KNOWLEDGE MANAGEMENT AS SOURCE OF SUSTAINABLE COMPETITIVE ADVANTAGE
Comparative Assessment of Egerton University Farms and Private Commercial Farms

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Abstract

Creation and sustenance of competitive advantage continues to be the central agenda in strategic research and practice. Farms strive to survive and succeed in competition by pursuing strategies that enable them to perform better than their competitors. Therefore, the study seeks to assess knowledge management as source of sustainable competitive advantage and its impact on the performance of Egerton University farms. Performance was analyzed in terms of productivity and profitability. The productivity was assessed as mean yields per acre for crops such as wheat, barley and maize. The Dairy sector assessment looked at average milk productivity per cow per day. Profitability was analyzed using Net Farm Income and Rate of Return on Assets (ROA). The farm business is a function of land, capital, labuor and management particularly that of knowledge. In addition, it is subject to variability of prices, costs, yields and seasons. This study was necessary because the farm businesses are currently operating under a lot of competition, and thus the expected outcomes of effective knowledge management led to improved organizational effectiveness, improved productivity, a way to capture best practices, improved decision making, a more innovative organization, source of competitiveness and improved performance. The objectives were achieved by use of both secondary data obtained from the farm accounts and other productivity records while primary data was collected by the use of structured and semi-structured questionnaire from people who have had experience with or associated with the running of Egerton University farms. The data collected was analyzed using descriptive and inferential statistics with assistance of SPSS software. The hypotheses were tested using Mann-Whitney U test and Chi-Square test. The study came out with the following major findings; first the study established that the private farms were more profitable than Egerton University farms. Secondly, the study established that private Farms were more productive in both crops and milk productivity. Third, the study found out that the private farms were more aware why they acquired the information compared to Egerton University farms, a scenario which will make the private farms be more competitive than the university farms which were not clear on their reasons for acquiring information. Fourth, the private farms acquired, stored and shared information for their competitive advantage from various sources compared to Egerton University farms, a situation which made the private farms be more competitive than the university.

Keywords: *Knowledge Management, Sustainable Competitive Advantage & Comparative Assessment*

1. Introduction

1.1 General Background

Farming is not just a way of life but a business and should be operated under sound economic principles in order to be successful. The farm business has to take account of the unique combination of labour, land, capital and management particularly that of knowledge in order to meet the organization's goals and objectives. It is important that farming organizations have to be high performers in order to meet their objectives.

Performance is a measure of how well an organization achieves appropriate objectives or how efficient and effective an organization is (Stoner et al, 2002). The expected outcomes of effective knowledge management lead to improved organizational effectiveness, improved productivity, a way to capture strategic practices, improved decision making, a more innovative organization, source of competitiveness and improved performance. The actual effectiveness of an organization was dependant upon the quality of its people, its objectives and the structure and the resources available to it. Since Agri-business performance occurs overtime, trends in key performance measures are important to evaluate (Barry et al, 1988). Some of the performance measures that may be used are productivity, profitability, liquidity, market share and costs (Hatch, 1997).

The Agricultural sector is the backbone of the Kenyan economy. It directly contributes 20% of the GDP and 60% of the export earnings. A further 27% is contributed through its links with manufacturing, distribution and service related sectors (GoK, 2001). The Government of Kenya through its Strategy for Revitalizing Agriculture (SRA, 2004) policy paper envisages improved standard of living for Kenyans and hopes to reduce substantially the number of people now suffering from extreme poverty and hunger, by the year 2015 (GoK, 2003).
The study focus on the performance of farms and assess knowledge management as source of sustainable competitive advantage mainly at Egerton University's three main farms namely Ngongongeri (2728 Acres), T.D.U (1000 Acres) and Laikipia farm (947 Acres). These three farms are situated in areas of high Agricultural potential of Kenya and are owned by an institution with its history deeply rooted in Kenya's Agricultural development and training since 1939.

The current university policy is that the farms should be able to sustain their activities and support the university financially. The farms should be centers of excellence in farming technologies and hence there is need for effective knowledge management. Hitherto, such facilities have been used extensively for tuition and research with little attention being paid to their commercial potential especially in knowledge management (Cheruiyot, 2006).

The Government of Kenya was previously in a position to fully fund the University education. But with increased number of public universities, rise in enrolment of public universities and poor performance of the country's economy over the last two decades, the Government is no longer able to fully finance public universities. Kenya's Annual growth in GDP in 1980 - 1989 was 4.1%, then dropped to 2.5% in 1990 -1995 and continued to decline to negative 0.3 in 2000 (GoK, 2001, 2003). In these circumstances, public universities are being called upon to explore ways and means of financing University programmes partly with funds generated from other sources other than the exchequer. The farms are some of these other sources of funds.

It was therefore necessary to comparatively assess their knowledge management as source of sustainable competitive advantage affecting the performance and recommend the appropriate remedial actions where necessary.

1.2 Competitive Advantage

Firms strive to survive and succeed in competition by pursuing strategies that enable them to perform better than their competitors. When two or more firms compete within the same market, one firm possesses a competitive advantage over its rivals when it earns or has the potential to earn a persistently higher rate of profit (Porter, 1980; Grant, 1997; Hill et. al, 2001). Competitive advantage then is the ability of the firm to occupy a superior position in an industry and outperform its rivals on the primary performance goal- profitability. A company's superior competitive position allows it to achieve higher profitability than the industry's average (Porter, 1985).

