INFLUENCE OF PRODUCT DIVERSIFICATION DRIVERS ON PERFORMANCE OF DAIRY ENTERPRISES IN KENYA

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Influence of Product Diversification Drivers on Performance of Dairy Enterprises in Kenya

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DECLARATION

This thesis is my original work and has not been presented for of a degree in any other university.

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DEDICATION

I wish to dedicate this research proposal to my loving and wonderful parents Mr. Francis and Mrs. Shiphrah Kariuki. You are the best parents I could wish for.

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ACRONYMS

AI: Artificial Insemination

BSC: Balance Score Card

GDP: Gross Domestic Product

GOK: Government of Kenya

ILRI: International Livestock Research Institute

ISIC Rev. 4: International Standard Industrial Classification Revision 4

KARI: Kenya Agricultural Research Institute

KCC: Kenya Cooperative Creameries

KDB: Kenya Dairy Board

NZ: New Zealand

OECD: Organization for Economic Co-operation and Development

ROK: Republic of Kenya

SDCP: Smallholder Dairy Commercialization Programme

SDGs: Sustainable Development Goals

SNV: Stichting Nederlandse Vrijwilligers (Netherlands Development Organization)

SSMVs: Small Scale Milk Vendors

DEFINITION OF TERMS

Dairy Enterprises: Traders who sell milk and other livestock products (Wambugu, Franzel, Cordero, & Stewart, 2006).

Dairy Farmers Farmers who practice a mixed crop - livestock system, food crops, including a variety of vegetables and fruits are grown in combination with fodder for livestock and sometimes perennial cash crops. The system works best in high potential areas with adequate rainfall (generally over 1000 mm), short dry seasons (3-4 months at most) and fertile soils, often of volcanic origin (Wambugu *et al.*, 2006).

Informal Dairy Enterprises: Traditional milk markets from small-scale farmers to small-scale Milk (SSMVs) vendors selling raw unprocessed milk (Kamundi, 2014).

Inputs Inputs are resources into the production process and include among others, raw materials, financial strength, capital equipment, skills of individual employees, patents and brand names (Grant, 1991).

Marketing: The identification of customer wants and needs, and adding value to products and services that satisfy those wants and needs at a profit (Khan, 2011).

Performance: Outputs of an organization which can be measured both qualitatively and quantitatively such as product quality, prices in terms of competitiveness or its outcomes such as profit (Johnson & Scholes, 2005).

Product Diversification: Expansion into products that are new to the firm based on exploitation of scale and scope advantages (Holcomb, Holmes & Hitt, 2006).

Technological Innovation: New technology that tends to focus on solutions and which creates an exclusive market for a new product, for example via patent protection (Terziovski, 2002).

Value Addition: Involves improving efficiency, providing expertise, providing investment, fostering innovation, mitigating risk created by the variety and variability of diversity and encouraging collaboration and coordination of effort which could result in products or services which a single unit could not deliver (Johnson & Scholes, 2005).

ABSTRACT

The dairy sub-sector constitutes that largest share of livestock contribution to Kenya's GDP, that is, 3.5per cent of the total GDP, with the country having the largest dairy herd of 70 per cent, in Eastern and Southern Africa. The sector is the most developed within the livestock sub-sector yet faces various challenges key among them being very little value addition especially with regard to the variety of dairy products produced, low quality of dairy products produced and high costs of production incurred. This has robbed the country of the opportunity to increase the shelf life of dairy products as the excess milk produced especially during the high rainfall seasons goes to waste leading to loss of income. Product diversification is one of the best strategies for increasing profitability, reducing risk, achieving high growth and ensuring more efficient resource allocation in businesses. In the informal dairy sector which is smallholder dominated, product diversification can go a long way in helping to improve food security and increase incomes hence reducing poverty. Questions have however been raised on whether a smallholder dominated economy can diversify and whether smallholders participate significantly in product diversification towards high value products. This study seeks to answer this question by providing an empirical model of three variables: inputs, technological innovation and markets, moderated by value addition, that influence the performance of dairy enterprises in Kenya. Descriptive research study design was employed based on a target population of approximately 696 milk bars/milk traders in Kiambu County. Cluster and simple random sampling were used to select a sample size of 252 dairy enterprises in the county. Semi-structured questionnaires were used to collect data and t-test, Pearson correlation as well as multiple regression analysis used to analyze the data. The F-test was used to test the hypothesis of the study. SPSS Version 16 aided in the data analysis. The findings of the study show a significant positive linear correlation between access to inputs, level of technological innovation, access to markets and dairy enterprise performance. The results however revealed that value addition does not moderate the combined relationship between access to inputs,

level of technological innovation, access to markets and dairy enterprise performance in Kiambu County, Kenya. Value addition to dairy products has positive implications on the profitability of the dairy enterprises and more dairy enterprises should be encouraged to add value to milk. The excess milk generated during the rainy season can therefore be used for value addition, hence reducing its wastage by transforming it into profitable products. Recommendation is made to the dairy industry players and the government take a more proactive approach especially in training the SSMVs on value addition of milk into higher value added dairy products. Lending institutions should be open to financing the informal dairy sector to enable them venture into value addition activities. Assistance should be given to the milk bars to enable them procure technology like yoghurt dispensers and simple equipment for processing products like cheese and the government should assist the SSMVs in getting markets for their value added dairy products. The study proposes that other counties known to be large producers of milk should be investigated in order to have a holistic picture of the entire country as well as a study done on total product diversification strategy by the milk bars with regard to performance.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Diversification has become an important aspect of business strategy with reasons for this increased focus being, increased profitability, reduction in risk, increasing competition, higher growth and more efficient resource allocation (McDougall & Round, 1984). In terms of poverty reduction, product diversification is appealing with most high-value food commodities generating quick returns, hence offering smallholders a perfect opportunity to increase their incomes (Birthal, Joshi, Roy & Thorat, 2007; Singh, 2011). Product diversification involves the addition of new products to existing products either being manufactured or being marketed.

Product diversification can either be related diversification or unrelated diversification. Thompson Jr., Strickland & Gamble (2005) defined Related Product Diversification as "a strategy that involves businesses whose value chains possess competitively valuable cross-business value chain match-ups or strategic fits. The appeal of related diversification is exploiting these match-ups to realize a "1+1=3" performance outcome and thus build shareholder value. Diversification makes good strategic business sense only if it results in added shareholder value. This is based on three tests; first is the industry attractiveness test, that is, favourable competitive conditions and a market environment conducive to earning profits. Second is the cost-of-entry test, that is, the cost to enter a target industry must not be so high as to erode the potential for profitability. Third is the better-of-test, that is, diversifying into new businesses must offer potential for the company's existing businesses and the new business to perform better together under a single corporate umbrella than they would perform operating as independent, stand-alone businesses". Unrelated diversification refers to pursuing

opportunities beyond the current product and market base of an organization and outside the current industry (Johnson & Scholes, 2005).

According to Grant (1998), some of the most important sources of value creation within a diversified firm are the ability to apply common general management capabilities, strategic management systems and resource allocation processes to different businesses. When considering grand strategies that would broaden the scope of their company's business activities through integration, diversification or joint venture strategies, managers must examine whether opportunities to build value are present (Pearson & Robinson, 2011). Consistent with propositions of Grant (1998), they continue to assert that these opportunities to build value via diversification strategies are usually found in market-related, operating-related and management activities with the opportunities centering on cost reduction, improving margins or providing access to new revenue sources.

A report by Ireland Dairy Industry Prospectus (2009) indicated that, "Global economic growth provides the foundation for increased demand for dairy products. Demand for milk products in China, Asia, Russia, Ukraine, Argentina and the Middle East continue to outstrip supply for all dairy products." The report also stated that, economic growth in developing countries was crucial as dairy consumption is responsive to income growth in these countries; with rising incomes, as well as high population growth rates in developing countries, consumers diversify their diets and consume more dairy products leading to a greater demand for more high-value products.

Dairy production is increasing rapidly in East Africa, which hosts roughly 3 million dairy farmers, with Kenya having 2.1 million dairy farmers who are increasingly acquiring improved dairy cattle (local animals cross bred with exotic ones) and a growing interest in dairy goats (Wambugu, Place & Franzel, 2010). Approximately 80 per cent of dairy farming households in Kenya have improved dairy cows which produce

on average 7-8kg/cow/day; with the potential for farmers' breeds to produce three times as much (Wambugu *et al.,* 2010). Comparisons with neighboring Kenya and Tanzania show that in terms of per unit income per capita, consumption of dairy products in Uganda remains very low, in spite of growth in income levels generally; in Kenya, where incomes are lower, some $0.07 of every dollar of income is spent on milk and dairy products, while in Uganda the figure is less than $0.02 (Staal & Kaguongo, 2003). According to Wambugu *et al.,* (2010), milk production increased during the 1990s at an annual rate of 4.1 per cent in Kenya and 2.6 per cent in Uganda, the reason for such growth being a high domestic consumption, with Kenya reporting a per capita consumption of 145 litres per year, which is among the highest rates in the developing world.

The dairy industry in Kenya has been growing with yields of 564 kilograms per year as at 2007, with the growth being attributed to increased yield per cow, though its yields remain significantly lower than international standards; South Africa and Argentina have yields ranging between 2500 and 3500 kilograms per year, while the USA stands at 9000 kilograms per year (Techno Serve, 2008). According to a report by Bolo, Lorika and Obonyo (2011), most of the milk sold in Kenya before liberalization and immediately after liberalization was through the Kenya Cooperative Creameries (KCC), who had a monopoly to process all the milk. The report documents that at the time of liberalization in 1992, government services to large and small producers had in many cases ceased to function or were very erratic with instances of unpaid or overly delayed payment for milk deliveries. Their report noted that the near collapse of the KCC in the 1990s left farmers with no outlet for much of their production. This resulted in rapid growth of the informal milk trade which is faced with several challenges such as milk gluts during the rainy season, hygiene issues and milk adulteration.

A question on which studies conducted previously are not unanimous is how to define "formal" with no clearly defined boundary between formal and informal firms (Gelb,

Mengistae, Ramachandran & Shah, 2009). In this study, informal dairy enterprises refer to traditional milk markets; from small-scale farmers to small-scale milk vendors (SSMVs) and milk bars selling raw unprocessed milk (Techno Serve, 2008; Kamundi, 2014). Gelb *et al.,* (2009) in a study comparing the performance of small informal and small formal firms in South and East Africa indicated that informal firms in the latter region are potential sources of growth and employment creation. The informal dairy sector in Kenya employs more people than the formal sector accounting for 70 per cent of total jobs in dairy marketing and processing (Muriuki, 2011). Gelb e*t al* noted that there is no difference in the performance of small formal and small informal firms in East Africa with both having the same level of productivity. They argued that the explanation could lie in the weak delivery of services that are supposed to flow from formalization and the weak ability to enforce formalization (Gelb *et al.,* 2009).

Gelb *et al.,* (2009) argue that different business environments have different costs and benefits of formality or informality and in turn may give rise to different probabilities of access to services such as electricity or finance. With the regulatory framework in the dairy sector changing over time, the informal milk market in Kenya has been licensed and milk traders now pay KDB a cess fee of $ 0.002 per litre on milk produced on behalf of the producers (Chepkoech, 2010).To this end, the legalization of the informal milk sector in 2007 saw dairy enterprises record an increase of 54 per cent of milk volume traded in 2009 (Baiya & Kithinji, 2010). Kamundi (2014) also noted that there has been proactive engagement by the KDB in training and certification of small-scale milk vendors (SSMVs) to safeguard public health and address quality concerns rather than trying to stamp out the informal sector. While these efforts are commendable, there has been no effort to address the milk glut problem during the rainy season in the informal sector by the government.

As stated in ROK (2009), “Since 2003, dairy production has grown impressively as manifested by an increase in production from 2.8 billion litres in 2002 to 3.8 billion

litres in 2006, representing a growth of 30 per cent. Milk intake by processors also increased from 178 million litres to 362 million litres during the same period representing a growth of 253 per cent, while milk prices increased from a low of $0.08 per litre to a high of $ 0.20 per litre. In the year 2006, Kenya exported about 14 million litres of milk worth $ 7.78 million compared to less than one million litres exported prior to 2003." Performance of the sector has continued to improve with processed milk increasing to 406.5 million litres in 2009 with milk prices rising to $0.30 per litre during the same period (ROK, 2010). According to ROK (2011), the dairy sub-sector recorded major output increases of formally marketed milk from 406.5 million litres in 2009 to 515.7 million litres in 2010. This being the largest percentage increase observed over the last 5 years. Despite this growth, the uptake of milk by processors is still low which means that the variety of milk products produced is also low.

Improved performance in the dairy sector has stimulated growth in related industries that manufacture animal feeds, veterinary drugs, packaging materials and other equipment. The good performance has been attributed to good pasture following good rainfall in key milk producing areas which led to a glut that surpassed processing capacity of the milk, resulting in huge quantities going to waste. The dairy sector is highly affected by rainfall patterns, with gluts during periods of high rainfall. Much of the glut milk goes to waste because supply exceeds the demand by dairy processors, with the bulk being consumed in fresh form. Milk production has continued to increase, yet there is very little value addition especially with regard to the variety of dairy products produced (ROK, 2007).

In Kenya, about 80per cent of the milk consumed in the domestic market is produced by small-scale producers and marketed through informal channels (GOK, 2003). This translates to only 20per cent of the milk entering the formal milk processing channel. This could be attributed to the fact that the informal channel fetches better prices for the farmers and is sold at lower prices to consumers than the formal channel, it generates immediate cash flow to farmers, the preference by Kenyans for raw milk due to the high

butterfat content, easy accessibility and the fact that it can be sold in variable quantities (Techno Serve, 2008; Muriuki, 2011). A report by SNV (2013) indicated that producers selling to bulking agents such as cooperatives and chilling hubs receive a lower price of about $ 0.30-0.33 per litre of milk while cash based traders in the informal sector purchase the milk at $ 0.33-0.44 per litre, representing a difference of about $0.11 per litre. The report also noted that a farmer selling milk through the formal sector needed 6 cows to break even, but a farmer selling through the informal sector needed only 5 cows to break even. As noted by Gelb *et al.,* (2009), the decision on whether to formalize or stay informal may be quite "idiosyncratic" in East Africa.

When compared to best practices, most dairy farmers in Kenya do not use AI, do not feed their cows properly, do not water them properly and use minimum if any preventive health care which results in low quality genetic cows. This makes the cows under produce in respect to their already limited potential due to poor health and insufficient nutrient intake, with complete reliance on grazing further compounding the problem by making milk production seasonal: with April to August experiencing abundance of rainfall hence abundance of pasture. This leads to milk gluts in excess of the formal and informal markets capacity to absorb and during the dry season, January to March, there is a huge shortage of milk as an input (Techno Serve, 2008).

Previous studies on the dairy sector in Kenya have revealed that during the rainy season when there is surplus milk, delivery rejections by cooperatives and processors are very high and can go up to over 10 per cent compared to the average 1 to 5 per cent (ILRI, 2003; Muriuki,2003; Kamundi, 2014). The cooperatives and processors are the actors in the value chain who are expected to absorb the excess milk when there are such surpluses. Various suggestions have been made on how to deal with the excess milk during the rainy season. These include: expansion of processing facilities to produce long life products, implementation of strategic milk reserves policy by the government of Kenya (ROK, 2010), a proposal to avail a grant of $ 3.33 million to KDB to buy the

excess processed milk from processors as a short term intervention (Wambugu, Kirimi & Opiyo, 2011), among other medium and long term interventions. However, such interventions still fall short of effectively addressing the informal sector where the bulk of the milk is sold. This is further compounded by the high milk delivery rejection rate by processors during the rainy season. During a past milk glut in 2010 when formal processors were unable to sell their milk, the informal sector recorded increased sales picking up most of the milk that the formal sector was rejecting as a result of reduced demand (Baiya & Kithinji, 2010).

Hashai and Delios (2011) noted that availability of resources leads to an expansion in diversification. Other studies by Chatterjee and Wernerfelt (1991) argue that a key factor in choosing a diversification strategy is the resource situation of the organization, particularly, underutilized resources, which is likely with related developments, whereas excess financial resources may be used to venture into unrelated developments, particularly if other resources and competencies are difficult to develop or grow quickly. The dairy sector experiences inadequate credit facilities, a weak institutional and legal framework and poor handling of the supply chain (ROK, 2008; Bolo *et al.*, 2011).

Technology innovation is a challenge in production of a variety of milk products in Kenya. For instance, only New KCC and Brookside have the facilities required to process milk to milk powder with costs of production being high and profit margins being very low (ROK, 2010; Kamundi, 2014). According to Kamundi (2014), a newly drafted dairy policy acknowledges the role played by SSMVs in Kenya and includes measures such as development of low cost appropriate technologies, training on safe milk handling and establishment of a supportive certification system.

There are different perspectives as to the actual performance of dairy products. One perspective is that the dairy sector worldwide has continued to grow expansively due to the increased global demand for milk based products, growth in population, an increased

desire to improve nutritional standards and introduction of a variety of milk based products, with Asia, Africa, Central America and the Middle East reporting increasing demand for imported dairy products (DairyNZ, 2009). This is supported by an interesting aspect of Latin American studies in the dairy sector where the production of cheese by small Salvadoran enterprises has increased and where taste and aroma have a greater influence on the quality of the product than does compliance with hygiene rules and standards, though the cheese is targeted at the local market (Pietrobelli & Rabelotti, 2006). The other perspective is that among the problems facing the dairy sector was the absence of proper consumer education to appreciate the value of fresh milk and milk products suggesting below expected thresholds of performance (Ranaweera, 2009). This presents two conflicting viewpoints on the nature of performance of the sector. Most dairy enterprises lack the necessary knowledge and business skills to measure the costs and hence the profitability or otherwise of their businesses (Techno Serve, 2008). This emphasizes the need for such kind of training but also presents challenges in terms of estimating and calculating the actual performance of these enterprises.

1.2 Statement of the Problem

According to a report by Bolo *et al.,* (2011), the Ministry of livestock and fisheries reported that dairy farmers lose about 95 million litres of milk annually due to waste and spoilage in farms and along the market chain. Specifically, Bolo *et al*., (2011) reported that farmers are faced with lack of market access for their excess milk. Because fresh milk is highly perishable, milk losses in the informal sector are high due to lack of milk collection and gluts during the rainy season (Muriuki, 2003; Techno Serve, 2008; KARI, 2009; ROK, 2010; Muia, Kariuki, Mbugua, Gachuiri, Lukibisi, Ayako &Ngunjiri, 2011; Wambugu *et al*., 2011; SNV, 2013). Karanja (2003) reported that milk production in Kenya is higher than the reported official statistics and that this could explain the observation shared by many in the dairy industry that the country is increasingly being faced by glut situations. According to Karanja, in Kiambu for instance, one dairy

cooperative had 28,000 litres of milk worth Kshs 450,000 going to waste in a month due to rejection by one of the processors, with the story being the same all over the country. In an impact assessment study on the informal milk traders, the main concern they highlighted was the sustainability of their businesses given the erratic supply of milk: during periods of excess supply (glut) the price of milk drastically falls making it difficult for them to make profits (ROK 2011). Regionally, similar challenges of surplus milk have been reported in a country like Uganda, with the dairy sub-sector being dominated by the informal market (Staal &Kaguongo, 2003). Globally, countries like Sri Lanka, China and Mongolia have also reported the challenge of handling excess milk during months of high milk production and the dominance of the informal dairy market (Food and Agricultural Organization, 2009; Ranaweera, 2009).

