market, the other 130 respondents translating to 52.0% of the sampled employees negated the claim.

Hence, this finding partly differed with that of Wajaktrakal (2005) which had purported that firms gain monopolistic advantage withstand competition emerging from liberalization through effective application of its knowledge capabilities.

These findings were supported by the personal interviews conducted by the researcher. For example, some of the respondents commented:

"The relevance of knowledge we acquire is due to the fact that trainings' are tailor made to suit the interest of various departmental needs hence workshops and seminars are organized to help us bridge the skill gaps making us efficient and productive". Respondent number 5

'We acquire relevant trainings through workshops and seminars which have improved staff efficiency and the firms' productivity. Such trainings have yielded knowledge that have led to increase in creativity and innovation of cost cutting strategies.'

'A reflection of the relevance of knowledge is seen in the company's new product innovations and implementations of cost cutting programs such as initiating ethanol, spirit and wines production, establishing water bottling plant and Bricket (charcoal making) plant. Our company has embarked on serious diversification due to stock of relevant knowledge in resources order to improve financial economies and become sustainable. Our company work closely with the private investors in making Bricket with the view to improving environmental control by reducing the publics' overdependence on wood fuel and pollution."

Respondent number 7 & 10

But responding to question on activities the companies have initiated to explain their intellectual actions towards ecosystem integrity, 128(51%) of the interviewees responded as follows;

"That the companies have proposed forward linkage-Bricket making plant (makes Charcoal from burgess) to reduce communal overdependence on charcoal from trees, have enhanced environmental management systems (EMS) by distributing free seedlings and encouraging tree planting and have complied to ISO 9001 the companies have built incinerators to improve environmental (pollution)hygiene'.

On the same breath some companies have established waste treatment plant to ensure that waste waters and chemicals from the companies are treated before being released into the rivers to reduce water and environmental pollution. This was established from the response of one of the interviewees who said: "Our industry has established water treatment plant to ensure that reduce adverse effects on biodiversity. One respondent who was interviewed asserted as follows;

'*With the knowledge that we have acquired over the years working with this company at home and abroad, through bench marks and research, we have initiated the treatment plant of water from the factory to the rivers and streams safeguard against biodiversity degradation and hence harmful effects on fauna and flora, aquatic, animal, peoples lives'*

Inferential statistics: Hypothesis Testing – Objective 3:

H03: *Knowledge application has no statistical significant influence on sustainability of sugar companies in Kenya.*

To investigate whether there was any statistical significant influence of knowledge application on sustainability of sugar companies in Kenya, the null hypothesis was tested. This was done by use of Pearson Product Moment Correlation Coefficient analysis, using the scores computed from frequency of responses. The

p-value was set at .05, where the null hypothesis was rejected when the p-value was less than .05 but it was accepted when the p-value obtained was greater than .05. Table 4.17 shows the correlation analysis results in SPSS output.

Table 4.17:Influence of Knowledge Application and Sustainability

		Sustainability
mplementation of Knowledge Application	Pearson Correlation	.542**
	Sig. (2-tailed)	.000
	N	250

**correlation is significant at the .05 level (2-tailed)

The finding of the study shows that there was statistically significant positive correlation (r=.542, n=250, p<.05) between implementation of knowledge application and sustainability of sugar companies, with increase in implementation of knowledge application resulting into increase in sustainability of sugar companies and vice-versa. Given that the relationship was statistically significant, the study rejects (fails to accept) the null hypothesis that, "there is no statically significant influence of implementation of knowledge application on sustainability of sugar companies". It was therefore concluded that implementation of Knowledge application has positive influence on sustainability of sugar companies in Kenya.

To further illustrate this relationship, a scatter plot was generated as shown in Figure 4.5.

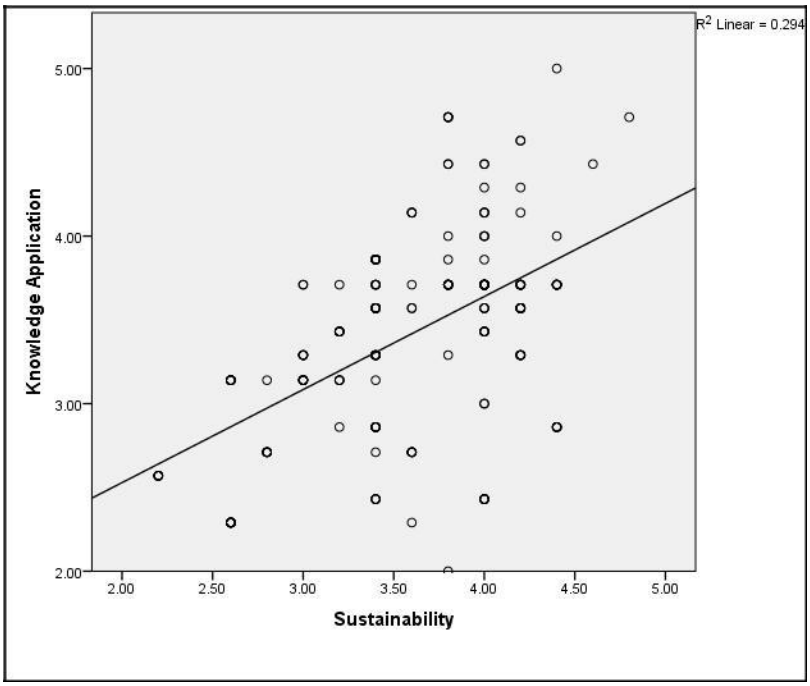

Figure 4.5: Influence of Knowledge Application on Sustainability

The scatter plot reveals that there was some positive correlation between knowledge application and sustainability of sugar companies. The pattern of dots slopes from lower left to upper right, implying that there is a positive correlation between the two variables. The trend line further indicates that there is correlation between the two variables as the scatters appear to concentrate along the trend line. Further, to estimate the level of influence of implementation of knowledge application on sustainability, a coefficient of determination was calculated by use of regression analysis as shown in Table 4.18.