Competitive advantage can arise from various sources. According to Porter (1985), a firm can achieve a higher rate of profit (or potential profit) over a rival in one of two ways: either it supplies an identical product or service at a lower cost, in which case the firm possesses a cost advantage; or it can supply a product or service that is differentiated in such a way that the customer is being able to pay a price premium that exceeds the additional cost of the differentiation advantage.

Differentiation by a firm from its competitors is achieved when it provides something unique that is

valuable to buyers beyond simply offering a lower price. Emphasizing the importance of innovation, Grant (1997) points out that innovation not only creates competitive advantage, it also provides a basis for overturning the competitive advantage of other firms. A firm with a distinctive competence can differentiate its products- provide something unique that is valuable to buyers, or achieve substantially lower cost than its rivals. Consequently, the firm creates more value than its rivals and earns a profit rate substantially above the industry average. Thus the strengths of an organization are grounded in its resources, capabilities and competencies that help a company attain a competitive advantage based on superior efficiency, innovation, and quality and customer responsiveness. Profiting from competitive advantage requires that the firm first establishes a competitive advantage, and then sustain its advantage for long enough to reap its rewards (Hill et. al., 2001).

Once established, competitive advantage is subject to erosion by competition. This arises because a company with a competitive advantage earn higher than average profits. These profits send a signal to rivals that the company is in possession of some valuable distinctive competence that allows it to create superior value (Hill et. al., 2001). Naturally, its competitors try to identify and imitate that competence. Insofar as they are successful, they may ultimately undermine the company's competitive advantage and surpass the company's superior profits. As Grant (1997) and Hill et. al., (2001) observe, the speed of imitation has a bearing upon the durability of a company's competitive advantage.

As it takes less and less time for one product or technology to replace another, companies are finding that there is no such thing as permanent competitive advantage. Other things being equal, the more rapidly competitors imitate a company's distinctive competencies; the less durable was its competitive advantage. Erosion of competitive advantage through imitation first requires potential imitators to identify those rivals in possession of competitive advantage and then diagnose the basis of their advantage. Having diagnosed an incumbent's competitive advantage, the imitator can mount a competitive challenge only by assembling the resources and capabilities necessary for imitation. Grant (1970) states that the greater the imperfection of information in an industry, the more difficult such identification and diagnosis. Thus firms, particularly private companies adopt a more attractive means of avoiding competition for the firm by withholding information about its profitability.

1.3 Knowledge Management and Competitive Advantage

In the last two decades, there has been an increasing interest in organizational knowledge as the source of competitive advantage, which can be traced back to the emergence of the resource- based perspective of the firm (Wenerfelt, 1984; Dierickx et. al., 1989; Barney, 1991; Mahoney et. al., 1992; Peteraf, 1993). Strategists describe the inclusion of knowledge as a primary asset as the extension of the resource- based view of the firm to one that is specifically knowledge- based (Grant, 1997).

Knowledge is acquired both internally and externally. The major source of internal knowledge acquisition for business is through research and development (Hall et. al., 2002). Kaser et. al., (2002) however, point out that one of the difficult tasks knowledge activists face is to help such knowledge reach all the places in the organization where it can be useful. The effectiveness of building knowledge within the firm depends on the firm's ability to monitor and absorb newly acquired knowledge from many sources and then integrate this knowledge into its existing knowledge base (Cohen et. al., 1990; Hamel, 1991). In order for external knowledge to be acquired, firms must survey research work that has previously been published (Danskin et al., 2005), for example, research on previous products, therefore gaining valuable insights about the product; excel at (benchmarking) gathering information about industry leaders (Bierly et. al., 2002), and rely on strategic alliances to acquire knowledge resources needed for their business (Grant, 1997). Firms can also acquire external knowledge about the market from their customers and distributors.

The overall purpose of KM is to maximize the enterprise's knowledge related effectiveness as well as to maximize returns from its knowledge assets. Wiig (1997) argues that making people knowledgeable brings innovation and continued ability to create and deliver products and services of the highest quality. Indeed, as Choo et. al., (2002) suggest, firms need knowledge to develop products; they need knowledge about customers and competitors in order to identify niche markets and serve them effectively.

The goals and expected outcomes of an organization with effective KM include improved organizational effectiveness, improved productivity, a way to capture best practices, improved decision making, becoming a more innovative organization and a source of competitiveness and improved performance. Soo et al. (2002) point out that the impact of knowledge management systems on

performance relates primarily to the organization's ability to innovate- either through improved processes or improved products and services. It is widely accepted that increasing the amount and the quality of knowledge sharing within firms is crucial to creating higher levels of innovation (Kaser et. al., 2002). New knowledge that drives product and process innovation really always comes out of the exchange of party formed ideas that trigger new insights. Thus KM increases the innovative performance of firms. Indeed, a firm that effectively uses its knowledge assets knows more about its customers, products, technologies, markets and their linkages, and should perform better. Penrose (1959) argue that companies having superior knowledge are able to coordinate and combine their traditional resources and capabilities in new and distinctive ways, providing more value for their customers than their competitors. Soo et al. (2002) explain that while knowledge itself is difficult to measure and the precise accounting for the use of intellectual capital is in its infancy stages, it does have a clear impact on business outcomes.