While adding value to farm and livestock products before they reach the local and international market is one of the key aims of Vision 2030, value addition in the dairy value chain is still a challenge (ROK, 2007). The dairy sector faces inadequate exploitation of value addition which robs the country of the opportunity to increase the shelf life of products (ROK, 2008). A report by Techno Serve (2008), indicated that in the informal market, only 16 per cent of the milk goes through artisanal processing and is sold as homemade sour milk (*mala* or *lala*) or yoghurt, while in the formal sector, very similar statistics prevail with 85 per cent of the milk being sold as fresh milk either as short life pasteurized milk or as long life UHT milk, yoghurt makes another 3 per cent, fermented milk 7 per cent, powder milk 3 per cent, with cheese and butter making a paltry 2 per cent of value added products sold. Another report by Muriuki (2011) indicated that 85 per cent of the marketed milk in Kenya is sold raw. These statistics indicate that there is very little value addition in the dairy sector in Kenya.

Value addition through product diversification is therefore one way of solving the problems associated with milk gluts during the rainy season, milk perishability and uncompetitiveness of the dairy sector in the country. While there are a number of aspects

that influence a decision to pursue value addition through product diversification strategy, the following variables were investigated: inputs, technological innovation and markets. This study sought to find out the influence of these variables on dairy enterprise performance in Kenya.

1.3 Objectives

1.3.1 General Objective

The aim of the study was to investigate the influence of product diversification drivers on performance of dairy enterprises in Kenya.

1.3.2 Specific Objectives

1. To determine how access to inputs influences performance of dairy enterprises in Kenya.
2. To investigate the extent to which level of technological innovation influences performance of dairy enterprises in Kenya.
3. To determine how access to markets for diverse products influences performance of dairy enterprises in Kenya.
4. To establish the moderating influence of value addition on the relationship between access to inputs, level of technological innovation, access to markets and performance of dairy enterprises in Kenya.

1.4 Research Questions

1. How does access to inputs influence performance of dairy enterprises in Kenya?
2. What is the extent to which level of technological innovation influences performance of dairy enterprises in Kenya?
3. How does access to markets for diverse products influence performance of dairy enterprises in Kenya?

4. What is the moderating influence of value addition on the relationship between access to inputs, level of technological innovation, access to markets and performance of dairy enterprises in Kenya.

1.5 Research Hypothesis

H_{01}: Access to inputs has no influence on performance of dairy enterprises in Kenya.

H_{a1}: Access to inputs influences performance of dairy enterprises in Kenya.

H_{02}: Level of technological innovation does not influence performance of dairy enterprises in Kenya.

H_{a2}: Level of technological innovation influences performance of dairy enterprises in Kenya.

H_{03}: Access to markets for diverse products does not influence performance of dairy enterprises in Kenya.

H_{a3}: Access to markets for diverse products influences performance of dairy enterprises in Kenya.

H_{04}: Value addition does not moderate the relationship between access to inputs, level of technological innovation, access to markets and performance of dairy enterprises in Kenya.

H_{a4}: Value addition moderates the relationship between access to inputs, level of technological innovation, access to markets and performance of dairy enterprises in Kenya.

1.6 Significance of the Study

The dairy value chain is a Government of Kenya priority. The dairy industry is placed very high in the broader national goals of poverty reduction, employment creation and food security, in line with the Sustainable Development Goals (SDGs). Further, dairy is the largest agricultural sub-sector in Kenya and commercial dairy production is

considered by government as providing one of the best conduits for meeting poverty reduction and economic growth goals as it underpins sustainable employment generation (Pelrine, 2009). The research will therefore assist the government and other policy makers to make appropriate decisions with regard to improving the dairy sector based on the recommendations that will be provided.

Findings from this study will prove useful to industry players in making decisions with regard to product diversification and exploring opportunities for regional expansion as well as exportation of dairy products. Other researchers will also benefit from the findings in line with existing knowledge available on the relationship between product diversification strategy and performance of dairy enterprises particularly from a developing country perspective and therefore provide a basis for conducting further research in the Kenyan context.

1.7 Scope of the Study

The study was carried out in Kenya, a developing country which is one of the East African Countries. It is a dual economy with a modern sector as well as a traditional subsistence sector. Nairobi is the capital city of Kenya and has a total population of 3,139,369 having the highest population density in the country and is also a high milk density area with parts of it receiving milk supplies from Kiambu County (Kaitibie, Omore, Rich & Kristjanson, 2010). Kiambu County formed the basis of the study and is one of the 47 counties in the country. It is located in the central region and covers a total area of 2543.5 Km^2. It borders Nairobi and Kajiado Counties to the South, Machakos to the East, Murang'a to the North and North East, Nyandarua to the North West, and Nakuru to the West (County Government of Kiambu, 2013).

According to the 2009 Kenya Population and Housing census, Kiambu county population was projected to be 1,766,058 in 2012 with 873,200 males and 892,858 females (ROK, 2010). Kiambu County has relatively high poverty levels with absolute poverty estimated at 21.7 per cent, urban poor 45 per cent, rural poor 27.2 per cent and

food poverty at 25.1 per cent. The county contributes 0.3 per cent to the national poverty (County Government of Kiambu, 2013). According to information provided by the Ministry of livestock, Kiambu is ranked as the leading county in the country in milk production with the county being known for its livestock production especially dairy farming. In the year 2012, the county produced 267.5 million litres of milk valued at $0.06 billion (County Government of Kiambu, 2013). Hence the choice of the study area. The research was limited to only dairy enterprises in Kiambu County.

1.8 Limitations of the Study

Most of the traders do not keep records of their business activities and therefore the figures they provided were based on estimates. This was addressed by checking for inconsistencies in the information provided and probing the respondents further to try and get a correct estimate over a three year period only to enable easier recall. As a result, it was not possible to estimate overall profitability of the entire business activities from the enterprises. This was addressed by calculating profit per litre of milk and that of value added dairy products over a three year period. The study was conducted in Kiambu County which has the advantage of close proximity to Nairobi, the capital city of Kenya. This may make it have an advantage over other counties due to high demand for dairy products and better prices in the market.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter covers the literature reviewed in the area of product diversification and business performance. The product diversification strategy is reviewed in detail, providing relevant supporting literature on the divergent views and findings of various researchers on its relationship to business performance. The theoretical foundations and an empirical review upon which product diversification strategy variables are based and their influence on business performance are also presented.

2.2Theoretical Framework

The review on theoretical framework is divided into eight sections. The first, second, third and fourth cover theories on each of the independent variables: inputs, marketing and innovation, the fifth, sixth and seventh cover theories on value addition (related product diversification), while the eighth covers theories on the dependent variable which is business performance in relation to product diversification.

2.2.1 Resource Based View (RBV) Theory

The Resource Based View (RBV) Theory tries to explain that for a firm to enjoy sustained competitive advantage (SCA), it must acquire and control valuable, rare, inimitable and non-substitutable (VRIN) resources and capabilities, plus have the organization in place that can absorb and apply them (Barney, 1991). He classified a firm's resources into three categories: First is Physical Capital Resources (PCR) which includes physical technology - plant and equipment, geographical location and access to raw materials. Second is Human Capital Resources (HCR) which includes training,

experience, judgment, intelligence, relationships and insight of individual managers and workers in a firm. Third is Organizational Capital Resources (OCR) which includes firm's formal reporting structure, its formal and informal planning, controlling and coordinating systems as well as informal relations among groups within a firm and between a firm and those in its environment.

Grant (1991) argued that capabilities include what a firm can do as a result of teams of resources working together. He stated that development of capabilities can then be used as the basis of broadening a firm's product range which is a common feature of successful strategies of related diversification. Yuan *et al.,* (2004) suggested that diversified firms have higher financial leverage than non-diversified firms. Kraaijenbrink, Spender and Groen (2010) in their critique of the resource based view suggested that emphasis should not be placed on the dynamic capabilities but on incorporating time, space and uncertainty into the RBV debate and that continuous successful innovation is key in an organization because SCA is perishable.

Holcomb, Holmes Jr. and Hitt (2006) argued that diversification strategies that allow firms to acquire additional resources through acquisitions improve a firm's ability to compete by creating new capabilities or altering existing capabilities. Inference can therefore be made that horizontal integration through acquisition of competitors in order to increase market share is a favourable strategy. This will lead to economies of scale. Brookside, one of the leading dairy processors in Kenya has adopted this strategy by acquiring competitor brands such as Tuzo, Delamere and in November, 2013, it acquired Molo Milk. This study used access to inputs as the resource that was investigated. The theory therefore informed the first variable which is access to inputs, where teams of resources in the form of finances, raw materials and skills can be used to diversify a firm's product range leading to success especially with regard to related product diversification.

2.2.2 Five Generations of Innovation Models

Five Generations of Innovation Models was put forward by Rothwell (1994) who argued that the evolution of innovation moves along five generations. These include: First generation innovation (technology push concept)-1950s to mid-1960s which argued that more research and development resulted in more products that were pushed on to the market, second generation innovation (market pull)- mid 1960s to early 1970s where new products were produced mainly based on existing technologies, supply and demand were in balance and large and highly efficient companies fought for market share, third generation innovation (coupling model)-early 1970s to mid-1980s which was characterized by high rates of inflation and demand saturation and companies were forced to adopt strategies of rationalization and consolidation. Successful innovation was based on a portfolio of wide ranging systematic studies covering many sectors and countries, fourth generation innovation (integrated model)-mid 1980s to early 1990s where there was an increased strategic emphasis on technological accumulation, new focus on manufacturing strategy, rapid growth in strategic alliances between companies and shortening of product life cycles. Lastly was the fifth generation innovation (networking model)-from 1990s where firms strive towards better integrated product and manufacturing technologies. The ability to control product development speed is seen as an important core competence (Rothwell, 1994). This theory informed the second variable which is technological innovation, where firms today aim at developing better technologies to produce new products which have positive implications on performance.

2.2.3 Institutional theory

The institutional theory has been used to explain firm diversification in transition economies (Yuan, Jun & Hailin, 2004). The researchers contended that institutional relatedness contributes to firm diversification, in the sense that the firms share institutional characteristics such as government support, social networks and cognitive

pillars of executives who are in decision making and that diversified firms are a more effective form of business operation in developing countries. According to them, in transition economies, the market was inefficient or ineffective due to two reasons, first there was a lack of critical resources for economic development which are critical to firm strategic decision making and second, the market became inefficient or ineffective when transactions of resources were dominated or controlled by non-market exchange governance. In order to overcome market failure, internal markets should be established for exchange of critical resources which are difficult to obtain from external markets. Through the internal markets, firms invest retained earnings in new businesses and this leads to diversification. The study by Yuan *et al.*, (2004) further suggests that firms that diversify earn higher return on equity than non-diversified firms and that firms that diversify have higher growth rates in assets than non-diversified firms. This theory informed the third variable which is markets, where firms use the finances within the organization to develop new products targeted at local markets which leads to better performance.

2.2.4 Theory of Access

Theory of Access by Ribot and Peluso (2003) contends that access is about all possible means by which a person is able to benefit from things. They assert that access analysis involves identifying and mapping the flow of a particular benefit of interest, identifying the mechanisms by which different actors involved gain, control and maintain the benefit flow and its distribution, and an analysis of the power relations underlying the mechanisms of access involved in instances where benefits are derived. They exemplify that benefits could be farm-gate profits from a particular crop or identifying the flow of benefits from that particular crop throughout its lifetime trajectory. They conclude that access is based on bundles of power-relations such as access to markets, capital, technology, labour, knowledge, authority, identity and social relations that enable actors to derive benefits from resources. This theory also informed the third variable, access to

markets, where the flow of benefits derived from selling value added products to various customers, leads to related product diversification.

2.2.5 Ansoff's Theory

Ansoff's Theory was put forward by Igor Ansoff. According to Ansoff (1957), a study of the 100 largest United States corporations from 1909 to 1948, indicated that few companies that had stuck to their traditional products and methods had grown. He continues to state that a company can diversify vertically through branching into production of component parts and materials and introduction of new products. It can also diversify horizontally by introducing new products which may not necessarily contribute to the present line in any way, but may cater for aspects which lie within the company's know-how and experience in technology, finance and marketing. There is also lateral diversification by moving beyond the confines of the industry to which a company belongs. He continues to say that choice of the diversification strategy to pursue is dependent on the objectives that a company seeks to achieve: if a company is facing declining sales due to declining volume of demand, then it would be unwise to consider vertical diversification since this would just be postponing an eventual decline in business. If a company shows signs of growth, vertical and horizontal diversification would be desirable for strengthening the position of the company in its field of knowledge and experience. If the objective is to achieve stability, lateral diversification would be best. The theory therefore informed the moderating variable which is value addition, where firms will seek to venture into related diversification activities in order to grow and increase profitability of the business.

2.2.6 The Inverted-U Model

The Inverted-U Model was advanced by Palich, Cardinal and Miller (2000) who found that moderate levels of diversification yield higher levels of performance than either limited or extensive diversification. According to their findings, performance increases

as firms shift from single-business strategies to related diversification, but performance decreases as firms change from related diversification to unrelated diversification. Hall Jr. and Lee (2010) agree with these findings based on a study conducted whose findings suggested a curvilinear relationship between product diversification and accounting based performance indicators such as Return on Assets (ROA), their findings also suggested that there are different degrees of linearity for the diversification-performance linkage among different countries. The theory also informed the moderating variable, value addition, where as a firm, shifts from a single product (raw milk) to developing value added dairy products (related product diversification), it is likely to achieve better performance.

2.2.7 Linear Premium and Linear Discount Model

The Linear Premium and Linear Discount Model was proposed by Lee, Peng and Lee (2008) who argued that, in evolving transition economies, Korean conglomerates enjoyed a diversification premium between 1984 and 1996 but when facing institution transition, over a period of time, in the face of environmental uncertainty, conglomerates that are unable or unwilling to downsize and/or down scope, are likely to see their diversification premium decrease. If diversification premium is significantly reduced, it may turn into a diversification discount. Their argument further postulates that such downsizing and/ or down scoping requires a reduction in firm size and complexity in order to better fit within the changing environment. This theory also informed the moderating variable, value addition, where a firm is likely to achieve higher performance through limited (related product diversification). However, the gains may be eroded if a firm over-diversifies in the face of environmental uncertainty.

2.2.8 New Approach to Consumer Theory

The New Approach to Consumer Theory was proposed by Lancaster (1966) who sought to criticize the conventional consumer theory and one of the reasons for the criticism is

that the traditional consumer theory does not factor the introduction of new products, which is a common feature in businesses today. According to Lancaster (1966), "a new product means the addition of one or more activities (n+1) to the consumption technology." He continues to say that, "If a new good possesses characteristics in the same proportions as some existing good, it will simply fail to sell to anyone if its price is too high, or will completely replace the old good if its price is sufficiently low. A new good possesses characteristics in somewhat different proportions to an existing good, so if its price is too high, it may be dominated by some combination of existing goods and will fail to sell." This may have an impact on the performance of a business. He also posits that consumers have different tastes and that some consumers might like more of something that other consumers do not want. Triplett (1976) indicated that this theory stressed the disaggregation of the units (goods) in which transactions are conducted into some less aggregative quantities called characteristics. The central theme underlying this proposition was on a shift of analysis from "goods" to "characteristics". This theory informed the dependent variable, which is business performance, where customer tastes and preferences of the various value added products was likely to influence sales and profitability of each product. This will dictate whether a business will develop that product or not.

2.3 Conceptual Framework

Culas (2005) and Birthal *et al.,* (2007) identified the following as factors that drive product diversification in the agricultural sector: production technology, resource endowment and infrastructure in the form of markets. These variables therefore informed the conceptual framework of the study based on their influence on performance of the dairy enterprises. In this study, inputs referred to the resources that go into the production of a product, including, finances, raw materials and human resources. Technological innovation referred to ideas that may not be new and may have been around but never vigorously pursued Porter (1990), in the form of machinery and

equipment. Marketing referred to the search for markets for products through identification of customer needs and wants at a profit. Value addition referred to related or linked product diversification, that is, organizations in which the group of businesses emerged as a result of incremental steps from a core (Capon, Hulbert, Farley & Martin, 1988). Performance was measured in terms of profit and sales.

The conceptual framework of the study as informed by the theoretical framework and the specific objectives is presented diagrammatically in figure 2.1.

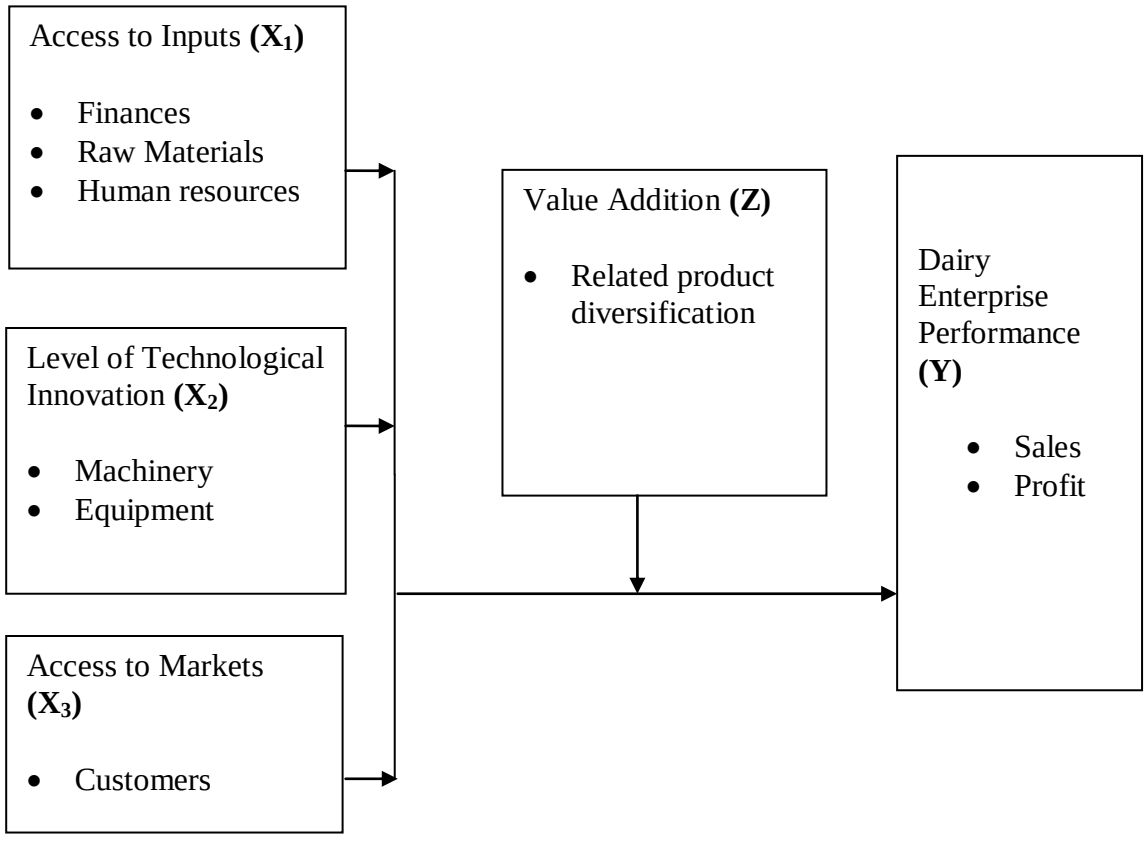

Figure 2.1: Conceptual Framework

2.4 Review of Literature on Variables

2.4.1 Inputs

Porter (1990) criticized the standard of economic theory that argues that factors of production: capital, land, labour, natural resources and infrastructure, will determine the flow of trade and a nation will export those goods that make most use of the factors with which it is relatively well endowed. He instead proposed that a nation does not inherit but instead creates the most important factors of production and that the stock of factors that a nation enjoys at a particular time is less important than the rate and efficiency with which it creates, upgrades, and deploys them in particular industries. According to him, the most important factors are those that are specialized to an industry's particular needs, they must be scarce, more difficult for foreigners to imitate and require sustained and heavy investment to create.