Table 4.18: Model Summary on Regression Analysis of Influence of Knowledge Application on Sustainability

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.542[a]	.294	.291	.46913

a. Predictors: (Constant), Knowledge Application.

The model shows that implementation of knowledge application accounted for 29.4% (R^2 =.294) of the variation in levels of sustainability of sugar companies in Kenya.

However, to determine whether knowledge application was a significant predictor of sustainability of sugar companies, Analysis of Variance (ANOVA) was computed as Table 4.19.

Table 4.19: ANOVA –Influence of Knowledge Application on Sustainability

Model		Sum of Squares	df	Mean Square	FSig.
1	Regression	22.762	1	22.762	103.423.000[b]
	Residual	54.581	248	.220	
	Total	77.342	249		

a. Dependent Variable: Sustainability
b. Predictors: (Constant), Knowledge Application

From Table 4.19, it is evident that knowledge application was a significant predicator of sustainability of sugar companies [F (1, 248) = 103.423, p < .05)]. This further indicates that knowledge application significantly influence sustainability. From the results it was clear that implementation of knowledge application accounts for a substantial amount of the variance in the level of sustainability of sugar companies in Kenya. It is therefore imperative to summarize that knowledge application is key in sustainability of Sugar companies in Kenya.

V. Summary, Conclusion And Recommendations

5.1: Introduction

This chapter presents the summary, conclusion and recommendations based on the findings of the study as follows.

5.1: Summary

This study involved 250 managerial staff from all the operational state owned sugar companies. The study adopted both descriptive and inferential statistics in analyzing quantitative and qualitative data. In particular the study used Pearson Correlation Coefficient, multiple regression and descriptive statistics in analyzing varied data. The study used null hypotheses to test the influence of KMPs' and in the analysis, 2-tailed test (ANOVA) was employed that gave 0.00 significance (p-value) at 95% confidence interval which was used to reject (failing to accept) the null hypotheses.

Similarly, in establishing the influence of Knowledge application on Sustainability, knowledge application measurements computed in a regression analysis table revealed that knowledge application indicators such as companies' product diversification, innovation and ecosystem management.

Table 4.16 reveals that knowledge application had a high (average score=3.43, standard deviation=1.24) influence on sustainability of sugar companies in Kenya, with all the indicators rated high (average mean ranging between 2.91 and 3.84).

The findings of the study established that efficient utilization of knowledge resource in developing new products accounted for the highest (mean=3.84, standard deviation=1.29) of influence in contributing to sustainability of an organization, with a majority of 182 (72.8%) of the managerial employees who took part in the survey confirming that their company's growth are largely attributed to its efficient utilization of Knowledge resources in developing new products. Implying that Knowledge application is capable of influencing the company's sustainability through profitability and growth, product diversification and ecosystem management which are prerequisite parameters. To authenticate further this finding, in objective three Knowledge application had statistically positive correlation (r=.542, n=250, p=.05) and greater influence on sustainability of the

companies. This implies that Knowledge application in product development and innovation and in ecosystem management are capable of improving the firms' performance, growth and sustainability.

The findings relates to intellectual capital theory which attributes organizational sustainability to elements in Edvison & Malome (1997) value platform model, Figure 1.2; that points out human capital, customer capital and organization capital as fundamental outcome of efficient Knowledge application and hence, firms superior performance competitiveness and sustainability. The companies' product innovation (customer capital) that results from Knowledge application therefore justifies the use of Intellectual Capital Theory in the study.

The study also found out that due to efficient knowledge utilization the companies have diversified their activities into Brisket (Charcoal made of burgess) making plant (currently with the help of private investors), Ethanol plant, Wine and spirit and water bottling plant through which they intend to improve on their profitability, management of ecosystem to ultimately make them sustainable

5.3: Conclusion

Having examined the influence of Knowledge application on sustainability of sugar companies in Kenya, the following conclusions were made:

5.3.1: Influence of Knowledge Application on Sustainability of Sugar Companies in Kenya.

The findings of the study confirmed that knowledge application has a positive statistical contribution and thus influence on sustainability as indicated by r= .294 in a regression Analysis Table 4.18.

The companies should therefore step up knowledge utilization in innovation, products diversifications to greatly influence their performance, growth and sustainability in Kenya. The governments should also intervene in subsidizing the operations of sugar companies to ease financial burden suffocating the companies in implementing large scale knowledge application initiatives to ensure sustainability.

5.4: Policy Recommendations

5.4.1: To the Government of Kenya

- This study recommends that the government removes bureaucratic bottlenecks in approving the companies' diversification programs to fast track knowledge application by inspiring sugar companies into creativity and innovation.

  The companies should step up knowledge utilization in innovation, products diversifications to greatly influence their market share, growth and sustainability in Kenya.

5.4.2: To the Managements of Sugar Companies in Kenya.

- The companies to implement strategic KMPs' that permit knowledge application by encouraging team based discovery and innovation by building of collaborative culture.
- The companies to ensure effective Knowledge application that leads to innovation and creativity by implementing group based reward system.

5.4.2.6: For Further Research.

Since the study has revealed positive correlation between application and sustainability, it is prudent to suggest further research on influence of institutional factors on the relationship between Knowledge utilization and sustainability of sugar companies in Kenya.

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Alex Abonyo Akoko. "The influence of Knowledge Application on Sustainability of Sugar Companies in Kenya" IOSR Journal of Business and Management (IOSR-JBM), Vol. 21, No. 1, 2019, pp. -.36-55