Knowledge creation and use are thus critical if firms are to have a competitive advantage. In the knowledge- based view of the firm, an organization's ability to create and utilize knowledge is viewed as the sure source of lasting competitive advantage (Grant, 1991; Kogut et. al., 1992 and Spender 1996). The knowledge-based theory views firms as distributed knowledge systems, which means that they are composed of knowledge embodied individuals and their social interactions. The knowledge-based theory of the firm postulate that knowledge is the only resource that provides sustainable competitive advantage, and therefore the firm's attention and the decision-making should focus primarily on knowledge and the competitive capabilities developed from it. The key contribution of the knowledge based view of the firm and KM literature is the insistence that knowledge can be managed as an organizational resource that in turn, hopefully, constitutes competitive advantage (Choo et. al., 2002). Soo et al. (2002) assert that the capacity to manage human intellect and to transform intellectual output into a service or a group of services embodied in a product is fast becoming the critical executive skill of this era.

The value of knowledge results from the way in which the firm combines its knowledge and capabilities in the productivity of products and services that deliver value to its market. A firm can gain advantage from using the capabilities that arise from the knowledge assets in ways which are difficult for others to imitate or replicate (Armistead et. al., 2002). Performance differences between organizations, then, are a result of their different stocks of knowledge and their differing capabilities in deploying knowledge. Knowledge and competence have become the primary drivers of competitive advantage; and to the extent that knowledge and capabilities are unique and difficult to imitate, they confer sustainable competitive advantage on the firm (Choo et. al., 2002).

Knowledge strategy can be described along two dimensions reflecting its degree of aggressiveness. The first dimension addresses the degree to which an organization needs to increase its knowledge in a particular area versus the opportunity it may have to leverage existing but under utilized knowledge resource- that is the extent to which the firm is primarily a creator (explorer) versus a user (exploiter) of knowledge. The second dimension addresses whether the primary sources of knowledge are internal or external. Together, these characteristics help a firm to describe its current and desired knowledge strategy (Bierly et. al., 1996).

Adopting Bierly et. al.s' (2002) description of the taxonomies, explorers are firms that excel at developing new radical knowledge but are not strong at exploiting existing knowledge. On the other hand, exploiters are firms that successfully exploit existing knowledge areas but are not effective in generating radically new knowledge. Exploiters are excellent at refining and leveraging existing knowledge and focus on becoming very efficient at current practices. Added to these typologies are bimodal learners- firms that excel at developing new radical knowledge but are also strong at exploiting existing knowledge. Instead of fitting the typical patterns of explorers and exploiters, bimodal learners posses the seemingly contradictory skills and competencies of both. Bierly et. al., (2002) also argue that there are other firms labeled maintainers that do not excel at developing new radical knowledge and are not strong at exploiting existing knowledge. These firms are poor learners and are contended to stay where they are and maintain their current knowledge level to best serve existing customers. Typically, these companies have a strong history and emphasize traditional and stability.

1.4 Statement of the Problem
Due to the critical role of Knowledge Management in the creation and sustainability of competitive advantage, the field of strategic and Knowledge Management have come up with a number of conceptual empirical works of how knowledge is created (Spender, 1996, Nonaka and Takendi, 1995; Von Krogh etal, 2002). However in creating Knowledge Management strategy to business strategy , managers must understand that it is not knowledge

per se that is important, but the way it is applied to strategic objectives that is the critical ingredient in improving competitiveness and performance (Nonaka,1994).

To encourage sharing managers need to adapt strategies that support knowledge sharing in their organizations. These may include evaluating and rewarding their employees based on their contributions and utilization of knowledge asset of the firm (Hansen et al., 1999), rewarding people for sharing and transferring knowledge directly (Dew, 1999) and experimenting with new organizational cultures and reward systems to enhance those social relationship (Quinn et al., 1996).

The farm business has to take account of the unique combination of land, labour, capital and management particularly of knowledge in order to meet the organizations goals and objectives, which include improved productivity and marketing efficiency and hence overall returns/profits. Egerton University is endowed with large scale farms with high Agricultural potential and a large pool of highly skilled resource personnel from which it can benefit. The university farms are expected to be centers of excellence in farming technologies and models of high productivity and profitability. There have been complaints from the University management committee that the university farms are not performing as well as expected. There is also a general belief that the neighbouring privately owned farms have been doing well (Cheruiyot,2006).

Currently, very little is known on the extent to which the agricultural farms apply knowledge management as a source of sustainable competitive advantage and therefore, this study is aimed at conducting an assessment on the extent to which various aspects of knowledge management is being applied for decision making with an aim of achieving sustainable competitive advantage in the organization.

The general objective of the study is comparative assessment on the use of knowledge management as a source of sustainable competitive advantage between Egerton University Farms and their neighbouring competitor farms. The specific objectives of the study included;
  (i)   To analyze and compare profitability of the farms.
  (ii) To compare productivity of University farms with those of similar privately owned farms.
  (iii) To compare the difference in the reasons for information acquisition by Egerton University and Private Farms.

(iv) To compare the difference in the acquisition strategies used to acquire information by Egerton University and Private Farms.
(v)   To compare the difference in the information collection techniques by Egerton University and Private Farms.
(vi) To compare the difference in information sharing strategies by Egerton University and Private Farms.
(vii) To compare the difference in information utilization strategies by Egerton University and Private Farms.
(viii) To compare the difference in information sharing strategies by Egerton University and Private Farms.
(ix) To compare the difference in information use for divesture strategies by Egerton University and Private Farms.