According to Grant (1991), resources are inputs into the production process and include among others, raw materials, financial strength, capital equipment, skills of individual employees, patents and brand names. He suggests that there are direct links between resources and profitability and that the ability to maximize productivity is particularly important in the case of tangible resources such as finance, plant and machinery and people. He alluded to the fact that it may involve using fewer resources to support the same level of business, or using the existing resources to support a larger volume of business.

According to Yuan *et al.,* (2004), firms grow and diversify in response to excess capacity in product, managerial and financial resources. The researchers also indicate that a firm uses internal transactions which include: mobility of resources including goods, capital, information and assets across units that are owned wholly or dominantly by the firm. Their findings seemed to suggest that diversified firms could achieve higher performance if they engaged in higher internal transactions of purchase from related

units and sales to affiliated units while non-diversified firms would achieve higher performance if they lowered internal transactions of purchase from related units within the organization but increase sales to affiliated units.

Yuan *et al.,* (2004) and Holcomb *et al.,* (2006) argue that non-diversified firms take advantage of economies of scale while firms adopting a diversification strategy enjoy economies of scope, through sharing strategic resources between strategic business units. Holcomb *et al.,* (2006) propose that, "diversification strategies that optimally structure the firm's resource portfolio, bundle such resources into valuable and difficult to imitate combinations across product-geographic markets can be a source of competitive advantage." Holcomb and his colleagues further assert that diversification strategies that allow firms to acquire additional resources, for example through acquisitions, may improve a firm's ability to compete by creating new capabilities or altering existing capabilities substantially. They argue that by obtaining resources to integrate with what a firm already controls may lead to more value over and above the costs of both old and new resources and increases the difference between the firm and its rival which provides a basis for achieving a competitive advantage.

Resource acquisition through internal development, acquisitions and strategic alliances requires finances. However, according to Holcomb *et al.,* (2006), resources accessed through alliances often demand lower financial commitments and may require less managerial attention than resources owned by firms, this allows them to focus their efforts on extracting additional value on the resources they own, which is beneficial when diversifying in uncertain environments.

A study conducted by Techno Serve (2008) found that the informal dairy sector is able to pass on input price increases and decreases to consumers compared to the formal sector which has much less flexibility as retail prices do not change quickly and frequently. This suggests that dairy enterprises in the informal sector can be able to

enjoy high profitability for their products without incurring additional costs as a result of fluctuations in input costs.

Hall Jr. and Lee (2010) in their findings found that financial leverage and performance based on Return on Assets (ROA) are negatively related. However the findings did not suggest the same findings with market-based performance measures as no significant results were found. These findings suggest that depending on the method used to measure performance of firms in relation to financial leverage, different results may be obtained and hence there is need for further investigation.

A study conducted by Muia *et al.*, (2011) in Nyandarua county, Kenya indicated that high costs of transportation due to poor infrastructure lead to high costs of other inputs such as artificial insemination (AI), animal health, extension, credit and electricity supply; the rural areas lack electricity which has led to reduced investments in cold storage facilities and processing facilities of the highly perishable milk and dairy products hence limited value addition of milk and milk products, with the cost of credit, limited use of land as collateral for financing dairy farming as well as limited number of banks in the area further compounding the problem of accessing credit from formal financial institutions.

2.4.2 Technological Innovation

Various researchers have tested the relationship between technological innovation and diversification. However conflicting viewpoints have emerged with some researchers finding that technological innovation does indeed influence the level of diversification in organizations (MC Dougall & Round, 1984; Kim & Kogut, 1996; Breschi, Lissoni & Malerba, 2003; Garci-Vega, 2006; Jarrar & Smith, 2011). Still another study by Hitt, Hosskison & Kim (1997) found out that product innovation and diversification were inversely related. Specifically, Baysinger and Hoskisson (1989) in their findings

reported that there was less research and development intensity in firms that had diversified in less related industries.

Studies by McDougall and Round (1984) indicated that firms that had diversified in technologically advanced industries earned significantly higher profit rates in all time periods and enjoyed lower relative variability in profit rates compared to firms that had diversified in industries with less technological opportunities. In contrast, no such significant differences were observed for non- diversified firms indicating that non-diversified firms do equally well in their specialized field. These findings therefore seem to suggest that technological innovation in diversified firms may result in superior performance.

Grant, Jammine and Thomas (1988) stated in their report that a firm whose product divisions are linked by common customers, distribution channels or technologies was likely to enjoy economies of scope than a diversified firm where such links were absent. However, they also postulated that firms can better exploit economies of scope in intangible assets such as technological innovations, brand reputation and production know-how through multinational diversification than through product diversification. This lends credence to the question of whether technological innovation in product diversification actually results in superior business performance or the relationship is in fact the reverse.

According to Porter (1990), companies achieve competitive advantage through acts of innovation including both new technologies and new ways of doing things. He proposes that innovation can be in terms of a new product design, a new production process or a new marketing approach. He reports that innovation is incremental, depending more on cumulation of small insights and advances rather than on a single, major technological breakthrough. Porter asserts that innovation may include ideas that may not be new and may have been around but never vigorously pursued. He also reports that domestic

rivalry creates pressure on companies to innovate and improve with local rivals pushing each other to lower costs, improve quality and service, and create new products and processes. Ebrahim, Ahmed and Taha (2010) seemed to agree with Porter by asserting that innovative development of existing products is required in order to stay ahead of competitors.

Hitt *et al.,* (1997) in their studies found that international diversification contributed to higher levels of innovation as it provided larger markets that helped firms reap the returns of innovation. However the same study found that product diversification was negatively related to Research and Development (R & D) intensity and that these negative effects of product diversification partially reduced the positive effects of international diversification on innovation. They attributed these negative effects of product diversification on innovation to tighter strategic and financial controls in product diversified firms, resulting in managers having fewer incentives to invest in R& D to produce innovation. They argued that product diversification would be best in internationally diversified firms where innovation was not very important taking care not to over-diversify internationally as this would result in negative returns.

A study by Terziovski (2002) indicated that technological innovation can create an exclusive market for a new product through patent protection. The study indicates that one of the performance excellence indicators in organizations is value innovation. It also suggests that value innovation intimately links customer value with technology innovation, though technological innovation on its own does not address buyer value, but rather tends to focus on solutions, while value innovation on the other hand focuses on redefining the problem.

Jeong (2003) argued that in less industrialized countries, firms lack the resources needed to develop innovative products and tend to manufacture goods on the basis of low cost labour based on imported technologies and processes. He continues to postulate that

larger firms have access to human, financial and technological resources which they can use to acquire new technologies and also have access to a variety of technological sources across markets internationally compared to smaller firms. He also reported that less industrialized countries develop me-too products rather than true innovations for a targeted premium market segment based on technology imported from abroad; as such these countries are heavily inclined towards product development innovations that can sustain their competitive advantage for a longer time horizon. On the other hand, Chiao, Yu, Li and Chen (2008) reported that, in emerging markets, subsidiaries that are well capitalized and have technological capabilities are able to exploit their resources in existing markets (related product diversification) and in new markets (unrelated product diversification).

Jarrar and Smith (2011) in their report were of the opinion that the Balance Score Card (BSC), which is a performance evaluation system, has the potential to solve the theoretical conflict on diversification-innovation relationship. According to them, the use of BSC with regard to product diversification enables management to continue using financial controls that provide objective short-term performance evaluation, while at the same time; the integration of strategic long-term control motivates management to be committed to innovation as an underlying factor of diversification strategy. Their empirical investigation found a direct and significant positive association between product diversification and the use of BSC, the use of BSC was also shown to positively influence organizational innovation and the implementation of Total Quality Management (TQM), which according to them helps in achieving a competitive advantage. They came to the conclusion that the BSC plays a significant role in linking product diversification to organizational performance.

A report by OECD (2011) cited a positive relationship between diversification through technological and non-technological innovation and comparative advantage with other countries and also indicated that, companies in the better- performing sectors of

emerging economies possess a stock of technological knowledge. The report also indicates that at the macro level, differences in per capita income and growth are due to differences in total factor productivity which is mainly driven by technological development and innovation with a strong influence on research and development (R & D), while at the micro level, in all sectors of activity, from high-technology to the more traditional resource-based industries, innovative firms exhibit better performance and create more and better jobs. The report further suggests that, for business innovation to translate into better macroeconomic performance, structural change is required to shift resources from non-innovative towards innovative firms irrespective of the industry.

2.4.3 Markets

According to a study conducted by Chistensen and Montgomery (1981), on the moderating effect of market structure variables, that is market share, market concentration, market growth, market profitability and absolute firm size, on the diversification, performance linkage, found that firms located in markets which constrain their growth or profitability are the most likely to diversify. They reported that firms or businesses in low opportunity markets are likely to find a similar lack of opportunity in markets which they could enter through constrained diversification, therefore they are likely to pursue unrelated diversification. They concluded that successful performance is the outcome of market opportunity combined with the capacity to take advantage of that opportunity, the low performance of unrelated portfolio firms suggests the danger of inattention to market structure in entry decisions or of knowingly entering highly fragmented, low profit markets. In addition, they asserted that these businesses are acquired because of unrealistic expectations of improving performance with new ownership and that market structure variables should be investigated which can lead to more realistic assessments of turnaround potential.

According to Yuan *et al.*, (2004) in a study that aimed at exploring the relationship between diversification, internal transaction and performance found that higher performance could be achieved when firms balance related purchase and related sales. Their findings seemed to arrive at the conclusion that with the progress of marketization, that is, when product markets become more open and liberal, competitive pressures increased in product markets. According to them, the question for diversified and non-diversified firms therefore was how to sell their products in the market. They continued to state that control over distribution channels or networks through which a firm sells its products to customers becomes an important means to get access to the market and also helps a firm explore its market power and create an entry barrier to rivals. Their findings continued to assert that the progress of marketization had the same impact on intermediaries hence firms become more selective when purchasing from affiliated units when more goods and services become available from affiliated sources and therefore related purchase could be negative to firm performance.

A report presented by Kiptarus (2005) indicated that raw milk vendors in Nairobi and other urban centers offer the main competition to the formal dairy sector in milk marketing with the market segment occupied by the raw milk market, both licensed and unlicensed, being more than 80 per cent. The report also stated that among the challenges experienced by the dairy sector include poor access to markets by farmers due to poor road infrastructure especially during the rainy season leading to a lot of wastage. It continued to suggest that the global market is very competitive with regard to diversity of milk and milk products of high international standards and there was therefore need for cooperation between farmers, research institutions and government to have high processing efficiency, which leads to lower consumer price and developed diversified global products.

A study conducted by Muia *et al.*, (2011) in Nyandarua county, Kenya indicated that the dairy sector posts low prices for milk with the low prices being attributable to poor road

infrastructure and long distance to markets which lead to high transportation costs; the high costs as well as inappropriate use of technologies makes smallholder dairy production in the county to be very uncompetitive leading to poor performance of the sector. Only 30 per cent of the households surveyed had access to good roads; with milk being highly perishable and farmers lacking the capacity to invest in cooling equipment, the high volumes of milk produced during the rainy season are therefore associated with high post-harvest losses, with the only alternative being selling the surplus milk at low prices through the informal channels.

A study by Sahara and Gyau (2014) that compares contractual agreements between farmers selling to traditional and supermarket channels found that in many developing countries, the role of modern market agents involving contractual arrangements with farmers is growing. The results of their study suggest the importance of verbal agreements in the contractual arrangements between farmers and buyers in both channels and therefore policies that promote written agreements are irrelevant. According to them, in verbal arrangements, buyers have to communicate aspects that are regulated in their agreements more frequently which prevents misunderstanding between farmers and buyers, buyers can offer advice to farmers on quality issues and can discuss with farmers on payment and price mechanisms. Their results also suggest that to improve farmers' commitment, buyers should not only focus on absolute price but rather on how they can earn the trust and satisfaction of the farmers. Their report continues to assert that buyers can improve the trust of farmers by providing payment on time, by following up on their promises, by offering fair prices for farmer's products and providing quicker responses to farmers' complaints and concerns.

2.4.4 Value Addition

Rumelt (1975) initial investigations into the relationship between product diversification and performance used Specialization Ratio (SR) to classify firms into: undiversified, single product firms, moderately diversified firms, which includes dominant, relatedly

diversified and unrelatedly diversified firms and highly diversified firms which includes conglomerates, relatedly- constrained and relatedly-linked firms. His findings suggested that there is a positive relationship between product diversification and firm performance. Specifically he argued that relatedly diversified firms perform better than unrelatedly diversified firms. His findings indicate that it is important to manage diversification as the merging of two large unrelated firms is likely to be accompanied by severe strategic and administrative problems.

Subsequent findings by Rumelt (1982) reinforced the earlier findings based on a sample of the Fortune 500 companies, that related businesses performed better than unrelated businesses. He argued that factors of production that enable diversity because of increasing returns are referred to as core factors which enable an organization reap the benefits of economies of scope. He continues to assert that if an organization can exhaust all economies of scale in the core factors with any single product then it need not diversify. He also argues that the limitations of efficient expansion of single products can be due to product markets that are differentiated, oligopolistic or otherwise constrained. The other limitation according to his report is that performance review and control is more strongly dependent on the number of business units controlled than on their size. This latter argument could explain the reason as to why the milk processing industry has failed to diversify their products.

Palepu (1985) used the Jacquemin-Berry entropy measure to determine a firm's performance as a result of pursuing either related product diversification or unrelated product diversification based on tests of 30 firms in the food manufacturing industry. He found that over time, firms with predominantly related diversification had better profit growth which translated to superior profitability level compared to firms with predominantly unrelated diversification. He argued that more is not always better, therefore, rather than pursuing diversification for the sake of it, management of a firm need to seek businesses that lead to real economic gains such as related diversification strategy.

Capon *et al.,* (1988) defined related or linked diversification as corporations in which the group of businesses emerged as a result of incremental steps from a core, each business linked to the previous one but where the entire group does not draw from a single common resource and that all other diversification strategies are unrelated. They labeled these as acquisitive conglomerates or passive. Their findings were similar to those of Rumelt (1975) and Rumelt (1982) with regard to superior financial performance for related diversification, but suggest that relatedness by market type (consumer or industrial) could be the explanatory factor.

A study by Yuan *et al.,* (2004) indicated that diversified firms have more opportunities to create value through internal transactions than non-diversified ones through sharing resources such as inputs or distribution channels so as to achieve economies of scope. Conglomerates can create value by serving as a source of investment funds for internal divisions through which financial synergies are created.

A report presented by Kiptarus (2005) indicated that Kenya's livestock sector is dominated by primary production with very little on-farm and off-farm processing taking place which translates to very little income for farmers and less jobs for Kenyans. His report suggested that value addition to livestock products was likely to improve rural incomes to farmers thereby saving on transport costs, creating the opportunities for the use of by-products as inputs in other farm operations such as manure, fuel and animal feeds, it also creates an opportunity for reducing farm losses through conversion of perishable products into durable products and will help in creating jobs in the rural areas hence reducing poverty and rural-urban migration. His report also suggested that value addition of livestock products prolongs shelf life of products and enhances packaging with increased earnings. His report further suggested that there was need for research on value addition, especially in the areas of processing, storage and packaging of livestock products, with one of the livestock products that he suggested as having the potential for value addition being milk.

A study conducted by Techno Serve (2008) on the dairy sector in Kenya found that some elements of taxation policy affect value addition to dairy products. For example, there is a high level of taxation for yoghurt processing versus other forms of processing. This suggests a need to re-evaluate the taxation policy on value addition to dairy products in order to encourage investment in value addition activities.

Odero-Wanga, Mulu-Mutuku and Ali-Olubandwa (2009) in a study on the value added milk products with regard to the constraints affecting women owned micro-enterprises in three districts: Nakuru, Nairobi and Kiambu Kenya found that with regard to related product diversification, 99.1% of the SSMVs sold fresh milk, 88% processed fermented milk, 36.1% processed yoghurt, 3.7% processed ice-cream and 0.9% processed ghee and butter. However the dairy enterprises were constrained in terms of access to finance for purchasing value addition equipment, lacked formal training on value addition skills and also lacked knowledge and skills on marketing which impacted negatively on the income generated from the sales of the value added dairy products. They recommended that women need to be included in planning of development programmes at all levels so that they could articulate the challenges they faced in an attempt to enhance value addition to milk. They also recommended that research needed to focus more on value addition technologies that are relevant and appropriate for the women micro-enterprises with the focus being on affordability and accessibility.

According to a report by Pelrine (2009), on agricultural value chain financing in Kenya, in the dairy value chain, that focused on four key dairy producing areas: Kabete, Nyeri, Nakuru and Eldoret, value addition to milk and milk by-products was assigned a weight of 10% in terms of evidence of diversification. The study found that diversification of value addition in the dairy value chain was excellent and sophisticated at both cottage and industrialized levels. Specifically at cottage level, he found that the additional return on value added provides the impetus for higher volume of milk purchases. His study found that pasteurized milk, ultra-heat temperature (UHT) milk, powdered milk, *mala*,

yoghurt, ice-cream, cheese and butter are produced and marketed in Kenya. Pelrine's study used a balanced score card where the score cards were assigned numeric weights on the basis considered valuable to the agenda of agricultural finance and rural development in Kenya. However, the ratings were based on perceptions of the raters and therefore were prone to subjectivity. Consistent with Pelrine, product diversification was therefore used to measure value addition in this study.

Burgers, Padgett, Bourdeau and Sun (2009) stated in his report that as much as empirical literature seemed to suggest that related diversification results in better performance compared to unrelated diversification, broader diversification need not necessarily result in better performance. They also argue that there was an implication that broader diversification has been over emphasized suggesting that firms that choose unrelated diversification have poorer managers. Their findings indicate that high profitability encourages specialization while low profitability encourages diversification. Their empirical findings also allude to the fact that low profitability firms who increase diversity and high profitability firms who reduce diversity enjoy higher sales growth than their opposites. They suggest that the initial profitability, situation, opportunities and challenges presented by the environment is what determines the strategy that a firm will adopt and therefore neither diversification nor specialization would be the better strategy for all companies. To them, alternative strategies are responses to the challenges faced by different organizations.