The study was important because it helps farm businesses to see how best they can utilize the strategic resources, especially the notion of knowledge management in the creation of sustainable competitive advantage. The study will help Egerton University farms to identify their strengths and weaknesses in order to take advantage of the prevailing opportunities and minimize threats facing them. It enables the university farms to compare their performance with similar privately owned neighbouring farms. The study sensitizes the University farms to utilize its farm knowledge resource particularly tacit knowledge as a key source of sustainable competitive advantage to generate income for the university. Other farms and organizations will use the findings to also improve their farm business.

 It is important for farmers to understand the role of knowledge management in the creation of sustainable competitive advantage in order to help them make appropriate changes to their operations. Policy makers must also understand the role of knowledge management in the creation of sustainable competitive advantage to ensure they formulate policies that help farmers maintain stable incomes. The study, thus contribute to the body of knowledge on the performance of University farms. Finally, the study forms a foundation for other researchers who would like to pursue studies in the same area.

2.0 Research Strategy
The study was limited to the three large-scale farms of Egerton University and three privately owned neighbouring farms. It covered a period of five years (2003-2007). Findings of the topic under study were realistic and useful if the personnel responses were accurate.

A case study approach was adopted because it was appropriate for collecting both primary and secondary data necessary to accomplish the tasks set out by the objective of the study. A case study was appropriate taking into consideration the limited time in which to conclude the research.

The study involved the large-scale farms of Egerton University namely: Ngongongeri, Tatton Demonstration Unit and Laikipia farm. Other large scale privately owned farms with similar characteristics within Njoro Division of Nakuru District were purposively chosen to compare their productivity and that of the University farms. These were Sasumua Estate, Chemusian farm and Deneside farm.

Purposive sampling and specifically judgmental sampling was used in selecting the farms and respondents that had the relevant information. Gupta (2002) noted that the use of judgment sampling is justified when only a small number of sampling units are in the universe and simple random selection may miss the more important elements; whereas judgment selection would certainly include them in sample.

The choice of farms was based on
(i) Size-large scale farms of 200 acres and above. These are the farms that are run commercially and are likely to keep records of their operations.
(ii) Enterprise combination - those with nearly similar enterprise combination such as dairy cows and crops such as wheat barley and maize were chosen.

(iii) Geographical location and weather conditions – were nearly the same or similar. This minimized the effect of weather and soil condition differences on the performance of the farms.

The respondents were chosen based on their position, knowledge, association and experience in running of the farms. The respondents chosen were people whose decisions and activities directly affect the operations of the farms. They were involved in the farm policy formulation and implementation, budget preparation and presentation for approvals. The management committee members, farm managers, supervisors and accountants are involved in the day-to-day running of the farms hence were respondents chosen.

For this study, both primary and secondary data were collected. The primary data was collected using structured and semi –structured questionnaire shown in appendix IV. The respondents were asked to give their opinions on the performance of the farms and their perception of knowledge management as source of sustainable competitive advantage. A 'drop and collect' method of self-administered questionnaire was adopted. The researcher personally hand delivered the questionnaires and subsequently recover the same after completion. This encouraged both high response rate and timely completion of the questionnaires.

The secondary data, which included financial and productivity data was collected from the net worth statements (balance sheets), profit and loss statements and other farm records using secondary data collection instruments (tables) shown in appendix VI .The productivity records included: crop yields in bags per acre, and the average milk productivity in liters per animal per day. The financial data collected included total farm income, total costs (including depreciation), total farm Assets, capital gains/losses and net farm income.

The same questionnaire was administered to all the respondents. The respondents were assumed to have enough knowledge and experience to be able to answer all the questions competently. Secondly, the land value was the same for all farms.

The data collected was analyzed using descriptive and inferential statistics with assistance of SPSS software. Profitability was analyzed using the net farm income (NFI) and Rate of Return on Assets (ROA)

NFI = Total Income – Total Costs

$$ROA = \frac{Net\ Farm\ Income}{Total\ Assets}$$

Rate of return on assets measure the effectiveness of the management to utilize the resources at its disposal. Productivity was looked at in terms of crop yields in bags per acre and dairy productivity in terms of milk productivity in litres per animal per day .There was need to find variances between budgeted and actual profitability and productivity in the university farms and even compare them with those of other similar neighbouring farms. Performance indicators needed to be calculated for several years to observe trends and avoid making judgments based on an unusual year (Edward 2000).The study was based on five years as it was assumed that the period was representative enough. Descriptive statistics that were used for analysis included: percentage, average and dispersion. The data was presented in tabular, graphical and numerical forms.

Inferential statistics were used to facilitate comparison of two or more variables and to determine the strength of any relationship that was significant. Mann-Whitney U test statistics was used

to measure weather there was any significant differences between actual and budgeted performance in a given farm. Mann-Whitney U test was also used to measure weather there was any significant differences between actual and budgeted performance in a given farm. Mann-Whitney U test was chosen because it was appropriate when sample size is 30 or is less and the sample standard deviation is unknown, Gupta (2002). Our sample size was less than 30. . Mann-Whitney U was presented as:

$U = n_1 n_2 + \frac{n_1(n_1+1)}{2} - R1$ Where n was the number in ordered data array and R was the sum of ordered array.

Chi-square was used to establish the importance of the application of knowledge management in the management of the farms.

3.0 Data Analysis, Findings and Discussions

The study was limited to the three large-scale farms of Egerton University and three privately owned neighbouring farms. It covered a period of five years (2003-2007). Findings of the topic under study were realistic and useful if the personnel responses were accurate.