2.4.5 Business Performance

According to Varadarajan (1986), firms generally view growth and profitability to be among the attributes of corporate virtue that they should aim at achieving. Different researchers have used different measures to determine business' performance in relation to diversification. Some used accounting-based measures, others used market based measures, while yet others used both measures. Accounting based measures that have

been used by researchers to relate diversification to performance include: The first which is the most commonly used measure is Return on Assets (ROA) which is defined as the net income, that is, income available to common stockholders, divided by the book value of total assets (McDougall & Round, 1984; Sambharya, 1995; Hitt *et al.*, 1997; Pandya & Rao, 1998; Chang, 2007; Sukpinach & Rugman, 2007; Afza, Slahudin, & Nazir, 2008; Burgers *et al.*, 2009; Hall Jr & Lee, 2010; Hashai & Delios, 2011; Mun˜oz-Bullo´n & Sanchez-Bueno, 2011). The second, Return on Equity (ROE) is defined as the net income, that is, income available to common stockholders divided by stockholder's equity (McDougall & Round, 1984; Varadarajan, 1986; Sambharya, 1995; Pandya & Rao, 1998; Yuan *et al.*, 2004; Afza *et al.*, 2008; Pan, Tsai & Kuo, 2010). The third is Market Return (MKRT) which is computed by taking the difference between the current year's ending stock price, and the previous year's ending price, adding it to the dividends paid out for the year, and then dividing the result by the previous year's ending price (Pandya & Rao, 1998; Afza *et al.*, 2008). The fourth is Return on Net Assets (RONA) which is a measure of the total after tax return on the net assets based on the present value of a firm's physical resources, avoiding the distortion caused by different calculations of depreciation (Yuan *et al.*, 2004). The fifth is Return on Sales (ROS) also referred to as Operating Margin Profit (OPM) which is calculated as Net Income divided by Total Sales, it is used to measure the relative efficiency with which the firm produces and markets its output and reflects the attainment of synergies in business operations through diversification (Palepu, 1985; Sambharya, 1995; Chang, 2007; Sukpinach & Rugman, 2007; Burgers *et al.*, 2009; Hashai & Delios, 2011; Mun˜oz-Bullo´n & Sanchez-Bueno, 2011). The sixth is Return on Capital (ROC) (Varadarajan, 1986). Standard Deviation (SD) and Coefficient of Variation (CV) have also been used to measure risk of diversification (McDougall & Round, 1984; Pandya & Rao, 1998; Afza *et al.*, 2008).

Porter (1990) in a report identified demand as one of the four determinants of national competitive advantage. Specifically he noted that industries gain competitive advantage

where home demand gives their companies a clear picture of buyer needs and where demanding buyers put pressure on management to innovate faster and achieve sophisticated competitive advantage than their foreign rivals. He postulated that demand conditions provide advantages by forcing companies to respond to tough challenges, that is, home buyers can help a nation's companies gain competitive advantage if their needs anticipate or help in shaping those of other nations (indicating global market trends), if the nation's values, tastes and products are spreading to those nations.

Another market based measure used in relating product diversity to performance is Tobin's Q (AQ) which is calculated as the ratio of the sum of the market value of equity and the book value of debt over the book value of total assets in order to arrive at the value of a firm (Pandya & Rao, 1998; Afza *et al*., 2008; Hall Jr & Lee, 2010). Other market based measures that have been used to relate product diversification to performance include; customer acceptance, sales volume, market share relative to competitors and technical performance (Jeong, 2003; Hall Jr. & Lee, 2010; Jarrar & Smith, 2011). Due to concerns relating to confidentiality of financial information researchers such as Chiao *et al.,* (2008) categorized firms into three (1= incurred losses; 2= broke even; 3=earned profits) then applied an ordered logit regression to the analysis to relate product diversification to performance. Burgers *et al.,* (2009) used growth rather than absolute measures of ROS and ROA and argued that it more accurately enables useful comparisons.

2.5 Empirical Review

Product Diversification and performance has been one of the most frequently researched strategic issues of business in economics, finance and strategic management, in particular, a number of studies have investigated the relationship between the choice of diversification as a strategy and the performance of the organization in financial terms (Benito-Osorio, 2012). These investigations are inconclusive and empirical studies

investigating the relationship between diversification and performance of firms have arrived at conflicting results and lack of consensus (McDougall & Round, 1984; Johnson & Scholes, 2005; Afza *et al.,* 2008). The lack of consensus has been attributed to the use of different theoretical views, time periods, databases, samples, operationalization of variables, different econometric techniques and the countries in which the study was carried out (Chang, 2007; Benito-Osorio, 2012).

Christensen and Montgomery (1981) in their studies found that highly diversified firms tend to compete in less attractive markets in which they wielded less market power and hence had lower performance. These findings were complimented by other studies which argued that firms operating in industries characterized by low profitability and few growth opportunities tended to expand by entering new businesses and that this was the only opportunity for turning their fortunes around (Rumelt,1982; Burgers *et al.*,2009). Hence product diversification was a means of escaping the poor profitability of the firms' industry and a means of reducing perceived performance gaps (Christensen & Montgomery, 1981).

A report based on studies by Varadarajan (1986) indicated that firms diversifying through greater depth in diversity were likely to enjoy superior financial performance than firms that diversified through greater breadth in diversity. Another set of researchers indicated that diversified firms perform better than their non-diversified counterparts in terms of profitability and size (McDougall & Round, 1984; Pandya & Rao, 1998). This raises the question of whether successful performance is a result of choosing diversification or if the relationship is in fact the reverse.

A study by Sambharya (1995) found that both international and product diversification strategies are not profitable by themselves but the interaction effects of product and international diversification leads to a substantial increase in firm performance. These findings contradict those of Mun˜oz-Bullo´n and Sanchez-Bueno (2011) that seemed to

suggest that firms that engage in both product and international diversification at the same time are unlikely to be profitable and such a move should be assessed based on the risks and the profitability perspective. However, different findings by Hashai and Delios (2011) studies on the combined effect of product and geographic diversification, suggested a curvilinear relationship between diversification and performance with resources and advantages leading to expansion and governance and limits to growth on the other hand leading to a contraction in diversification. Based on their findings, firms seek to optimize their returns from diversification but also seek to balance it under conditions of uncertainty, leading to the possibility of over or under diversification along either dimension.

Studies by Pandya and Rao (1998) argued that according to financial economists, a diversified firm is a conglomerate with unrelated businesses in its portfolio and do not consider related diversification as being diversification because they do not represent different product-market investments. They therefore categorized firms as either diversified or undiversified. Their findings suggested that the Average Return on Equity (AROE) of undiversified firms was four times better than that of highly diversified firms but such firms had 36 times the volatility of diversified firms, which led them to conclude that diversification reduces risk in terms of competitive threat but at the cost of returns. Other researchers agreed with the findings suggesting that little evidence had been found that linked product diversification to increased market power and firm performance (Gort, 1962; Miller, 1973; Mun˜oz-Bullo´n & Sanchez-Bueno, 2011).

Hoskisson, Kim, White and Tihanyi (2004) investigated the moderating effects of product diversification on the relationship between international diversification and business group performance. They proposed that, the depressive effect of product diversification on business-group performance is higher in developed than in emerging economies because of high information processing demands arising from managers' inability to cope with product depth. They argued that there tends to be a more complex

market environment in developed economies than in emerging economies. According to them, product diversification is likely to minimize the ability of business groups to recognize and assess new resources and capabilities and to acquire and assimilate them in developed economies than in emerging economies. Their argument suggests the need for further investigation into the relationship between product diversification and business performance in a developing country context like Kenya.

Sukpinach and Rugman (2007) introduce a notion of intra-regional and inter-regional selling with their study indicating that higher levels of intra-regional sales tend to improve the impact of product diversity on performance compared to venturing into inter-regional selling. The study also seemed to suggest that at high levels of intra-regional sales, there exists a non-linear relationship (inverted J-curve) between product diversification and a firm's performance supporting the resource based and transaction cost theories.

Studies conducted by Yu-Ching, Chow-Ming, Peng-Yu and Yi-Chuan (2008) indicate that firms that pursue related product diversification enjoy increased subsidiary performance. Similar findings by Chiao *et al.,* (2008) indicated that larger subsidiaries tended to engage in international and product diversification and that they also tended to perform better than smaller subsidiaries. Their findings also suggest that subsidiaries that engaged in related product diversification in locally based businesses tended to have good performance and tended to enjoy higher levels of profitability. However, their findings also suggest that subsidiaries that sold closely related products to those of their parent companies in foreign markets had no benefit in terms of performance. Their argument was that these products had no relevance to the needs of their customers in the local markets.

Findings of Pan *et al.,* (2010) agreed with those of Sukpinach and Rugman (2007), suggesting that there is an inverted U-shaped relationship between international

diversification and performance. Their studies further suggest that with increasing levels of country diversification, a firm's performance will gradually decline due to different behaviours, tastes, cultures and contexts derived from various backgrounds which increase the costs for the management team. On the other hand their findings propose that for regional diversification, an inverted U-shaped relationship exists, such that with low levels of regional diversification, a firm's governance costs might increase, but as a firm gains experience and gets acquainted with the environment as well as gains new knowledge and capabilities, due to similarities in demands and culture, its performance will start to increase.

2.6 Critique of Existing Literature

One of the criticisms advanced on the Resource Based View (RBV) is that it stands on analytic statements that are tautological, true by definition and not able to be tested (Kraaijenbrink, *et al.,* 2010). The impreciseness of the definition of value has led to a debate on whether value in the RBV is determined endogenously (by the firm) Makadok (2001), exogenously (by the market) Priem and Butler (2001) or otherwise. This study seeks to show that value creation can be tested through related product diversification strategy. It also seeks to agree with the assertion that value is determined endogenously through the business' internal activities based on the resources available at its disposal.

Kotsemir and Meissner (2013) critiqued Rothwell (1994) Five Generation of Innovation Process indicating that his analysis was not primarily on the innovation models themselves but more on the strategies of innovation activity of firms under different economic and political circumstances. According to them, Rothwell's model was primarily for company models as opposed to other models that took care of the economy as a whole. The model does not also take into account the informal sector which does not have to follow a similar series of steps when pursuing innovation strategies.

Lee *et al.,* (2008) criticized the institutional theory on the basis that although institutions powerfully shape strategic choices in organizations, institutions also change in character and potency over time. They argued that institutions need to adapt to new institutional realities failure to which such lack of adaptation may make the previous fit with old institutional requirements unable to ensure continued legitimacy and even survival. They instead advocated the linear premium and discount model that takes care of environmental changes especially in emerging economies.

Ansoff's theory proposed by Ansoff (1957) like all other theories and models is not perfect. It fails to take into consideration the changing environmental factors that may make an organization pursue different product diversification options based on the strengths, weaknesses, opportunities and threats that present themselves at different times. It also fails to take into account the changing tastes and preferences of customers that may make them desire one product over another.

Burgers *et al.,* (2009) criticized the Inverted - U model that was advanced by Palich *et al.,* (2000) arguing that if moderate levels of diversification yielded higher performance than either limited or extensive diversification, then simple linear models that were used prior to the 1990's would either yield positive or negative results but in all cases, a weak relationship. They argued that this would then explain the conflicting or weak results obtained previously. They also criticized the view that there was a general consensus that relatedly diversified organizations performed better than those that pursued unrelated diversification. According to him, neither unrelated diversification nor related diversification would be the better strategy for all companies and that the strengths of a firm with regard to initial profitability and the prevailing environmental challenges and opportunities is what determined the strategy that a firm was likely to pursue. This study sought to find out if value addition as a product diversification strategy is one of the opportunities that a firm can pursue based on its impact on performance.

Various researchers have sought to understand product diversification strategy and by extension its definition, and its influence on firm performance with some arguing that it should be looked at based on related and unrelated diversification while others argue that related diversification is not diversification and therefore product diversification should be addressed from the point of view of whether product diversification or the lack of it has an impact on business performance. They have employed different methods to advance their arguments with different findings on this relationship.

Categorical measures have been used to classify firms such as the Specialization Ratio (SR), which classifies them as either undiversified single product, moderately diversified (relatedly diversified) and highly diversified (unrelatedly diversification)based on nine classifications (Rumelt, 1975; Dubofsky & Varadarajan, 1987).A refined version was proposed based on seven classifications (Rumelt, 1982). This method has been criticized by Palepu (1985) and Capon *et al.,* (1988) on account of its qualitative judgments, subjectivity, ambiguity and being time consuming. Grant *et al.,* (1988) criticized Rumelt's classification stating that it was of little value in understanding the relationship between diversification and profitability and instead advocated for the use if SIC-based measures of diversity. Other critiques of Rumelt's method are Pandya and Rao (1998) who used a modified version of Rumelt's classification method arguing that related diversification is not diversification as it does not represent different product-market investments; therefore they enlarged the moderate and highly diversified categories.

Simple product counts based on Standard Industrial Classification (SIC based measures) have also been used to classify firms as either diversified or not (Montgomery, 1982; McDougall & Round, 1984; Yuan *et al.,* 2004; Hashai & Delios, 2011). It has also been criticized for being too simplistic to allow meaningful analysis (Palepu, 1985). Some researchers such as Dudofsky and Varadarajan (1987) have argued that this method is objective though it has been criticized for failing to take into consideration differences in size of various businesses that constitute a firm's scope of activities, with one or a few

products accounting for the bulk of the firm's sales with the rest accounting for only a very small proportion (Varadarajan, 1986).

Palepu (1985) criticized the methods that had been used previously to measure product diversification indicating that they did not distinguish between related and unrelated diversification. Palepu sought to build on Rumelt (1975) method by proposing the use of the entropy measure of product diversification, using which he carried out tests on 30 firms from the food industry manufacturing group. The entropy measure was first proposed by Jacquemin and Berry (1979) as a measure of product diversification. Palepu argued that the entropy measure was better as it is based on the number of product segments in which a firm operates, distribution of the firm's sales across the product segments and the degree of relatedness among the product segments.

Palepu's method therefore overcame the limitations of previous measures by distinguishing between unrelated products, that is, the extent to which a firm's output is distributed in products across unrelated industry groups and related products, that is, the distribution of the output among related products within the industry groups. Palepu also argued that the entropy measure maintained the computational simplicity used by other index measures. The entropy measure has been argued to possess the advantages of decomposability, that is, it enables better classification of firms by industry type and relative importance of each to the total sales (Baysinger & Hoskisson, 1989; Acar & Sankaran, 1999; Sukpinach & Rugman, 2007; Pan *et al.*, 2010). However, Palepu's method did not take into account value addition activities as a product diversification strategy in the dairy sector and the corresponding effect on business performance, which is what this research has addressed.

Broad and Narrow Spectrum Diversity was offered as an alternative measure of diversification based on Broad Spectrum Diversity (BSD) and Mean Narrow Spectrum Diversity (MNSD) with a firm being categorized as a low diversifier if it is low on both

BSD and MNSD and a higher diversifier if it is high on both BSD and MNSD (Varadarajan, 1986). This method has been argued to be similar to the related and unrelated components of the entropy measure though in terms of measurement avoids the use of detailed business segment sales data and the computations involved in the entropy measure (Sambharya, 1995). This method therefore does not take into cognizance the fact that a firm may operate in different product segments of the market.

Herfindahl-type quantitative index has also been used as a measure of product diversification (Grant *et al.,* 1988; Baysinger & Hoskisson, 1989). The index varies directly with the number of different products produced, varies inversely with the increasingly unequal distribution of products across product lines and is bounded between zero and unity. It takes into account the number of segments in which a firm operates and the relative importance of each segment in sales (Chang, 2007). The index has been argued to have a more stable range and is therefore more versatile with respect to inversion than the entropy index (Acar & Sankaran, 1999). The index however does not distinguish between related and unrelated diversification which the entropy measure does.

2.7 Research Gaps

Questions have been raised on whether a smallholder dominated economy can diversify and whether smallholders participate significantly in product diversification towards high value products (Birthal *et al.,* 2007). To address this question, this study used an empirical model of three variables: inputs, technological innovation and markets, which drive product diversification in order to assess their influence on performance of dairy enterprises in the informal sector (dominated by smallholders) in Kenya.

There has been a lot of emphasis on the value chain in the marketing of dairy products based on the role played by processors in the dairy sector in Kenya. The role of the SSMVs has largely been ignored in the marketing of milk and other value added dairy

products despite their large contribution to the dairy industry and the economy as a whole. Interventions by the government to solve problems of milk gluts during the rainy season have focused on the formal sector and not the informal sector, yet these interventions have yet to produce any significant results even in the formal sector. Up to date, the problem of milk gluts during the rainy season is still a challenge both in the formal and informal sectors. This suggests that the value chain argument especially on marketing of dairy products that has previously been used in the dairy sector has not solved the milk glut problem during the rainy season and more so in the informal sector in the Kenyan context.

A report by Kiptarus (2005) suggested that there was need for research on value addition of dairy products which calls for more investigation with regard to performance. Kamundi (2014) also alluded to the fact that value addition as opposed to the consumption of raw milk should be emphasized, taking into account the farmers interests especially in the marketing of milk products where the farmer has usually no say or input. A study by Odero-Wanga *et al.,* (2009) on constraints by women owned micro-enterprises with regard to value addition focused on women only and did not use analytical models such as the entropy measure to measure related product diversification and instead used descriptive statistics such as percentages. This research therefore explored value addition in both male and female owned dairy enterprises through related product diversification, using the entropy measure, as an alternative way of addressing the milk glut problem in the informal dairy sector during the rainy season in Kenya.

Previous studies on the relationship between product diversification and performance have focused on developed countries and emerging economies like Japan, China and Korea (Yuan *et al.,* 2004; Lee, *et al.,* 2008; Chiao *et al.,* 2008; Yu-Ching *et al.,* 2008; Burgers, 2009; Hashai and Delios, 2011). Studies conducted have also mainly concentrated on manufacturing industries as well as service industries (Palepu, 1988; Grant, 1988; Pandya and Rao, 1998; Yuan *et al.,* 2004; Afza *et al.,* 2008; Hashai and

Delios, 2011). The studies have not focused on developing countries, on the agricultural sector and specifically on small holder informal enterprises. This study therefore focused on three drivers of product diversification strategy (inputs, technological innovation and markets) in the informal dairy enterprise sector in a developing country context with agriculture being the main economic activity in Kenya. The study further extends the frontiers of knowledge in seeking to understand the influence of drivers of product diversification strategy on dairy enterprise performance.

2.8 Summary

This chapter reviewed literature on the influence of three variables: value addition, inputs, markets and technological innovation on business performance with different researchers arriving at different contradicting findings. This suggests the need for further investigation on the relationship that exists between access to inputs, level of technological innovation, access to markets as moderated by value addition, on business performance based on these variables.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter covers the research design that was employed in the study as well as the justification for its choice. It also addresses the population of study, the sampling frame, the data collection instrument that was used, how it was administered and pilot tested as well as how the data and hypothesis were tested and analyzed.

3.2 Research Design

This study employed the descriptive research design. The design is used to examine the relationships among variables (correlational). The design was deemed appropriate for the study as it attempts to describe a group of people, a phenomenon or an event (Salkind, 2010) based on the influence on another variable. When there is some kind of influence of one variable on the other, the correlation can either be none, positive or negative (Walliman, 2011). Correlational research is a form of descriptive research that attempts to establish the patterns of association among variables at a particular point in time without any manipulation based on the premise that if a statistically significant relationship exists between two variables, then it is possible to predict one variable using the information available on another variable (Mugenda, 2008; Mugenda & Mugenda, 2012).

Both quantitative and qualitative data was collected. Quantitative research involves numeric descriptions of attitudes and opinions of a population by studying a sample of that population using a closed-ended questionnaire or structured interview for data collection (Creswell, 2013). It is an approach for resting objective theories by examining the relationship among variables and the variables can then be analyzed using statistical procedures (Creswell, 2013). Qualitative research involves exploring and understanding

the meaning individuals or groups ascribe to a social problem using open-ended questions, with data analysis involving inductively building from particulars to general themes, and the researcher making interpretations from the meaning of data (Creswell, 2013). Qualitative data was then subjected to quantitative analysis in this study. A study by Chepkoech (2010) on regulation of dairy production in Kenya used both quantitative and qualitative research designs. Odero-Wanga *et al.,* (2009) in their study on value added milk products and the constraints to women owned micro enterprises, used an interview schedule based on both open and closed-ended questions. Consistent with similar studies in the dairy sector, the design was therefore chosen because the study seeks to establish the influence of the independent variables on the dependent variable.