3.1 Comparison of Profitability of the Egerton University and Private Farms

Performance is the measure of how well an organization achieves appropriate objectives or how efficient and effective an organization is (Stoner et. al., 2002). Performances are set up so that the deviance between the actual and intended outcome is identified. After that the necessary analysis is instituted to determine the source of the deviance and possible courses of action to remedy it (Baker, 1991).

Some of the performance measures are productivity, profitability, liquidity, solvency, market share and costs, (Hatch 1997). Farmers who have large investments of land, machinery, livestock and equipment need to keep informed about the financial condition of their operations. Some useful measures of financial performance can be calculated from information found in most farm record books and accounting programs. The farms should have kept a good set of financial statements and farm records. These measures can help farmers assess the productivity, profitability, debt capacity and financial risks currently faced by their businesses. The international standards committee (ISC) is in the process of incorporating International Accounting Standard No.41 which deals specifically with farm accounting (Edward, 2000).

Performance measures used by the University of Minnesota extension service (Nordquist 2004) and

Iowa state university (Edward 2000; Jolly et. al. 2002) are based on guidelines of the Farm Financial Standards Council of the United States of America.

Table .1: Profitability Ratio of the Egerton Farms

Farms	Net income	Total Assets	Profitability (%)
Ngongongeri	6,000,000	55,000,000	11
Tatton	3,100,000	31,000,000	10
Laikipia	4,982,351	129,730,000	4

Source: Field Data (2008)

Table one above was used to analyze the profitability ratio of the Egerton University Farms. Ngongongeri farm was the most profitable at 11% followed by Tatton farm at 10% and Laikipia farm which was least profitable at 4%.

Table .2: Profitability Ratio of the Private Farms

Farms	Net income	Total Assets	Profitability (%)
Sasumua	11,000,000	72,000,000	15
Chemusian	12,000,000	79,000,000	15
Deneside	4,138,000	45,000,000	9

Source: Field Data (2008)

Table 2 above was used to analyze the profitability ratio of the Private Farms. Susumua and Chemusian farms were the most profitable at 15% respectively followed by Deneside farm at 9% which was least profitable.

Although Egerton University is the cradle of knowledge in terms of agricultural productivity, it used most of its farms for education compared to the private farms which used the farms purely for profit. The first objective of the study was to analyze and compare profitability of the farms. The findings indicated that the private farms were more profitable than Egerton University farms.

3.2 Comparison of Productivity of Egerton University and Private Farms

Objective 2 of the study was meant to establish the comparative productivity between Egerton University farms and privately owned farms.

Table 3 below was used to analyze both the crop and milk productivity at the Egerton University Farms. The study established that Laikipia Farm was the leading in crop productivity of an average of 18 bags

per acre, followed by Tatton and Ngongongeri which produced an average of 17 bags per acre. In milk productivity, Tatton was leading with 11.6 litres per cow per day followed by Laikipia which produced 10.8 litres and Ngongongeri which produced 10.4 litres. In average, the Egerton university farms produced 18 bags per acre of crops and 10.9 litres per cow per day of milk.

Table 3: Crop and Milk Productivity by the Egerton University Farms

Farms	Average(Bags/Acre)	AverageMilk (Per Cow/day)
Ngongongeri	17	10.4
Tatton	17	11.6
Laikipia	18	10.8
Average	17.33	10.9

Source: Field Data (2008)

Table 4 below was used to analyze both the crop and milk productivity at the Private Farms. The study established that Chemusian Farm was the leading in crop productivity of 28.3 bags per acre, followed by Deneside which produced 16.5 bags per acre and Sasumua which produced 15.9 bags per acre. In milk productivity, Deneside was leading with 21.3 litres per cow per day followed by Sasumua which produced 20.4 litres and Chemusian which produced 16.5 litres. In average, the private farms produced 20.2 bags per acre of crops and 19.4 litres of milk per cow per day.

Table 4: Crop and Milk Productivity by the Private Farms

Farms	Crop (Bags/acre)	Milk (Litre/cow/day)
Sasumua	15.9	20.4
Chemusian	28.3	16.5
Deneside	16.5	21.3
Average	20.2	19.4

Source: Field Data (2008)

Table 5: Comparison of Crop and Milk Productivity by the Farms

| Farm	Crop (Bags/acre)	Milk (Litre/cow/day)
Egerton University Farms	17.3	10.9
Private Farms	20.2	19.4

Source: Field Data (2008)

Table 5 above was used to compare the crop and milk productivity at Egerton University Farms and Privately Owned Farms. The study established that

private Farms are more productive in both crops and milk productivity.

3.3 The reasons for information acquisition by Egerton University and Private Farms

Figure 1 below was used to analyze the perception of the respondents at the Egerton University and Private farms on the reasons why they acquire information in the farm management operations. The study established that the majority of the respondents from Egerton University farms 80.0% disagreed that they acquire information for such reasons as; to know their customers, to know their market, to know about changes in the weather patterns and to know the changes in farming technologies compared to 20% who agreed on the above cited reasons. On the other hand the majority of the respondents for the private farms 79.0% agreed on the above reasons for information acquisition compared to 21.0% who disagreed. This finding indicated that the private farms were more aware why they acquired the information compared to Egerton University farms, a scenario which will make the private farms be more competitive than the university farms which were not clear on their reasons for acquiring information.
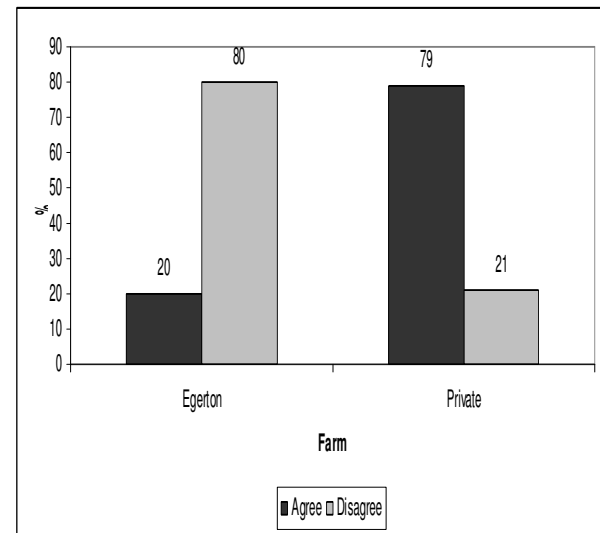
Source: Field Data (2008)
Figure 1: The reasons for information acquisition by Egerton University and Private Farms.

The study was also used to analyze the farms sources of information that they use for competitive advantage. The study established that the majority of the respondents from Egerton University Farms 86.0% disagreed on the following sources of information as per the design of the study; information from the models of decision making, information from off-site learning, information from work related simulations, information obtained from reflections from lessons learnt, information obtained

from employees experience from outside the farm, information gathered from the feedback from customers, information obtained from post work situations, information obtained from international farming journals and information obtained from national farming databases. Only 14.0% of the respondents from the university farms agreed on the above sources of information.

On the other hand, the majority of the respondents from the private farms 86% agreed they get information from the above listed sources compared to 14.0% who disagreed on the sources. This finding showed that the private farms acquired information for their competitive advantage from various sources compared to Egerton University farms, a situation which made the private farms be more competitive than the university.

3.4 The information Collection Techniques by Egerton University and Private Farms.

On the the information collection techniques used by the farms in achieving their competitive advantages, the study established that the majority of the respondents from the university farms 89.0% disagreed on the following information collection techniques as per the design of the study; information collected through request, information documented by groups/individuals, information collected from the administrative operations of the firm, information collected through customization of work related environment, information collected from electronic storages, information collected from specialized communities, information collected using new technologies and systems, information collected through specialists, information collected from specific specialized individuals, information collected using search and retrieval systems, information collected from both electronic and paper tools information collected using online tools e.g. the internet. Only 11.0% agreed that the university farms used the above information collection techniques.

On the other hand the majority of the respondents from the private farms 89.0% agreed that the farms used the above information collection techniques to enhance their competitive advantages compared to 11.0% who disagreed on the above techniques. This finding showed that the private farms perceived information collection techniques to be a specialty in knowledge management that made them to have competitive advantage over the university farms.

3.5 The information Sharing Techniques for Competitive Advantage by Egerton University and Private Farms

On the the information sharing techniques used by the farms in achieving their competitive advantages, the study established that the majority of the respondents from the university farms 91.0% disagreed on the following information sharing techniques as a source of the farms competitive advantage; deployment of a dedicated knowledge management manager to help employees in the sharing of the knowledge, sharing knowledge across the groups to enhance competitiveness, sharing information to enhance individual value in the farms, transferring knowledge across the entire farm for competitiveness, information is shared through linkages among the employees across the farms, knowledge is linked to appraisal systems, difficult knowledge are transferred through face to face interaction, barriers to knowledge sharing are removed for purposes of competitiveness and lastly knowledge sharing is linked to the farms' mission and critical business strategies. Only 9.0% agreed that the university farms used the above information sharing techniques.

On the other hand the majority of the respondents from the private farms 91.0% agreed that the farms used the above information sharing techniques to enhance their competitive advantages compared to 9.0% who disagreed on the above techniques. This indicated that the private farms used different strategies for information sharing which they perceived to be competitive advantage.

3.6 Information Storage and Utilization by the Farms

On the information utilization and employment into techniques used by the farms in achieving their competitive advantages, the study established that the majority of the respondents from the university farms 84.0% disagreed on the following information utilization techniques as a source of the farms' competitive advantage; information is used for decision making and that employees can describe how the decision can affect the overall organization performance, information empowers employees to speak out their opinion on different matters related to organization performance, information is used for collaboration with the competitors to grow the farming industry, information is used to build up employees ideas for the benefit of the organization, information is used to achieve the farms flexibility in decision and applications, information is used to build security protocols for the protection of the organizations' classified information and knowledge, information is used to empower employees for better work performance, information is used to develop adaptable simulations and models for better performance .

Only 16.0% agreed that the university farms information for its competitiveness. On the other hand the majority of the respondents from the private farms 84.0% agreed that the farms used the above information to enhance their competitive advantages compared to 16.0% who disagreed on the above techniques. This indicated that the private farms put their information in proper utilization to enhance their completive advantages.

On the techniques used by the farms to store their information resource in order to achieving their competitive advantages, the study established that the majority of the respondents from the university farms 57.0% disagreed on the following information storage techniques as a source of the farms' competitive advantage; information is stored in the IT systems , part of the information stored are the farms formal and informal values, information is stored in different networks to mitigate any loss during disasters, information is stored along side the plans at different managerial levels and information is also stored with in the employees with critical mission oriented skills and that such employees are retained in the farms. Only 43.0% agreed that the university farms use varied strategies to store information for its competitiveness. On the other hand the majority of the respondents from the private farms 57.0% agreed that the farms used the above information storage strategies to enhance their competitive advantages compared to 43.0% who disagreed on the above techniques. This indicated that the private farms acknowledge information storage as a critical knowledge management practice that assures them competitiveness.