3.3 Population of Study

A population describes the wider set from which the research sample is drawn (Cramer & Howitt, 2004). According to Odero-Wanga *et al.,* (2009), it is difficult to estimate the population of SSMVs as most of them do not register with the Kenya Dairy Board. As a result, it was difficult to determine the population of milk bars in Kiambu County and therefore estimates were used based on available literature. According to a report by SNV (2013), Kenya has approximately 4636 milk bars. Odero-Wanga *et al.,* (2009) indicated that Kiambu accounted for 15% of the licensed small scale dairy processors, which includes milk bars, in Kenya. This indicates that Kiambu County has approximately 696 milk bars. The study population was therefore approximately 696 milk bar owners in Kiambu County. Most of the milk produced in Kiambu is sold in the county and in Nairobi (Odero-Wanga *et al.,* 2009; Kaitibie *et al.,* 2010). Kiambu County was chosen as the basis for investigation because according to information provided by the Ministry of livestock, the county is ranked as the leading in the country in milk production. In the year 2012, the county produced 267.5 million litres of milk valued at $0.06 billion (County Government of Kiambu, 2013).

Milk in the informal channel is sold at farm level and through mobile milk traders and milk bars. Milk sold through milk bars includes both producers and non-producers of milk with Kiambu County being dominated by milk bars and small scale mobile traders (Kaitibie *et al.*, 2010). Milk bars therefore formed the basis of the investigation. The milk bars were mainly targeted in this study as they have a business premises and therefore have the potential to undertake value addition to milk. As small scale milk vendors (SSMVs) are not easily tracked and statistics in the informal dairy sector are not available, to obtain data one has to rely on the use of recall information (Kaitibie *et al.*, 2010). The milk bars do not keep dairy records and therefore information obtained from the respondents was based on recall information.

3.4 Sampling Frame

The Sampling frame included all the milk bar owners in Kiambu County numbering approximately 696. Kiambu County has 12 sub-counties namely: Gatundu South, Gatundu North, Ruiru, Thika, Githunguri, Kiambu, Limuru, Kikuyu, Lari, Juja, Kiambaa and Kabete. Sampling refers to taking part of some sample population to represent the whole population (Alreck & Settle, 2004). Clustered sampling was used to divide Kiambu County into sub-counties or clusters. This reduced variance, where people in one sub-county may have had polarized views and therefore markedly increased reliability and confidence obtained from the study. Clustered sampling is appropriate when respondents are widely dispersed over a wide geographical area; the clusters should be large enough to sample the entire region adequately (Alreck & Settle, 2004). Kiambu County has 12 sub-counties and each sub-county was treated as a cluster. Simple random sampling was then used to select respondents in each sub-county.

3.5 Sample and Sampling Technique

The number of respondents in each sub-county was arrived at by dividing the total sample size by the number of clusters to obtain the number to be within each cluster

assuming equal sizes. This brought the number of respondents in each cluster to 21. As a pre-condition, to be included in the sample, the dairy enterprise must have been operating in the informal dairy sector during the study period.

Mugenda (2008) suggested the following formula for estimating sample sizes in social surveys:

$$n = \frac{Z^2 pq}{d^2}$$

Where:

n is the desired sample size if the target population.

Z is the standard normal deviate at the required confidence level. Confidence level at

95 per cent (standard value of 1.96).

p is the proportion in the target population estimated to have the characteristic (raw milk=

80%, value added products=20%)

$q = 1-p$

d is the margin of error

$$= \frac{1.96^2 * 0.20 * 0.80}{0.05^2} = 246$$

Number of respondents in each cluster was therefore determined by dividing the sample size with the number of clusters which were 12.

246 ÷ 12 = 20.5 which is approximately 21 respondents.

It is normal practice to adjust the sample size for finite populations, but in this study, the practice was avoided in order to improve the precision of the results. Burgers *et al.*, (2009) however argued that is not appropriate to take a large sample and relate performance to diversity but rather investigation should be done based on unique

situations and challenges facing industries. Therefore the sample was deemed sufficient for the study.

Table 3.1: Sample Size Determination

	Clusters based on sub-counties	Total No. of Respondents
1.	Gatundu South	21
2.	Gatundu North	21
3.	Ruiru	21
4.	Thika	21
5.	Githunguri	21
6.	Kiambu	21
7.	Limuru	21
8.	Kikuyu	21
9.	Lari	21
10.	Juja	21
11.	Kiambaa	21
12.	Kabete	21
	Total	**252**

3.6 Data Collection Instruments

A semi-structured questionnaire was used as the data collection instrument which contained closed-ended questions as well as open-ended questions. The advantage of closed-ended questions is that they are quick to answer and require no specialized writing skills from the respondent and they are easier to code. The advantage of open-ended questions is that they allow respondents to provide their own views. The questionnaire was divided into six parts, namely dairy entrepreneur's background

designed to capture basic information about the target entrepreneur, value addition meant to capture information relating to the range of products that the dairy enterprise markets, inputs intended to capture information relating to the access to resources required for diversification, markets meant to capture information relating to access to markets to sell the diversified products, technological innovation designed to capture information relating to the extent to which the dairy entrepreneur uses technology to add value in order to diversify products and dairy enterprise performance intended to collect data on variables to be used as measures of performance. Secondary data included literature review as well as classifying the industry segments based on the ISIC Rev. 4 codes where products belonging to different four-digit ISIC industries within the same two-digit industry group were treated as related while products from two-digit ISIC industry groups were treated as unrelated (Palepu, 1985; Hitt *et al.,* 1997).

3.7 Data Collection Procedures

Both primary data and secondary data were used in the study. Primary data covered the background information, the independent variables, that is, inputs, technological innovation and access to markets in relation to product diversification. It also covered the intervening variable which is value addition through related product diversification as well as the dependent variable, that is, dairy enterprise performance. Secondary data mainly covered product diversification based on the ISIC Rev. 4 codes. According to Odero-Wanga *et al.,* (2009), any sign post advertising the business premises of a dairy enterprise must be authorized and paid for. As most of the milk bars were not licensed, they lacked a business name, only having the name "milk bar" at the entrance to the premises. In respect to this, only the name of the milk bar owner was elicited from the respondents for those who were willing to provide their names.

3.8 Pilot Testing

The questionnaire was pre-tested to ensure that quality data was collected. A pre-test involves administering the data collection instrument to a small group of individuals

(n=10-30) who are similar to the target population for whom the researcher wants to generalize study results (Aparasu, 2011).The purpose of pre-testing is to ensure that items are clearly presented so that respondents understand and interpret the questions or items in the same way (Mugenda, 2008). Pre-test results can help the researcher identify problems with clarity of questions, response categories, directions and other problems that may interfere with the respondents completing the survey consistently and accurately (Aparasu, 2011). The selection of the sample dairy enterprises to be pre-tested depended on the proximity and willingness of the respondents to participate in the exercise. The questionnaire was discussed with the respondents to identify any shortcomings in the instrument. Information arising out of the pre-testing exercise was used to make the necessary adjustments before undertaking the main data collection exercise.

3.8.1 Reliability of Data Collection Instruments

Cronbach's alpha test of reliability was used to measure the internal consistency of items in the questionnaire; when a measure is internally consistent, all of the individual questions or items making up that measure should correlate well with the others (Cramer & Howitt, 2004). According to Mugenda & Mugenda (1999), Cronbach's alpha is a general form of the Kunder-Richardson (K-R) 20 formula and is based on the split-half reliabilities of data from all possible halves of the instrument, it's use reduces the time required to compute a reliability coefficient in other methods and results in a more conservative estimate of reliability which helps to avoid erroneous conclusions. A high coefficient implies that there is high consistency among the items in measuring the concept of interest. According to Field, Miles and Field (2012), a value of 0.7 is an acceptable value for Cronbach's alpha. Bryman (2008) on the other hand recommended that a minimum level of 0.6 for Cronbach alpha coefficient is good.

3.8.2 Validity and Accuracy of Data Collection Instruments

Validity refers to whether an instrument measures what it was designed to measure (Field *et al.*, 2012). Content validity considers the extent to which the contents of a test are relevant to and representative of the construct definition, that is, representativeness of selected items in relation to the whole of what is to be measured (Salkind, 2010). To ensure content validity the researcher worked closely with the supervisors for their insight into the questionnaire. Substantive validity considers the extent to which responses of a test are consistent with the construct definition and includes evidence of the processes through which examinees respond to the test items and of consistencies among responses to different items (Salkind, 2010). To ensure substantive validity and accuracy of responses, the questionnaires were administered to the respondents through personal interviews. The interviewer contacted potential respondents and asked qualifying questions before beginning the enquiry and if the interviewer needed the respondent, the interview proceeded while if the respondent was not required, the interview was terminated with an explanation (Alreck & Settle, 2004).

3.9 Data Processing and Analysis

Data cleaning and editing was done by checking for incomplete information, where a call was made or a second visit to clarify important information in the questionnaires and necessary corrections were done. The data was then coded to enable meaningful analysis. Outliers were checked by examining the data based on the expected results to determine how good the data was. To protect the informants' identities, it was not mandatory to provide both names by the respondents as some of the milk bars were not registered and respondents were only required to provide the names they were comfortable with.

Analysis of data collected and the hypothesis testing was done using multiple regression analysis. Bivariate analysis was also used and involves testing the relationship between an independent variable and the dependent variable simultaneously. It was suitable as it was used to analyze the correlation between two variables, that is, the change in the

value of the dependent variable associated with a change in the independent variable (Flick, 2011). Pearson's correlation coefficient was used to determine the relationship between the independent variable and the dependent variable and is used in bivariate relationships (Levin, Fox & Forde, 2010). Pearson's correlation coefficient was suitable because likert scales were used in this study. According to Levin *et al.*, (2010) likert scales are interval scales and where interval scales are used in a study, Pearson's correlation coefficient is the most appropriate tool for data analysis. The F-test was used to test hypothesis 1, 2, 3 and 4.

Multivariate analysis was also employed in the analysis of data. Multivariate analysis is a set of techniques applied to the analysis of data sets that comprise of many variables. It considers the linear effect of a combination of independent variables on a single dependent variable (Mugenda & Mugenda, 2012). The *t*-test is a parametric test and is used to compare the scores of two independent samples and was therefore used to compare the means of profit per litre of milk with the profit per litre of value added dairy products. A non directional (two-tailed test) was used to test whether the sample means were different (Salkind, 2010).

Squared multiple correlation (multiple coefficient of determination) is the proportion of variance in a dependent variable explained by a set of independent variables in combination and was used to give the measure of fit of the Y values and those predicted by the regression line (Levin *et al.*, 2010). It was suitable because it is used to determine the strength of the direction of the linear association between the criterion and a predictor controlling for the association of the predictors with each other and the criterion (Cramer & Howitt, 2004). SPSS version 16 was used for data analysis. Data was presented using tables.

3.9.1 Operationalizing the Variables

Access to Inputs

To measure access to inputs, structured questions were used to find out the sources of inputs used by the dairy entrepreneurs to diversify their product range while a likert scale was used to assess the attitudes of the dairy entrepreneurs toward inputs such as credit financing as well other resources for use in diversification. Structured and semi-structured questions were also used.

Technological Innovation

To measure technological innovation in product diversification, likert type questions were used to assess the level of technological innovation used by the dairy entrepreneurs to undertake value addition to milk as well as to diversify into other products. Structured and semi-structured questions were also used.

Access to Markets

To measure access to markets, likert type questions were used to assess the level of marketability of diversified dairy products as well as dairy entrepreneur perception on the extent to which customers may be willing to accept or fail to accept diversified products. Semi-structured questions were also used.

Value addition

Value addition is the moderating variable. Dairy enterprises that had added value to milk were identified against those that sold raw milk only. To measure value addition to dairy products, a direct measure was employed. Where products with no value added and which have short shelf lives of up to seven days were identified against those with value added and have a long shelf life of above one week. Consistent with Pelrine (2009), product diversification was used to measure value addition in this study. The entropy measure of product diversification was therefore used to measure related product diversification in this study. In this study, related product diversification refers to the combined total of the milk product and related dairy products with value added. The

entropy measure is a weighted average of the shares of the segments, the weight of each segment being the logarithm of the inverse of its share, therefore it takes into consideration the number of segments in which a firm operates, the relative importance of each of the segments in the total sales and the degree of relatedness among the various segments in which a firm operates (Palepu, 1985; Hitt *et al.,* 1997).

$$DR = \sum_{i=1}^{N} P_i \ \ln (1/P_i)$$

Where:

DR refers to related diversification

N is the industry segments in which the organization operates.

P_i is the share of the *i*th segment in the total sales of the firm.

This index takes the value of 0 when a firm is completely specialized and will approach maximum when diversification is high. For increasing diversification, DR should increase (Culas & Mahendrarajah, 2005). The International Standard Industrial Classification of All Economic Activities (ISIC), Rev.4 codes were used to define the industry segments and groups (United Nations, 2008).

Dairy Enterprise Performance

To measure dairy enterprise performance, which is the dependent variable, structured and likert type questions were used to determine dairy entrepreneur's perceptions on the performance of their products over the last three years in terms of profits and sales. Consistent with Karanja (2003) and Kaitibie *et al.,* (2010) studies on the informal dairy sector in Kenya, profit per litre of milk was used to capture information on level of profitability of the milk bars. Information on profit per litre of milk vis a vis that of value added dairy products over a three year period was elicited from the respondents.

Information on percentage contribution of milk and other value added products to the total sales was also elicited from the respondents to capture information on sales.

3.9.2 Testing the Multiple Linear Regression Model

The data collected was generated by real happenings on the ground and therefore the data was far from perfect. As a result the data was tested for multicollinearity. Multicollinearity occurs in multiple regression models in which some of the independent variables are significantly correlated among themselves (Hatekar, 2010; Mugenda & Mugenda, 2012).Multicollinearity was tested using the Variance Inflation Factor (VIF) which indicates whether a predictor has a strong linear relationship with the other predictor(s), with a value of 10 being a good value at which to worry (Field *et al.*, 2012).This suggests that a value of 10 and above could suggest multicollinearity. According to Hatekar (2010), in case multicollinearity is detected, the problem is usually solved by use of extraneous information, that is, information obtained from outside the sample that is used for estimation purposes and is obtained from previous empirical work or institutional sources. According to Field *et al.*, (2012), factor analysis can also be used to solve the problem of multicollinearity by combining predictor variables that are collinear to reduce them down to a sub-set of uncorrelated factors, if the multiple regression is re-run using the factor scores as predictor variables, then the problem of multicollinearity vanishes.

3.9.3 Model Specification

The multiple regression model equations used in the study were of the following forms:

The model (1) represents the case in which the independent variables affect the dependent variable without the moderator.

$$Y= \beta_0 +\beta_1X_1+ \beta_2X_2+\beta_3X_3+ \varepsilon \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

The model (2) represents the case in which there is no moderating effect on the dependent variable.

$$Y= \beta_0 +\beta X+ \varepsilon \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

The hypothesized moderator is a predictor variable and is expressed in the model (3) in the form:

$$Y= \beta_0 + \beta i X i + \beta z\ Xz + \varepsilon \quad \ldots\ldots \text{(3)}$$

The model (4) represents the case in which there is a moderating effect on the dependent variable.

$$Y= \beta_0 + \beta i\ X i + \beta z\ Z + \beta i z X i Z + \varepsilon \quad \ldots\ldots \text{(4)}$$

(i =1,2,3)

The moderation effect of value addition on the independent variables: inputs, technological innovation and markets is therefore expressed in a model (5) of the form:

$$Y= \beta_z Z + \beta_{1z} X_1 Z + \beta_{2z} X_2 Z + \beta_{3z} X_3 Z + \varepsilon \quad \ldots\ldots \text{(5)}$$

The multiple regression model (6) with a moderator therefore takes the form:

$$Y= \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_z Z + \beta_{1z} X_1 Z + \beta_{2z} X_2 Z + \beta_{3z} X_3 Z + \varepsilon \quad \ldots\ldots \text{(6)}$$

Where: Y is the dependent variable, that is, dairy enterprise performance

β_0 is the constant or intercept

β_1–β_3 are the regression coefficients or change induced in Y by each X for X_i (i =1,2,3)

X_1 is level of access to inputs

X_2 is level of technological innovation

X_3 is level of access to markets

Z is the moderating variable moderating Xs and Y.

X_i Z is the interaction term of value addition with each of the independent variables (X_1, X_2, X_3) for X_i ((i =1,2,3) =1,2,3)

ε is the error term

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

This chapter covers the data analysis results and discussion of the findings of the study. It presents the findings of how access to inputs, level of technological innovation and access to markets as moderated by value addition influence dairy enterprise performance. It starts with a presentation of the descriptive statistics followed by presentation of the findings for each specific objective.

4.2 Background Information

The response rate for the questionnaires was 250 respondents out of the desired sample size of 252. This represents 99% response rate. According to Babbie (2004), a response rate of 50% is acceptable for analysis and publication, 60% is good and 70% is very good. The response rate was therefore deemed sufficient for analysis.

4.2.1 Demographic Profile of the Respondents

Descriptive statistics indicated that 56.8% of the respondents were female while 43.2% were male as shown on table 4.1. This indicates that there are more women engaged in small scale milk vendor business compared to men in the study group. The findings also suggest that more women are being empowered to start their own income generating activities and have the ability to run successful businesses. Support for these findings are provided by Odero-Wanga *et al.,* (2009) who alluded to the fact that economic recess and lack of employment seem to contribute to the rising number of women engaged in the SSMV sector as a means of earning incomes for their families.

The marital status indicates that 52.6% were single while 47.4% were married. This could be an indication that majority of the SSMV businesses in the study group were owned by a relatively young group of people. It could also suggest that the sector is attracting young entrepreneurs who are increasingly moving into self employment ventures after completing their education.

In terms of the level of education of the respondents, findings indicated that most of the them had acquired basic education, with 11.6% having a degree, 39.6% having a diploma, 46.8% having secondary education and only a paltry 2% having primary education as the highest level of education acquired. This indicates that the sector is attracting a high number of well educated people with over 51% having acquired tertiary education. This may also point to the fact that an increasing number of well educated people who cannot get formal employment are joining the informal small scale sector. It may also suggest that the business owners are able to understand skills on adding value to milk and possess knowledge of conducting business. This in line with findings by Odero-Wanga *et al.*, (2009) who found in their study that the women who owned dairy enterprises were relatively well educated with 75% having secondary education, 27.4% having post-secondary education with only 2.4 % having had no formal education at all.