3.7 The Use of Information for Strategic Divestures by the Farms

On how farms used information for strategic divestures in order to achieve their competitive advantages, the study established majority of the respondents from the university farms 93.0% disagreed on the following use of information for the following strategic divestures; that knowledge acquisition was dependent on how much the farms could leverage, the farm make divestment decision based on both strategic importance of knowledge based assets and financial projections, the farms routinely examines whether their operation support non-strategic knowledge at the expense of strategic critical knowledge, employees skills and expertise are verified for deployment before termination,.

Lastly, the farms make use of informal relationships with related businesses locally to keep its knowledge updated. Only 7.0% agreed that the university farms used knowledge for strategic divestures for its

competitiveness. On the other hand the majority of the respondents from the private farms 84.0% agreed that the farms used the information to achieve the above listed divesture strategies to enhance their competitive advantages compared to 16.0% who disagreed on the above techniques. This showed that the private farms acknowledge information as a critical knowledge management practice that can strategically help them to achieve different divesture scenarios.

3.8 Hypotheses Test

Hypothesis 1: University farms and private farms are equally profitable.

Productivity	Egerton(x_1)	Private(x_1)
Farm1	11	15
Farm2	10	15
Farm3	4	9
Total	25	39

Source: Field Data (2008)

Mann-Whitney U test was used to test the first hypothesis as stated above because the test is important in testing the equality of two population distributions whose sample sizes are small.

The model for the test is as given below:

$$U = n_1 n_2 + \frac{n_1(n_1+1)}{2} - R1$$

Egerton University Values = 11,10,4
Private Farms Values = 15,15,9

Table 6: Ordered Ranking of the two Populations

Egerton	4		10			
Private		9		11	15	15
Ranks	1	2	3	4	5	6

R1= 2+5+6 = 13

$$U = (3)(3) + \frac{(3)(4)}{2} - 13 = 2$$

From the critical Mann-Whitney U table, we find that the probability that U will attain a value of 2 or less is 0.10. If $\alpha = 0.05$, then $\alpha/2 = 0.025$. Since 0.10 is greater than 0.025, the alternate hypothesis that University farms and private farms are equally profitable is confirmed at a p value of 0.20.

Hypothesis 2: There is significant difference between the productivity of the University farms and privately owned farms.

Table 7: Contingency Table of the Farms Productivity

Productivity (milk)	Egerton	Private
Farm1	10	20
Farm2	12	17
Farm3	11	21
Total	32.8	58.2

Source: Field Data (2008)

Mann-Whitney U test was used to test the second hypothesis as stated above because the test is important in testing the equality of two population distributions whose sample sizes are small.

The model for the test is as given below:

$$U = nn + n_1 n_2 + \frac{n_1(n_1+1)}{2} - R1$$

Productivity of Egerton University Values = 10,12,11
Productivity of Private Farms Values = 20,17,21

Table 8: Ordered Ranking of the two Populations

Egertone	10	11	12			
Private				17	20	21
Ranks	1	2	3	4	5	6

R1= 4+5+6 = 15

$$U = (3)(3) + \frac{(3)(4)}{2} - 15 = 0$$

From the critical Mann-Whitney U table, we find that the probability that U will attain a value of 0 or less is 0.05. If α = 0.05, then α/2 = 0.025. Since 0.05 is greater than 0.025, the alternate hypothesis that there is significant difference between the productivity of the University farms and privately owned farms is confirmed at a p value of 0.10.

Hypothesis 3: There is difference in the reasons for information acquisition by Egerton University and Private Farms.

Table 9: Contingency Table Comparing the Farms Difference in Information Acquisition

Farm	Agree	Disagree	Total
Egerton University Farms	4	11	15
Private Farms	12	3	15

Source: Field Data (2008)

The probability of the above contingent table is given E1=E2= 0.5. The expected frequency is given by

$y = E * S$ where E is the probability and S is the sample size
$y = 0.5 * 30 = 15$ This was the expected frequency

The calculated chi-square was 19.3 whereas the critical chi-square was 3.8 at 1 degree of freedom and p=0.05. Since the calculated chi-square was far much higher than the critical chi-square, there was evidence to reject the hypothesis that there is difference in the reasons for information acquisition by Egerton University and Private Farms. The study established that although University farms did not have as higher productivity and profitability ratio as the private firms, they still perceived the acquisition of information to be the backbone of effective knowledge management and as an important tool for successful competitive farm management.

Hypothesis 4: There is significance difference in the acquisition strategies used to acquire information by Egerton University and Private Farms.

Table 10: Contingency Table of the Farms Perception on Information Acquisition

Farm	Agree	Disagree	Total
Egerton University Farms	3	12	15
Private Farms	12	3	15

Source: Field Data (2008)

The calculated chi-square was 10.2 whereas the critical chi-square was 3.8 at 1 degree of freedom and p=0.05. Since the calculated chi-square was far much higher than the critical chi-square, there was evidence to reject the hypothesis that there is difference in the acquisition strategies used to acquire information by Egerton University and Private Farms. The study established that both the category of farms perceived knowledge acquisition as a key tool for improvement of their performances.

Hypothesis 5: There is difference in the information collection techniques used by Egerton University and Private Farms.