Table 4.1: Demographic Profile of Respondents

Variables	Characteristic	Frequency	Percent
Gender	Female	142	56.8
	Male	108	43.2
Marital Status	Single	131	52.6
	Married	118	47.4
Highest level of Education	Primary level	5	2.0
	KCSE/KCSE	117	46.8
	Diploma	99	39.6
	Degree	29	11.6

4.3: Descriptive Analysis of Drivers of Product Diversification and Dairy Enterprise Performance

4.3.1: Access to Inputs

The study sought to investigate access to inputs (finances, skills and raw materials) and their influence on dairy enterprise performance. Table 4.2 shows that the dairy enterprises sourced finances for their business from multiple sources. The findings indicate that the source of funding that was commonly used by the respondents was sales proceed from other products sold at 61.6% followed by owner savings at 60%, 22.5% sourced from family members and friends, 18.8% used a loan from a bank, while only 6.9% sourced from a cooperative society. The results suggest that the respondents shied away from using loans from banks and cooperative societies. This may suggest risk aversiveness, or the lack of collateral or other stringent conditions required to access loans. This underscores the findings of (Muia *et al.*, 2011; Pedersen & McCormick, 2000) that banks are not willing to lend to SSMVs. This could suggest that in light of lack of access to finance from formal financial institutions, the SSMVs had resorted to

financing their businesses from other alternatives available to them. Most creditors prefer to lend to well resourced farmers who can afford to provide the collateral asked as a pre-condition for financing (McMichael, 2013). The lack of collateral and limited number of financial institutions in the rural areas makes it very difficult for the SSMVs to access credit from formal financial institutions (Odero-Wanga, *et al.*, 2009; Muia *et al.*, 2011). This suggests that the informal sector has largely been alienated from the mainstream formal financial service sector.

Table 4.2: Source of Funding for the Dairy Enterprise

Source of Funding	Response	Frequency	Percent
Owner savings	Yes	147	60.0
	No	98	40.0
Family members and friends	Yes	55	22.5
	No	189	77.5
Sales proceeds from other products	Yes	151	61.6
sold	No	94	38.4
Cooperative society	Yes	17	6.9
	No	228	93.1
Loan from a bank	Yes	46	18.8
	No	199	81.2

Table 4.3 shows the extent to which availability of finances for use in product diversification had affected profitability of their businesses with 65.2% of the respondents being of the opinion that availability of finances was critical to diversification and profitability, 13.9% were of the opinion that availability of finances was not a great challenge in diversification and profitability, 13.1% were of the opinion that availability of finances moderately affects diversification and profitability, 3.3% were of the opinion that availability of finances would lead to expansion in diversification and profitability and only 0.8% were of the opinion that availability of

finances had no effect on diversification and profitability of the business. The results seem to suggest that availability of finances for the SSMVs was important in making a decision to diversify and contributed to the profitability of the enterprises.

Table 4.3: Extent to Which Availability of Finances Affects Profitability of the Business

Extent of Availability of Finances on Profitability	Frequency	Percent
Has improved the sales in my business	3	1.2
Has led to increase of milk based products	5	2.0
I would expand the business which would increase profits	8	3.3
Moderately	32	13.1
Finance is critical to diversification hence profitability	159	65.2
Finances are not a great challenge	34	13.9
No effect	2	.8
Marketing of milk	1	.4
Total	244	100.0

On the skills that the respondents possessed on producing diversified dairy products that had an effect on the sales of the business, 69.2% had skills on processing yoghurt and *mala* (fermented milk) while 5.6% indicated that they possessed skills on milk cultures, 1.2% indicated that they had skills on producing milk based drinks such as tea which had altogether resulted in increased sales as shown on table 4.4. This implies that most of the respondents possessed skills on value addition to milk. This in line with increasing evidence that the training directed at equipping SSMVs with value addition skills into higher value added dairy products suggested that more of them were engaging in value addition activities (Republic of Kenya, 2011).

Table 4.4: Skills Possessed by the Entrepreneur on Value Addition

Value Added Product	Frequency	Percent
Milk cultures	14	5.6
Skills to produce Mala/Yoghurt	173	69.2
Skills to produce milk products	3	1.2

Table 4.5 shows the extent to which the dairy entrepreneurs had access to various inputs for use in product diversification to value added dairy products sold. The findings indicate that 74.8% of the respondents indicated that they got a lot of milk that can be used for value addition, 61.6% indicated that they possessed the skills required to add value to milk, 78.8% indicated that extension officers did not provide the training required for value addition to milk, 60% indicated that they did not know where they could obtain training on value addition to milk while 74.3% agreed that it costs a lot of money to obtain training on adding value to milk. The results suggest that most of the respondents had the raw material in terms of milk that could be used for value addition, possessed the skills required to add value but did not have the finances required to obtain training on value addition to milk. They also seem to suggest that extension officers had provided training on value addition only to a limited number of respondents and that for those who had the skills, there were other places from where they were obtaining such skills. This is in line with findings by Odero-Wanga *et al.*, (2009) that SSMVs have problems accessing appropriate value addition information due to lack of knowledge of sources of this information and the lack of time to look for this information.

Table 4.5: Access to Diverse Resources

Access to Diverse Resources	Response	Frequency	Percent
I get a lot of milk that can be used for value addition	Yes	187	74.8
	No	63	25.2
I do not have the skills required to add value to milk	Yes	96	38.4
	No	154	61.6
Extension officers provide the training required on producing a variety of dairy products	Yes	53	21.2
	No	197	78.8
I do not know where I can obtain training on adding value to milk	Yes	150	60.0
	No	100	40.0
It costs a lot of money to obtain training on adding value to milk which I cannot afford	Yes	185	74.3
	No	64	25.7

4.3.2: Level of Technological Innovation

The objective of the study was to investigate how the level of technological innovation (machinery and equipment) influences performance of dairy enterprises. The SSMVs had adopted the use of machinery and equipment at varying degrees. As shown on table 4.6, the equipment that was owned by majority of the enterprises was a freezer with 78.4% of the respondents having one in their business, next was a lactometer at 44%, a refrigerator at 29.2%, a thermometer at 18% and an ECL and packing machine at 0.8%. This indicates that the SSMVs appreciated the need to adopt technology in an effort to preserve the highly perishable milk as well as test the quality of milk. This also signifies that the SSMVs can produce quality milk products and that there is an increased awareness on the need to produce high quality dairy products. This in line with the findings by Kurwijila and Bennet (2011) that the need to innovate and use improved

systems for milk handling and processing by SSMVs had become an important driver of change in the dairy industry in East Africa with regard to quality improvement. However, on the low adoption of technological innovations by the SSMVs, support is provided by Odero-Wanga *et al.*, (2009) who indicated that micro enterprises use low level technologies that hinder their products from competing effectively with large scale manufacturers.

Table 4.6: Use of Equipment and Machinery

Equipment and Machines	Response	Frequency	Percent
Used a thermometer	Yes	45	18
	No	205	82
Used a lactometer	Yes	110	44
	No	140	56
Used a refrigerator	Yes	73	29.2
	No	177	70.8
Used a freezer	Yes	196	78.4
	No	54	21.6
Used a boiler	Yes	2	0.8
	No	248	99.2
Used an ECL machine	Yes	1	0.4
	No	249	99.6
Used a packaging machine	Yes	1	0.4
	No	249	99.6

On the extent to which technology affects the decision to produce diversified dairy products, 29.2% of the respondents indicated that technology affects the decision to produce diversified dairy products to a large extent, 26.7% indicated that it had a moderate effect while 27.2% indicated that it had little effect. The findings indicate that to a certain extent, technology had an influence on the decision to produce value added

dairy products. A few that is 4.5%, indicated that technology had no effect on the decision to produce diversified dairy products. Some, that is, 6.6% indicated that it had led to improved sales due to access to diversified markets and had opened new markets for milk products as shown on table 4.7. This corroborates the view by Terziovski (2002) that value innovation is a better strategy to pursue, with the focus being on value and creation of new customers and to a lesser extent on the competition, where managers should go beyond incremental improvements on products and pursue new ways of doing things. A paltry 1.6% indicated that it had led to higher production, while 0.8% indicated that it had led to quality products with a similar number indicating that online learning leads to knowledge on how to produce more dairy products. Further support is provided by Odero-Wanga *et al.,* (2009) who alluded to the fact that technology plays a key role in the value addition process.

Table 4.7: Effect of Technology on the Decision to Produce Diversified Dairy Products

Extent to which technology leads to diversification	Frequency	Percent
Has developed new ways of milk preservation	4	1.6
Has opened new markets for milk products	2	0.8
Has improved sales due to access to diversified markets	14	5.8
Moderately	65	26.7
It affects to a great extent	71	29.2
No effect	11	4.5
Little effect	66	27.2
Quality products	2	0.8
Higher production	4	1.6
Lack of knowledge for using technology	2	0.8
Lack of funds to acquire technology	1	0.4
Online learning helps to learn how to produce more dairy products	2	0.8

4.3.3: Access to Markets

The objective of the study was to find out the influence of access to markets on dairy enterprise performance. Generally, the findings seem to suggest that there is high demand for dairy products in the dairy enterprises with 90.4% of the respondents indicating that they had contracts with certain customers to supply diverse dairy products, 64.3 indicated that the products were purchased directly from the shop, 61.2% indicated that they run out of stock within a few hours of selling their products while 76.3% indicated that customers flocked to their shops to purchase the dairy products. This supports the findings on the preference by Kenyans for purchasing dairy products especially raw milk from the informal dairy sector due to the high butterfat content, easy

accessibility and the fact that it can be sold in variable quantities (Muriuki, 2011; Techno Serve, 2008). However, 69.6% of the respondents indicated that their dairy products usually go bad which could be indicative of poor preservation habits or poor hygiene which makes the milk easily go bad as shown on table 4.8. This supports findings by Stichting Nederlandse Vrijwilligers (2013) who alluded that estimates point to 40% of raw milk produced being lost due to lack of proper cooling and bulking facilities. Further support is provided by Odero-Wanga *et al.,* (2009) who found that 28.8% of the SSMVs in their study did not have any cooling or preservation equipment.

Table 4.8: Access to Markets

Access to Markets	Response	Frequency	Percent
I have contracts to supply dairy products with certain customers	Yes	226	90.4
	No	24	9.6
My dairy products are purchased directly from my shop	Yes	160	64.3
	No	89	35.7
My dairy products never go bad	Yes	76	30.4
	No	174	69.6
Most of the time, I run out of stock within a few hours of selling my dairy products	Yes	153	61.2
	No	97	38.8
Customers flock to my shop to sell my dairy products	Yes	190	76.3
	No	59	23.7

The respondents had adopted various methods to influence customer uptake of the dairy products. The majority, that is 59.6% of the respondents used displays, 49.2% used word of mouth, 19.2% offered quality products, 6.8% used posters, 3.6% sold at affordable prices, 3.2% maintained hygiene, 2.4% used free samples, 2.0% gave discounts to loyal customers, 2.0% used advertisement, 2.0% offered quality customer service and trust while 1.6% used public relations with a similar percentage using social media as shown on table 4.9. This supports the findings by Kurwijila and Bennet (2011) that in the absence of regulators to promote technology in East Africa, there was resistance in the

use of improved methods for adding value in milk handling, processing and marketing. Displays and word of mouth were the most common methods used to influence customer adoption of value added dairy products while the least used methods were public relations and social media indicating that the respondents had not embraced technology as a way of promoting their dairy products. The results also support findings by Stichting Nederlandse Vrijwilligers (2013) that milk bars use Point of Sales (POS) materials to communicate about their competitive prices and that they use word of mouth on quality to grow their volumes. The results are indicative of the need to cut down costs as most of them had adopted marketing strategies that involved very little cost. Further support is provided by Odero-Wanga *et al.*, (2009) that SSMVs, particularly those owned by women have limited marketing skills which hamper the performance of their dairy enterprises.

Table 4.9: Strategies to Influence Customer Uptake of Value Added Dairy Products

Strategies to Influence Customer Uptake of Value Added Dairy Products	**Frequency**	**Percent**
Displays	149	59.6
Word of mouth	123	49.2
Offering quality products	48	19.2
Posters	17	6.8
Selling at affordable prices	9	3.6
Hygiene maintenance	8	3.2
Giving free samples	6	2.4
Giving discounts to loyal customers	5	2.0
Advertisement	5	2.0
Quality customer Service and trust	5	2.0
Social media	4	1.6
Public Relations	4	1.6

4.3.4: Descriptive Analysis for Dairy Enterprise Performance

Table 4.10 provides descriptive statistics on the percentage contribution of the dairy products to the total sales of the business. All the respondents sell raw milk but they add value to milk at varying degrees. The contribution of milk to the total sales is highest ($\bar{X}$ = 74.76, SD= 19.35), followed by *mala* (fermented milk) at ($\bar{X}$ =16.39, SD= 9.94), milk based drinks (tea with milk)

($\bar{X}$ =14.68, SD= 13.40), yoghurt ($\bar{X}$ =14.33, SD= 9.50), ice cream ($\bar{X}$ =8.14, SD= 3.29), cream ($\bar{X}$ =7.37, SD= 4.68), Cheese ($\bar{X}$ =7.00, SD= 4.36) and lastly butter ($\bar{X}$ =5.25, SD=3.40). The variation between the contribution of milk to the total sales and the other value added dairy products is high. This provides credence to the findings by various researchers on the preference for purchasing raw fresh milk by Kenyans (Techno Serve, 2008; Muriuki, 2011) and that there is very little value addition to dairy products (Republic of Kenya, 2008; Techno Serve, 2008; Muriuki, 2011). The findings also support that there is very little diversity of milk products and that their consumption is very low in the domestic market (Republic of Kenya, 2010). The findings also point out that despite the perception that SSMVs only add value in terms of milk based drinks, *mala* and yoghurt, a few of the enterprises are processing ice cream, cheese and butter. This is in line with findings by Odero-Wanga *et al.*, (2009) who found in their study that 99.1% of the SSMVs sold fresh milk, 88% processed fermented milk, 36.1% processed yoghurt, 3.7% processed ice-cream and 0.9% processed ghee and butter. Despite the fact that sales figure estimates were used in this study as provided by the respondents, the findings are considered credible. This is based on the findings by Dess and Robinson (1984) that when accurate objective measures of performance are unavailable, subjective measures are reliable as there was a strong correlation between subjective and objective measures of performance based on the measure of growth in sales.

Table 4.10: Percentage Contribution of Dairy Products to Total Sales

	Percentage contribution of Fresh Liquid Milk	Percentage contribution of Milk based drinks	Percentage contribution of Mala	Percentage contribution of Yoghurt	Percentage contribution of Cream	Percentage contribution of Butter	Percentage contribution of Cheese	Percentage contribution of Ice cream
Valid	250	115	174	108	9	4	3	7
Missing	0	135	76	142	241	246	247	243
Mean	74.7552	14.6826	16.3874	14.3324	7.3667	5.2500	7.0000	8.1429
Std. Deviation	19.35085	13.39918	9.93946	9.49875	4.68348	3.40343	4.35890	3.28778
Variance	374.455	179.538	98.793	90.226	21.935	11.583	19.000	10.810

Table 4.11 shows the descriptive statistics of profit per litre of fresh milk and that of value added dairy products in a span of three years; 2012-2014. In 2012, six of the respondents had not started their businesses hence 194 respondents were adding value to milk. In 2013 and 2014, 200 of the 250 respondents were adding value to milk in one form or another. This represents 80% of the total respondents. This is noteworthy suggesting that most of them had some form of skills on value addition to milk and were reaping some gains from the value added dairy products. The mean profit per litre for value added milk products is higher than that of the profit per litre of fresh milk in all the three years. The mean profit per litre for value added milk products in 2012 was Kshs 4.69 ($\bar{X}$ = 4.69, SD= 1.72) and that of fresh milk was Kshs 2.45 ($\bar{X}$ = 2.45, SD= 0.82). The mean profit per litre for value added milk products in 2013 was Kshs 4.74 ($\bar{X}$ = 4.74, SD= 1.62) and that of fresh milk was Kshs 2.50 ($\bar{X}$ = 2.50, SD= 0.76). The mean profit per litre for value added milk products in 2014 was Kshs 4.95 ($\bar{X}$ = 4.95, SD= 1.59) and that of fresh milk was Kshs 2.63 ($\bar{X}$ = 2.63, SD=0.94). The deviation from the mean profit per litre for value added milk products is also higher than that of profit per litre of fresh milk in all the three years. The results in all the three years suggest that

profits per litre of value added milk products are higher than those of raw milk. This supports findings by Odero-Wanga *et al.*, (2009) who indicated that dairy micro enterprises mostly sell raw milk which fetches lower prices for the entrepreneurs.

Table 4.11: Comparing Profit per Litre of Fresh Milk and Profit per Litre of Value Added Milk Products

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Profit of Fresh Milk per litre in 2012	2.4536	194	.82098	.05894
	Profit of Value Added Milk products per litre in 2012	4.6856	194	1.72128	.12358
Pair 2	Profit of Fresh Milk per litre in 2013	2.4950	200	.76347	.05399
	Profit of Value Added Milk products per litre in 2013	4.7350	200	1.62418	.11485
Pair 3	Profit of Fresh Milk per litre in 2014	2.6250	200	.93743	.06629
	Profit of Value Added Milk products per litre in 2014	4.9500	200	1.59064	.11248

4.4: T-test Statistics

Table 4.12 shows the paired sample t-test results which revealed a significant difference in profits per litre made before and after value addition in 2012; ($t(193) = -18.18$, $p < 0.001$). Similar results were replicated in 2013 ($t(199) = -18.98$, $p < 0.001$) and in 2014 ($t(199) = -19.78$; $p < 0.001$). The results therefore indicate that products that have value added perform better in terms of profitability compared to products that have no value added in the informal dairy sector in Kenya. This confirms the findings of Karanja

(2003) that milk bars that add value to milk enjoy higher profits per litre of milk compared to those milk bars that do not add value. Karanja (2003) noted that milk bars that add value to milk earned profits of up to Kshs 70,000 compared to milk bars who sell raw milk only and which were located in the same area (Nairobi) who earned Kshs 23,300. The findings are also in line with Muriuki (2003) who indicated that supply fluctuations can be addressed at the market place by converting the surplus milk into long life products such as milk powder, UHT, cheese and other value added dairy products.

Further support was provided by Pelrine (2009) who indicated that at cottage level, the additional return on value added dairy products provides the impetus for higher volume of milk purchases by dairy enterprises. However the percentage contribution of milk to the total sales of the businesses is very high compared to that of value added dairy products in the informal dairy sector as shown on table 4.10 providing support for the dominance of milk sales compared to value added dairy products in Kenya. The results seem to suggest that depending on the measure of performance used, different results may be obtained on the diversification and performance linkage. This is in line with findings of Hall Jr. and Lee (2010) who obtained different results on the diversification and performance relationship when they used a measure of performance based on Return on Assets (ROA) and found it was negatively related but no significant results were found when they used market-based performance measures.

Table 4.12: T-Test Statistics for 2012-2014

		Paired Differences					T	Df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1 2012	Profit of Fresh Milk - Profit of Value Added Milk products per litre	-2.23196	1.71032	.12279	-2.47415	-1.98977	-18.176	193	.000
Pair 2 2013	Profit of Fresh Milk - Profit of Value Added Milk products per litre	-2.24000	1.66923	.11803	-2.47275	-2.00725	-18.978	199	.000
Pair 3 2014	Profit of Fresh Milk - Profit of Value Added Milk products per litre	-2.32500	1.66228	.11754	-2.55679	-2.09321	-19.780	199	.000

4.5: Reliability Analysis

Reliability test for each of the variables as well as the item total correlation was conducted separately and the summary is presented on table 4.13. For analysis purposes, each of the variables was abbreviated as: Performance (Perf), Inputs (Inp), Technological Innovation (TecIn) and Markets (Mkt) and the items numbered respectively. The Cronbach alpha coefficient for performance was 0.84 implying that the variables could measure performance, for access to inputs was 0.72 implying that the variables could measure access to inputs, for level of technological innovation was 0.73 implying that the variables could measure level of technological innovation. This signifies the reliability of responses from the sample group. As the Cronbach alpha coefficient was low for access to markets, Mkt 3 and Mkt 7 were removed from the analysis. Their removal resulted in an improved reliability estimate of 0.60 under the

variable of access to markets. The Cronbach alpha coefficients therefore ranged from 0.60 to 0.84. This is in line with Bryman (2008) recommendations that the minimum level of 0.6 for Cronbach alpha coefficient is good.

Table 4.13: Summary of Reliability Estimates and Item Total Correlations

Variable	Item	Item Mean	Item Standard Deviation	Corrected Item-Total Correlation	Reliability
Perf					0.837
	Perf 1	3.728	1.252	.315	
	Perf 2	2.975	1.350	.808	
	Perf 3	2.741	1.399	.693	
	Perf 4	2.762	1.222	.775	
	Perf 5	2.151	0.932	.435	
	Perf 6	2.879	1.222	.781	
	Perf 7	3.611	1.370	.369	
Inp					
	Inp 1	3.806	1.064	.554	0.723
	Inp 2	4.045	0.894	.701	
	Inp 3	3.482	1.059	.415	
	Inp 4	3.692	1.087	.224	
	Inp 5	4.113	0.908	.603	
TecIn					0.730
	TecIn 1	4.065	0.730	.503	
	TecIn 2	3.567	0.885	.617	
	TecIn 3	2.599	0.995	.278	
	TecIn 4	3.364	1.002	.585	
	TecIn 5	3.785	0.910	.613	
	TecIn 6	1.498	0.748	.237	
Mkt					0.600
	Mkt 1	4.209	0.961	.250	
	Mkt 2	3.918	1.108	.319	
	Mkt4	2.451	1.086	.410	
	Mkt5	2.955	1.245	.464	
	Mkt6	3.705	1.028	.313	

$p<0.05$(two tailed)

4.6: Correlation Analysis for the Linear Relationship between Inputs, Level of Technological Innovation, Markets and Dairy Enterprise Performance

Correlation analysis using Pearson Product Moment Correlation Coefficient was conducted to find out the linear relationship and the strength of the association between the independent variables and the dependent variable. The correlation analysis on table

4.14 revealed that access to inputs positively affects performance ($r_{(250)} = 0.23$; $p < 0.001$), level of technological innovation positively affects performance ($r_{(250)} = 0.38$; $p < 0.001$) and access to markets also positively affects performance ($r_{(250)} = 0.45$; $p < 0.001$). All values were significant. The results reveal that there is a low positive correlation between access to inputs and dairy enterprise performance, there is a low positive correlation between level of technological innovation and dairy enterprise performance and there is a moderate positive correlation between access to inputs and dairy enterprise performance.

Table 4.14: Correlation between Inputs, Technological Innovation, Markets and Dairy Enterprise Performance

		Performance	X1	X2	X3
Performance	Pearson Correlation	1			
	Sig. (2-tailed)				
	N	250			
X1	Pearson Correlation	.229**	1		
	Sig. (2-tailed)	.000			
	N	250	250		
X2	Pearson Correlation	.378**	.499**	1	
	Sig. (2-tailed)	.000	.000		
	N	250	250	250	
X3	Pearson Correlation	.454**	.201**	.080	1
	Sig. (2-tailed)	.000	.001	.207	
	N	249	249	249	249

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

Where:

X1 – Access to inputs

X2 – Level of technological innovation

X3 – Access to markets

4.7: Gender Pair-wise Correlation

A gender analysis in the dairy sector is highly recommended as it helps to ensure that women and men benefit equitably from dairy interventions hence aiding in the mainstreaming of gender (Republic of Kenya, 2010). The gender pair-wise correlation as shown on table 4.15 revealed that for women, high profits were made in selling value added products as well as with selling fresh milk. In 2012, the statistics for women revealed a high pair-wise correlation between profit of fresh milk per litre and profit of value added milk products per litre ($r = 0.268$, $p= 0.004$), in 2013 ($r = 0.211$, $p= 0.022$) and also in 2014 ($r = 0.279$, $p= 0.002$). On the other hand for the men, the statistics revealed no pair-wise correlation between profit of fresh milk per litre and profit of value added milk products per litre in 2013 ($r = 0.124$, $p= 0.267$) and also in 2014 ($r = 0.135$, $p= 0.226$). This could be attributed to the fact that in Africa, there are more women than men involved in agricultural related businesses and in the informal trade. Statistics indicate that women make up 75% of the agricultural labour force in Kenya (DFID, 2004) with Republic of Kenya (2010) quoting the figure at 60-80% of the labour force being involved in the livestock sub-sector. This is in line with findings by Muriuki (2003) that women and school age children contribute greatly to labour for dairy activities especially to milk production and marketing. A report by Republic of Kenya (2011) revealed that in terms of gender contribution in the selling of milk, 17.6% were men while in contrast, 33.8% were women and 48.6% involved the contribution of both. It could also be attributed to the fact that women tend to be more patient than men in business. Fletschner and Kenney (2011) indicated that women and men tend to exhibit systematic differences in their behavior as a result of innate psychological characteristics and attitudes influenced by social conditions. According to Republic of Kenya (2010), development interventions in the livestock sector and in the agricultural sector as a whole tend to affect women and men differently, though in the dairy sector, there has been a tendency of treating gender in a neutral manner with the assumption that bottlenecks and solutions impact both men and women in a similar way. According to

the findings of this study, any interventions made especially on training, resource allocation and even technological innovation on value addition to milk are likely to benefit women to a larger extent compared to men based on the preceding results. This is corroborated by an impact assessment study by the ministry of livestock on Smallholder Dairy Commercialization Programme (SDCP) on a training carried out centered on value addition into higher value added products like yoghurt, *mala*, etc. which revealed that there were more women participants than men: with 723 of the participants being women compared to 573 participants who were men (Republic of Kenya, 2011).

Table 4.15: Gender Paired Sample Correlations

Gender			N	Correlation	Sig.
Female	Pair 1	Profit of Fresh Milk per litre in 2012 & Profit of Value Added Milk products per litre in 2012	114	.268	.004
	Pair 2	Profit of Fresh Milk per litre in 2013 & Profit of Value Added Milk products per litre in 2013	118	.211	.022
	Pair 3	Profit of Fresh Milk per litre in 2014 & Profit of Value Added Milk products per litre in 2014	118	.279	.002
Male	Pair 1	Profit of Fresh Milk per litre in 2012 & Profit of Value Added Milk products per litre in 2012	80	.228	.042
	Pair 2	Profit of Fresh Milk per litre in 2013 & Profit of Value Added Milk products per litre in 2013	82	.124	.267
	Pair 3	Profit of Fresh Milk per litre in 2014 & Profit of Value Added Milk products per litre in 2014	82	.135	.226

4.8: Hypothesis Testing

Linear regression analysis was conducted in order to test the hypothesis of the study. The purpose was to test whether there was a relationship between the independent, moderating and the dependent variables and the strength of the relationship. Each of the independent variables: access to inputs, level of technological innovation and access to markets were tested to find out their relationship with the dependent variable, dairy

enterprise performance. The interaction of value addition with the independent variables and the effect on the dependent variable was also tested. The correlation coefficient was determined to find out the relationship between the independent and the dependent variables. The coefficient of determination was also calculated to determine the goodness of fit of the models.

4.8.1: Test of hypothesis 1

H_{01}: Access to inputs has no influence on performance of dairy enterprises in Kenya.

Table 4.16 shows the results of regression analysis on access to resources for use in product diversification in relation to performance of the dairy enterprises. A linear regression F-test using ANOVA was carried out to test whether access to inputs influences dairy enterprise performance. The linear regression model of access to resources against performance was found to be significant ($F(1,248) = 13.69$, $p < 0.001$) at 5% confidence interval. The null hypothesis was therefore rejected and the alternative hypothesis that access to inputs influences performance of the dairy enterprises was accepted. The resulting goodness of fit was $R^2 = 0.05$ indicating that 5% of the variability in Y is explained by access to resources index while R= 22.9%. This indicates that there is a weak relationship between access to resources and dairy enterprise performance. There was no multicollinearity in the model because the Variance Inflation Factor (VIF) = 1.00. The regression equation was:

$$Y = 1.87 + 0.29 \text{ access to inputs}$$

where; Y= Dairy enterprise performance

Table 4.16: Regression Analysis between Access to Inputs and Performance of Dairy Enterprises

Table 4.16a: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics			
					R Square Change	F Change	df1	df2	Sig. F Change
1	.229[a]	.052	.048	.86328	.052	13.687	1	248	.000

a. Predictors: (Constant), X1

Table 4.16b: ANOVA[b]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	10.200	1	10.200	13.687	.000[a]
	Residual	184.823	248	.745		
	Total	195.023	249			

a. Predictors: (Constant), X1

b. Dependent Variable: performance

Table 4.16c: Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	1.874	.308		6.077	.000		
	X1	.293	.079	.229	3.700	.000	1.000	1.000

a. Dependent Variable: performance

4.8.1.1: Discussion of Findings on the Influence of Access to Inputs and Dairy Enterprise Performance

The findings of the study revealed that there is a positive linear relationship between access to inputs and dairy enterprise performance. The results revealed that there was a significant influence when access to inputs for use in diversification was measured in terms of raw material (milk), finances and skills on dairy enterprise performance in Kiambu County. The results support the recommendations made by Holcomb *et al.* (2006) that firms need to accumulate, acquire and access resources (inputs) to establish and maintain an effective resource portfolio which usually has a positive effect on performance. The value of R^2 was low (5%) indicating that access to inputs for product diversification influences the relationship on performance only to a limited degree. This could be explained by the fact that very little of the inputs go into value addition. This is based on the results of the study which showed that the contribution of milk to the total sales was highest ($\bar{X}$ = 74.76, SD= 19.35), followed by *mala* (fermented milk) ($\bar{X}$ =16.39, SD= 9.94), milk based drinks (tea with milk) ($\bar{X}$ =14.68, SD= 13.40), yoghurt ($\bar{X}$ =14.33, SD= 9.50), ice cream ($\bar{X}$ =8.14, SD= 3.29), cream ($\bar{X}$ =7.37, SD= 4.68), Cheese ($\bar{X}$ =7.00,SD= 4.36) and lastly butter ($\bar{X}$ =5.25, SD=3.40). This is in line with findings that most of the inputs in form of raw material (milk) that is 84%, is consumed raw with only a paltry 16% being processed to value added dairy products in the informal dairy sector in Kenya (Techno Serve, 2008). Similar statistics were also given by Muriuki (2011) who indicated that 85% of the milk in Kenya is consumed raw.

4.8.2: Test of hypothesis 2

H_{02}: Level of technological innovation does not influence performance of dairy enterprises in Kenya.

Table 4.17 shows the results of correlations on level of technological innovation in relation to performance of the dairy enterprises. A linear regression F-test using

ANOVA was carried out to test whether level of technological innovation influences dairy enterprise performance. The linear regression model of level of technological innovation against performance was found to be significant ($F(1,248) = 41.24$, $p < 0.001$) at 5% degree of significance. The null hypothesis was therefore rejected and the alternative hypothesis that level of technological innovation influences performance of the dairy enterprises was accepted. The resulting goodness of fit was $R^2 = 0.143$ indicating that 14.3% of the variability in Y is explained by level of technological innovation index while R= 37.8%. This indicates that there is a moderate relationship between level of technological innovation and dairy enterprise performance. There was no multicollinearity in the model because the Variance Inflation Factor (VIF) = 1.00. The regression equation was:

$$Y = 1.18 + 0.58 \text{ level of technological innovation}$$

where; Y= Dairy enterprise performance

Table 4.17: Regression Analysis between Level of Technological Innovation and Performance of Dairy Enterprises

Table 4.17a: Model Summary

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.378[a]	.143	.139	.82113	.143	41.243	1	248	.000

a. Predictors: (Constant), X2

Table 4.17b: ANOVA[b]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	27.808	1	27.808	41.243	.000[a]
	Residual	167.215	248	.674		
	Total	195.023	249			

a. Predictors: (Constant), X2

b. Dependent Variable: performance

Table 4.17c: Coefficients[a]

		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
Model		B	Std. Error	Beta	T	Sig.	Tolerance	VIF
1	(Constant)	1.175	.288		4.074	.000		
	X2	.578	.090	.378	6.422	.000	1.000	1.000

a. Dependent Variable: performance

4.8.2.1: Discussion of Discussion of Findings on the Influence of Level of Technological Innovation and Dairy Enterprise Performance

Level of technological innovation had a positive linear effect on dairy enterprise performance in the study group. The results were significant when technological innovation was measured in terms of machinery and equipment. The findings were

corroborated by Grant *et al.* (1988) who found that technology and learning in diversified firms increased effectiveness and efficiency resulting to increased profitability in organizations. This was supported by Terziovski (2002) whose findings indicated that technological innovation can create an exclusive market for a new product resulting in improved performance. Further support was provided by Kurwijila and Bennet (2011) who found that technological upgrading in the form of introducing new machinery and improving technological capabilities provides the dairy industry with a means to be successful. The value of R^2 was low (14.3%). This indicates that level of technological innovation for use in product diversification influences dairy enterprise performance for the SSMVs only to a limited extent. This is in line with Kurwijila and Bennet (2011) assertions that modern technology requires substantial financial input that is not accessible to small scale dairy operators.

4.8.3: Test of hypothesis 3

H_{03}: Access to markets for diverse products does not influence performance of dairy enterprises in Kenya.

Table 4.18 shows the results of regression analysis on access to markets for diverse products in relation to performance of the dairy enterprises. A linear regression F-test using ANOVA was carried out to test whether access to markets influences dairy enterprise performance. The linear regression model of access to markets against performance was found to be significant ($F(1,247) = 63.98$, $p < 0.001$) at 5% level of significance. The null hypothesis was therefore rejected and the alternative hypothesis that access to markets for diverse products influences performance of the dairy enterprises was accepted. The resulting goodness of fit was $R^2 = 0.206$ indicating that 20.6% of the variability in Y is explained by access to markets index while R= 45.4%. This indicates that there is a moderate relationship between access to markets and dairy

enterprise performance. There was no multicollinearity in the model because the Variance Inflation Factor (VIF) = 1.00. The regression equation was:

Y= 0.93 +0.60 access to markets

where; Y= Dairy enterprise performance

Table 4.18: Regression Analysis between Access to Markets and Performance of Dairy Enterprises

Table 4.18a: Model Summary

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.454[a]	.206	.203	.79191	.206	63.983	1	247	.000

a. Predictors: (Constant), X3

Table 4.18b: ANOVA[b]

Model		Sum of Squares	Df	Mean Square	F	Sig
1	Regression	40.125	1	40.125	63.983	.000[a]
	Residual	154.899	247	.627		
	Total	195.023	248			

a. Predictors: (Constant), X3
b. Dependent Variable: performance

Table 4.18c: Coefficients

		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
Model		B	Std. Error	Beta	T	Sig	Tolerance	VIF
1	(Constant)	.934	.263		3.553	.000		
		.599	.075	.454	7.999	.000	1.000	1.000

Dependent Variable: performance

4.8.3.1: Discussion of Discussion of Findings on the Influence of Access to Markets and Dairy Enterprise Performance

Access to markets for diversified products had a positive linear relationship on dairy enterprise performance. The results were significant when access to markets was measured in terms of customers who purchase the dairy products. The findings are in line with Muriuki (2003) who indicated that to overcome the weakness of small-scale milk production and marketing in Kenya, smallholders had developed strategies that included selling dairy products directly through informal markets using milk traders for bulking and distribution. The findings are also supported by Christensen and Montgomery (1981) who alluded to the fact that firms that pursue related diversification tend to be profitable because they operate in very profitable, highly concentrated markets and are able to acquire large shares in those markets with successful performance being the outcome of market opportunity combined with taking advantage of that opportunity. Support for these findings were given by Capon *et al.* (1988) who indicated that firms that concentrate on one market area, either consumer or industrial are likely to achieve superior performance. The findings were further supported by Baiya and Kithinji (2010) who indicated that markets and consumers drive the dairy sector and that when dealing with a commodity, the products offered must conform to what the consumer wants to purchase for there to be increased profitability of the enterprise. This provides credence to the assertion by Capon *et al.* (1988) that market based factors are critical for the success of organizations. Additional support is provided by Muriuki (2003) who indicated that milk consumption in Kenya can be increased through broadening the dairy product mix in the market and promoting the consumption of concentrated products targeting particular communities such as Asians who prefer products like cheese.

Muriuki (2003) indicated that there has been opposing views on whether Kenya's policies should aim at self sufficiency in milk and dairy products or should combine self sufficiency and surplus production for export to the region taking its current strength and

advantage of its large dairy cattle production. The findings of this study suggest that it is important to incorporate surplus production in the policy framework with the purpose of marketing dairy products in the regional markets. The value of R^2 was low (20.6%) which could be explained by the fact that customers have different tastes and preferences for various products and therefore if consumers do not prefer a certain value added product, it may fail to sell leading to decreased performance. This in line with the assertion by Lancaster (1966) that if a new good possesses characteristics in the same proportions as some existing good, it will simply fail to sell to anyone if its price is too high, or will completely replace the old good if its price is sufficiently low.

4.8.4: Multiple Regression Analysis

A multiple regression analysis was conducted to find out the linear relationship between all the independent variables and the dependent variable. As shown on table 4.19, the multiple regression analysis indicated that there was a significant relationship between access to inputs, level of technological innovation, access to markets and dairy enterprise performance ($F(3,245) = 39.16$, $p < 0.001$). The resulting goodness of fit was $R^2 = 0.324$ indicating that 32.4% of the variability in Y is explained by the combined effect of access to markets, level of technological innovation and access to markets while R= 56.9%. This indicates that there is a moderate relationship between access to inputs, level of technological innovation and access to markets and dairy enterprise performance. There was no multicollinearity in the model because the Variance Inflation Factor (VIF) < 10. The multiple regression equation was:

Y= -0.53- 0.05access to inputs + 0.56 level of technological innovation +0.57 access to markets

where; Y= Dairy enterprise performance

Table 4.19: Multiple Regression Analysis for Access to Inputs, Level of Technological Innovation, Access to Markets and Dairy Enterprise Performance

Table 4.19a: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics			
					R Square Change	F Change	df1	df2	Sig. F Change
1	.569[a]	.324	.316	.73352	.324	39.155	3	245	.000

a. Predictors: (Constant), X3, X2, X1

Table 4.19b: ANOVA[b]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	63.201	3	21.067	39.155	.000[a]
	Residual	131.822	245	.538		
	Total	195.023	248			

a. Predictors: (Constant), X3, X2, X1

b. Dependent Variable: performance

Table4.19c: Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	T	Sig.	Tolerance	VIF
1	(Constant)	-.528	.357		-1.479	.140		
	X1	-.050	.079	-.039	-.625	.533	.725	1.380
	X2	.555	.093	.362	5.975	.000	.751	1.332
	X3	.571	.071	.432	8.060	.000	.959	1.043

a. Dependent Variable: performance

4.8.5: Testing Hypothesis 4

H_{04}: Value addition does not moderate the relationship between access to inputs, level of technological innovation and access to markets and performance of dairy enterprises in Kenya.