Table 11: Contingency Table of the Farms Perception on Information Collection

Farm	Agree	Disagree	Total
Egerton University Farms	1	14	15
Private Farms	14	1	15

Source: Field Data (2008)

The calculated chi-square was 13.1 whereas the critical chi-square was 3.8 at 1 degree of freedom and

p=0.05**.** Since the calculated chi-square was far much higher than the critical chi-square, there was evidence to reject the hypothesis that there is difference in the information collection techniques by Egerton University and Private Farms. The study established that both the category of farms perceived information collection as a key tool for improvement of their performances.

Hypothesis 6: There is difference in information sharing strategies use by Egerton University and Private Farms.

Table 12: Contingency Table of the Farms Perception on Information Sharing

Farm	Agree	Disagree	Total
Egerton University Farms	1	14	15
Private Farms	14	1	15

Source: Field Data (2008)

The calculated chi-square was 13.1 whereas the critical chi-square was 3.8 at 1 degree of freedom and p=0.05**.** Since the calculated chi-square was far much higher than the critical chi-square, there was evidence to reject the hypothesis that there is difference in information sharing strategies by Egerton University and Private Farm. The study established that both the category of farms perceived information sharing as a key tool for improvement of their performances.

Hypothesis 7: There is difference in information utilization strategies used by Egerton University and Private Farms.

Table 13: Contingency Table of the Farms Perception on Information Utilization

Farm	Agree	Disagree	Total
Egerton University Farms	2	13	15
Private Farms	13	2	15

Source: Field Data (2008)

The calculated chi-square was 15.5 whereas the critical chi-square was 3.8 at 1 degree of freedom and p=0.05**.** Since the calculated chi-square was far much higher than the critical chi-square, there was evidence to reject the hypothesis that there is difference in information utilization strategies by Egerton Universit and Private Farms. The study established that both the category of farms perceived information utilization as a key tool for improvement of their performances.

Hypothesis 8: There is difference in information use for divesture strategies used by Egerton University and Private Farms.

Table 14 Divestures: Contingency Table of the Farms Perception on the use of Information in Divesture Strategies.

Farm	Agree	Disagree	Total
Egerton University Farms	0	15	15
Private Farms	15	0	15

Source: Field Data (2008)

The calculated chi-square was 15.5 whereas the critical chi-square was 3.8 at 1 degree of freedom and p=0.05**.** Since the calculated chi-square was far much higher than the critical chi-square, there was evidence to reject the hypothesis that there is difference in information use for divesture strategies by Egerton University and Private Farms. The study established that both the category of farms perceived information use in the farms divesture as a key tool for the improvement of their performances.

4.0 Summary, Conclusions and Recommendations

4.1 *Summary of the Key Findings*

The study established that the private farms were more profitable than Egerton University farms. Secondly, the study established that private Farms are more productive in both crops and milk productivity. Third, the study found out that the private farms were more aware why they acquired the information compared to Egerton University farms, a scenario which will make the private farms be more competitive than the university farms which were not clear on their reasons for acquiring information. Fourth, the private farms acquired information for their competitive advantage from various sources compared to Egerton University farms, a situation which made the private farms be more competitive than the university. Fifth, the study established that the private farms perceived information collection techniques to be a specialty in knowledge management that made them to have competitive advantage over the university farms. Six, the study established that the private farms used different strategies for information sharing which they perceived to be competitive advantage. Seven, that the private farms acknowledge information as a critical knowledge management practices that can strategically help them to achieve different divesture scenarios.

4.2 Conclusions

Based on the results from data analysis and findings of the research, one can safely conclude the following; Knowledge management is the new era technological application of knowledge in critical planning, appraisal, decision making, evaluation and redesign of farms operative systems. Few countries in the world today have reached the era of knowledge based economy, whereas the third world country like Kenya is still struggling to achieve industrialization by 2030. Some farms in Kenya have discovered the importance of knowledge management in being competitive and in niching their operations. The study found out that the private farms have remained more profitable, productive and with more positively focused perception on the application of knowledge management in their entire operations compared to Egerton University farms. The perception in the use, acquisition, collection, sharing, utilization, storage and divesture of Knowledge management on the other hand were equally perceived by both the farms as important tool for attaining their respective competitiveness.

4.3 Recommendations for Improvement

From the findings and conclusion of this study, the following recommendations are very crucial for developing effective knowledge management and its application in the farms. The farms should establish a functional knowledge management department in their managerial hierarchy and to operationalise its success in the running of the farms. This will make this new technological era be realized not only in the farms but also in the entire farming systems in Kenya. Secondly, the farms should adopt and adapt the application of knowledge management in their profitability endeavor. This will make the farms get knowledge at their finger tips on the variables that are the enablers of profitability like the assets, operating income and expenses. The farms will be able to control the expenses by improving their asset base which is the source of capitals.

Thirdly, the farms need to realign their productivity operations around the wheels of knowledge management. This will make them easily compare their productivity stands not only with the established local standards but also international standards. Fourth, the farms need to improve on their perception on the application of knowledge management in their entire operations. Knowledge management should be used for innovative product design and improvement processes which are the desire of the customers who consume the products.

4.3 Suggestion for Further Research

The following related areas can be researched on to add up to the knowledge of what this study has achieved. First, there is a need to carry out a comprehensive evaluation of the agricultural policy in Kenya to establish the entrenchment of knowledge management. Such a study will help knowledge workers and farmers realize an all inclusive knowledge based agricultural policy. Secondly, a research should be carried out to evaluate the impact of the use of knowledge management in the national agricultural productivity in Kenya. The findings from such a study will help agricultural and industrial policy makers understand the level at which Kenya is in, in the use of agricultural knowledge management.

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