A moderated multiple regression model (MMR) was used to test the moderating effect of value addition on the relationship between access to inputs, level of technological innovation and access to markets and dairy enterprise performance. A predictor Z is hypothesized to be a moderator for predicting the Y and X relationship. X and Z become the predictors for the criterion Y. According to Aguinis (1995), a third term is introduced in the regression equation by creating a new variable, the product between the predictors (X*Z) with significance of the F- statistic indicating the presence of the X*Z interaction. Therefore rejecting the H_0: $\beta_{iz}= 0$ indicates the presence of a moderating effect. In this study, the moderator and interaction terms were added to the initial model containing the three predictor variables.

The moderation effect was tested using the following 3 models:

1. $Y= \beta_0 +\beta_1X_1+ \beta_2X_2+\beta_3X_3+ \varepsilon$
2. $Y= \beta_0 +\beta_1X_1+ \beta_2X_2+\beta_3X_{3+}\beta_z Z+\varepsilon$
3. $Y= \beta_0 +\beta_1X_1+ \beta_2X_2+\beta_3X_3+\beta_z Z+\beta_{1z}X_1Z+ \beta_{2z}X_2 Z+\beta_{3z}X_3 Z + \varepsilon$ (i=1, 2, 3)

In the first, model, the dependent variable was entered into the model and its significance was tested. In model 2, the moderator was entered as a predictor and finally in the 3rd model, the moderator and interaction terms were both entered.

The moderation effect of Z on the relationship between Xs and Y were tested. The 3 models were found valid $F(3,189)=20.309$, $p<0.001$; $F(4,188)=15.370$, $p<0.001$ and $F(7,185)=8.937$, $p<0.001$). From the summary table 4.20, we can observe that while the predictors X1, X2 and X3 significantly improved the model (F Change=20.309,

$p<0.001$), the moderator Z did not add value to the model containing X (F Change=0.662, p=0.417). Adding the interaction term to this model did not improve (F Change=0.518, p=0.670). Therefore Z is not a significant moderator of the relationship between X1, X2, X3 and Y. Note that the independent variables and the moderating variable had to be centered before this model was fitted to address the issue of multicollinearity.

Table 4.20: Moderating Effect of Value Addition on the Combined Relationship between Inputs, Technological Innovation, Markets and Dairy Enterprise Performance

Table 4.20a: Model Summary

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.494[a]	.244	.232	.46069	.244	20.309	3	189	.000
2	.496[b]	.246	.230	.46111	.003	.662	1	188	.417
3	.503[c]	.253	.224	.46289	.006	.518	3	185	.670

a. Predictors: (Constant), X3centered, X1centered, X2centered

b. Predictors: (Constant), X3centered, X1centered, X2centered, Z

Table 4.20b: ANOVA[d]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	12.931	3	4.310	20.309	.000[a]
	Residual	40.113	189	.212		
	Total	53.044	192			
2	Regression	13.072	4	3.268	15.370	.000[b]
	Residual	39.973	188	.213		
	Total	53.044	192			
3	Regression	13.405	7	1.915	8.937	.000[c]
	Residual	39.639	185	.214		
	Total	53.044	192			

a. Predictors: (Constant), X3centered, X1centered, X2centered

b. Predictors: (Constant), X3centered, X1centered, X2centered, Z

c. Predictors: (Constant), X3centered, X1centered, X2centered, Z, X2Z1, X3Z1, X1Z1

d. Dependent Variable: performance

b. Predictors: (Constant), X3centered, X1centered, X2centered, Z, X2Z1, X3Z1, X1Z1

4.8.5.1: Discussion of Findings on the Moderating Influence of Value Addition on Inputs, Technological Innovation, Markets and Dairy Enterprise Performance

The interaction effect of value addition on the combined relationship between inputs, technological innovation, markets and dairy enterprise performance revealed that there was no moderating effect. This could be explained by the fact that customers have different tastes and preferences and may therefore prefer one product over another. If the customers do not prefer a certain value added product, it will fail to sell. In the study, the purchases for milk were higher indicating a high preference for milk over other value added dairy products indicating that the value added products had no influence on the relationship between access to markets and dairy enterprise performance. This is based on findings by Christensen & Montgomery (1981) that differences in diversification strategy go beyond skeletal patterns of product linkages and include characteristics of the markets in which firms participate which leads to performance differences, in which case the market characteristics have a greater influence on performance than the diversified products. Customer characteristics in the form of customer tastes and preferences in this study influenced performance differences for milk *vis a vis* the performance of value added products. This is based on the assertion by Lancaster (1966) who alluded to the fact that consumers have different tastes and preferences and that some consumers might like more of something compared to another product. This is supported by Baiya and Kithinji (2010) who indicated that customer wants must be taken into consideration when selling dairy products for there to be increased performance. These findings are also supported by Odero-Wanga *et al.,* (2009) who indicated that the limited number of customers and geographical areas reached with value added dairy products impacts negatively on the incomes realized from the sale of the products. Further support is provided by a study by Odero-Wanga *et al.,* (2009) who found that pricing of raw milk is dependent on the cost of production, necessitated largely by fluctuations in raw milk prices which constrains favourable competition of

value added dairy products in the domestic market. A report by SNV (2014) also indicated that the high percentage of smallholder dominated dairy producers poses challenges to the industry in terms of cost of production coupled with seasonal fluctuations in supply of raw milk.

The overall R^2 was low with a value of 24.4% signifying that only a small percentage of the variance in the performance measures is explained by the interaction effect of value addition. These low R^2 values in this study are comparable with previous studies on the product diversification and performance relationship with Rumelt (1982) study reporting 6.9% of the variance obtained in performance as accounted for by the diversification strategy (R^2= 0.069). On the other hand, Varadarajan (1986) obtained (R^2= 0.069) at 5% degree of significance when he used profitability performance measures and (R^2= 0.045) when he used sales based performance measures. Grant *et al.* (1988) found that both product and multinational diversification accounted for a small proportion 6.2%- 7.4% of the overall variance in profitability. Burgers (2009) found higher values of (R^2= 0.317) when he used Return on Assets and (R^2= 0.319) when he used Return on Sales measures on the product diversification and corporate performance link. Hall Jr. and Lee (2010) found that product and international diversification accounted for slightly higher values of (R^2= 0.448) when they used Return on Assets and (R^2= 0.386) when they used a market based performance measure, Tobin's Q of the overall variance in performance. The low R^2 reported in this and other studies are understandable since a firm's diversification strategy is just one of a number of factors impacting on corporate performance as reported by (Varadarajan, 1986). This study obtained similar values for R^2 indicating that the combined effect of access to inputs, level of technological innovation and access to markets as moderated by value addition (related product diversification) are some of the factors that have an impact on organizational performance. Though value addition had no significant moderating effect.

4.9: Related Product Diversification

The entropy measure of related product diversification as proposed by Palepu (1985) was used to measure related product diversification. The entropy measure index formula is:

$$\mathrm{DR} = \sum_{i=1}^{N} P_i \ \ln\left(1/P_i\right)$$

Where:

DR refers to related diversification

N is the industry segments in which the organization operates.

P_i is the share of the *i*th segment in the total sales of the firm.

ln is the natural log

This index takes the value of 0 when a firm is completely specialized and will approach maximum when diversification is high. For increasing diversification, Related Product Diversification (DR) should increase (Culas & Mahendrarajah, 2005). The total number of dairy products being sold by all the milk traders was 8. For each product, the individual index was computed as:

$$DRi = P_i \ln (1/P_i)$$

Where:

DRi refers to related diversification index for each product *i*

P_i is the share of the *i*th segment in the total sales of the firm.

The mean total related product diversification entropy index for all the 8 products was 0.6103 as shown on table 4.21. The entropy index for the dairy enterprise that had not diversified and was selling raw fresh milk only was 0, implying specialization. The maximum entropy index for the dairy enterprise that had diversified most was 1.84 in this study. The maximum limit is not usually defined as there can be as many products depending on the extent to which a dairy enterprise would innovate and develop as many related products as possible. The limitation of this index is that it does not indicate the percentage contribution of the dairy enterprises in terms of related product diversification in the industry. In an attempt to overcome this limitation and therefore calculate the percentage contribution of the milk traders to total related product diversification in the dairy sector, this study has developed a formula which it has referred to as percentage related diversification index as described in 4.9.1. Another limitation of the index is that it is limited to calculating the proportion of a product in a segment based on its contribution to the total sales of the firm and does not enable calculation of the profitability of a product. This study attempted to overcome this limitation by calculating the level of profitability of fresh milk *vis a vis* that of value added dairy products as shown by the t-test statistics on table 4.12.

Table 4.21: Descriptive Statistics for Related Product Diversification Entropy Index

Product	*i*	N	Minimum	Maximum	Mean	Std. Deviation
Fresh raw milk	1	250	.00	.37	.1908	.12631
Milk based drinks	2	115	.00	.37	.2348	.08312
Mala	3	174	.08	.37	.2699	.07021
Yoghurt	4	108	.03	.37	.2485	.08373
Cream	5	9	.08	.29	.1783	.07667
Butter	6	4	.08	.23	.1468	.06325
Cheese	7	3	.08	.23	.1751	.08413
Ice cream	8	7	.08	.23	.1970	.06036
DR		250	.00	1.84	.6103	.40715
Valid N (listwise)		2				

4.9.1: Percentage Related Diversification Index

It would be desirable for all the milk bars to add value to milk and therefore diversify their product range based on the study results; with profits per litre of value added milk products being higher than profits per litre of milk sold as shown on table 4.11. If a milk bar was to diversify into all the 8 products in equal proportions based on the entropy measure index, then the maximum value for related diversification would be:

Maximum value for complete related diversification = $1 \div 8 * \ln 8 * 8 = 2.08$

The percentage related product diversification index would therefore be arrived at using the following formula:

Percentage Related Diversification Index = 100 * Related Diversification Index

Maximum Value for Complete Diversification

As shown on table 4.22, the mean percentage related diversification index (PDR) for the milk traders in the study region was 29.34. This indicates that according to the percentage related diversification index, the milk traders had a low related diversification of 29.34%. This is based on the assumption that a dairy enterprise diversified in equal proportions among the 8 products. That is; fresh liquid milk, milk based drinks, fermented milk (*mala*), yoghurt, cream, butter, cheese and ice cream. However, this figure indicates that more informal dairy sector traders are adding value to milk as it is an improvement from the figures that have been quoted in past studies of only 15%-16% amount of value addition (Techno Serve, 2008; Muriuki, 2011). In this study, maximum PDR was 88.59 indicating that the milk trader who had diversified most had not diversified fully, though the level of related diversification was high at 88.59%.

Table 4.22: Percentage Related Product Diversification Index

Percentage Related Product Diversification	N	Minimum	Maximum	Mean	Std. Deviation
PDR	250	.00	88.59	29.3427	19.57452
Valid N (listwise)	250				

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter gives a summary of the study conducted as guided by the research objectives. It draws conclusions based on the findings and gives recommendations for action as derived from the research undertaken. It also gives suggestions for further research based on areas that were beyond the scope of this study.

5.2 Summary

The study aimed at investigating the drivers of product diversification strategy and how they influence dairy enterprise performance in Kiambu County which is one of the counties in Kenya. Specifically, the study sought to find out the influence of access to inputs, level of technological innovation and access to markets on dairy enterprise performance as moderated by value addition. The study was based on the informal dairy sector with the target group being milk bars which are part of the small scale milk vendors (SSMVs) in Kenya. Empirical literature revealed that most of the milk in the country is sold through the informal dairy sector and that Kiambu County is dominated by milk bars and small scale mobile traders.

Specific Objective 1: To determine how access to inputs influences performance of dairy enterprises in Kenya.

Organizations require inputs (resources) in the production of various products. This study investigated three inputs required in the production process, that is, raw materials, finances and skills as proposed by Grant (1991) who asserted that there are direct links between resources and profitability of an organization and especially for firms

undertaking related diversification. The study sought to determine if these three inputs influenced dairy enterprise performance in Kiambu County, Kenya.

The findings of the study revealed that that there is a positive linear relationship between access to inputs and dairy enterprise performance based on inferential statistics of an ANOVA analysis which showed that access to inputs positively influences dairy enterprise performance. The results support the recommendations made by Holcomb *et al.* (2006) that firms need to accumulate, acquire and access resources (inputs) to establish and maintain an effective resource portfolio which usually has a positive effect on performance. The value of R^2 was low indicating that access to inputs for product diversification influences the relationship on performance only to a limited degree. This could be explained by the fact that very little of the inputs go into value addition. These findings are in line with empirical literature which indicates that most of the inputs in form of raw material (milk) that is 84%, is consumed raw with only a paltry 16% being processed to value added dairy products in the informal dairy sector in Kenya (Techno Serve, 2008; Muriuki; 2011). The descriptive analysis revealed that most of the respondents get a lot of milk that can be used for value addition, possessed skills required in order to add value to milk and that availability of finances for use in product diversification was critical to diversification and profitability of the dairy enterprises..

Specific Objective 2: To investigate the extent to which level of technological innovation influences performance of dairy enterprises in Kenya.

Technological innovation is crucial in firms seeking to produce various products with dairy enterprises being no exception. Technological innovation as identified in literature increases effectiveness and efficiency in organizations while creating an exclusive market for a new product resulting in improved performance (Grant *et al.*, 1988; Terziovski, 2002). The findings of this study revealed that level of technological innovation had a positive linear effect on dairy enterprise performance in the study group. The results were significant when technological innovation was measured in

terms of machinery and equipment. Support for these findings were provided by Kurwijila and Bennet (2011) who found that technological upgrading through introducing new machinery and improving technological capabilities drives success in the dairy industry and that the need to innovate and use improved systems for milk handling and processing by SSMVs had become an important driver of change in the dairy industry in East Africa. Further support was provided by Karanja (2003) who indicated that technologies that add value to raw milk increased performance of dairy enterprises. The value of R^2 was low indicating that level of technological innovation for use in product diversification influences dairy enterprise performance for the SSMVs only to a limited extent. This is in line with Kurwijila and Bennet (2011) assertions that modern technology requires substantial financial input that is not accessible to small scale dairy operators. Further support is provided by Odero-Wanga *et al.,* (2009) indicated that technology played a central role in the value addition process but small scale processors find it difficult to get the right kind of equipment for their business. Majority of the SSMVs therefore acquire only the machinery and equipment that is essential for milk preservation and ensuring that they have quality milk.

Specific Objective 3: To determine how access to markets for diverse products influences performance of dairy enterprises in Kenya.

Markets and consumers drive the dairy sector and when dealing with a commodity, the products offered must conform to what the consumer wants to purchase for there to be increased profitability of the enterprise (Baiya & Kithinji, 2010). This study identified access to markets as crucial to diversification based on literature which revealed that market based factors are critical for the success of organizations (Capon *et al.*, 1988). Access to markets for diversified products had a positive linear relationship on dairy enterprise performance. The results were significant when access to markets was measured in terms of customers who purchase the dairy products. The findings are in line with Christensen and Montgomery (1981) who alluded to the fact that firms that

pursue related diversification tend to be profitable because they operate in very profitable, highly concentrated markets and are able to acquire large shares in those markets: with successful performance being the outcome of market opportunity combined with taking advantage of that opportunity. Support for these findings were given by Capon *et al.* (1988) who indicated that firms that concentrate on one market area, either consumer or industrial are likely to achieve superior performance. The value of R^2 was low which could be explained by the fact that customers have different tastes and preferences for various products and therefore if consumers do not prefer a certain value added product, it may fail to sell leading to decreased performance. The findings support the view that if a new good possesses characteristics in the same proportions as some existing good, it will fail to sell to anyone if its price is too high, or will completely replace the old good if its price is sufficiently low(Lancaster, 1966).

Specific Objective 4: To establish the moderating influence of value addition on the relationship between access to inputs, level of technological innovation, access to markets and performance of dairy enterprises in Kenya.

The findings revealed that there was no moderating effect of value addition on the relationship between access to inputs, level of technological innovation, access to markets and dairy enterprise performance. This could be explained by the fact that income generated from value added dairy products highly depends on the ability of SSMVs to market their products in the domestic market, with pricing of milk being dependent on the cost of production, necessitated largely by fluctuations in raw milk prices constraining favourable competition in the market (Odero-Wanga *et al.*, 2009). It could also be explained by the limited number of customers and geographical areas reached with the value added dairy products which impacts negatively on the incomes realized from the sale of the products (Odero-Wanga *et al.*, 2009). The value of R^2 was low signifying that only a small percentage of the variance in the performance measures is explained by the interaction effect of value addition. These low R^2 values in this study

are comparable with previous studies such as Rumelt (1982), Varadarajan (1986), Grant *et al.* (1988) and Burgers (2009) on the product diversification and performance relationship. According to Varadarajan (1986), the low R^2 reported in this and other studies are understandable since a firm's diversification strategy is just one of a number of factors impacting on corporate performance.

5.3 Conclusion

The conclusion drawn from the study is that access to inputs positively influences dairy enterprise performance. Inputs (resources) in terms of raw materials, finances and skills had a positive linear effect on sales and profits of the dairy enterprises. The SSMVs usually get excess milk which could be used for value addition. Multiple sources of funding are used with the most commonly used being sales proceed from other products sold and owner savings while the least used source being loans from banks and cooperative societies. The SSMVs have skills for adding value to milk especially yoghurt and fermented milk but they do not obtain this training from extension officers. It can therefore be concluded that access to inputs in terms of raw materials, finances and skills are essential in the performance of dairy enterprises.

Level of technological innovation positively influences performance of dairy enterprises. Adoption of technology by SSMVs in terms of machinery and equipment is at varying degrees with most of them having adopted basic technology for preserving the highly perishable dairy products. Adoption of modern, new technological innovations such as an ECL machine that is used to pack liquids and low viscosity liquids such as milk, yoghurt and fermented milk is very low. Technology therefore influences the decision to produce value added dairy products. Conclusion can therefore be made that technological innovation through introducing machinery and equipment which leads to improvement of technological capabilities drives success in the dairy enterprises to a certain degree.

Access to markets for diversified products positively influences performance of dairy enterprises. There is high demand for dairy products in the dairy enterprises. Displays and word of mouth are the most common methods used to influence customer adoption of value added dairy products while the least used methods are public relations and social media indicating that the respondents had not embraced technology as a way of promoting their dairy products. Conclusion can therefore be made that access to markets influences the performance of the dairy enterprises but when dealing with a commodity, the products offered must conform to what the consumer wants to purchase for there to be increased profitability of the enterprise.

Value addition does not moderate the combined relationship between inputs, technological innovation, markets and dairy enterprise performance. Conclusion can therefore be made that value addition has no significant moderating effect on dairy enterprise performance. However, value addition to dairy products has positive implications on the profitability of SSMVs and more dairy enterprises should be encouraged to add value to milk. A few dairy enterprises are venturing into processing ice cream, cheese and butter indicating that SSMVs have the ability to process high value dairy products which attract higher profits. The excess milk generated during the rainy season can therefore be used for value addition, hence reducing its wastage by transforming it into profitable products.

The informal dairy sector and especially the SSMVs are key contributors to employment especially of women, who were more than the men operating the milk bars. Women benefitted more from value addition to milk compared to men and therefore interventions made especially on aspects like training on value addition to milk are likely to have a greater impact on women compared to men. These are key findings as they have implications on the achievement of the proposed sustainable development goals (SDGs) on the empowerment of women, promotion of sustainable inclusive economic growth and productive employment for all as well as the alleviation of

poverty. With women being the most affected by poverty, and bearing the burden of taking care of their children, the informal dairy sector can play a significant role in improving their livelihoods with a trickledown effect on their families and the economy as a whole. The large percentage of well educated participants in the dairy informal sector point to a need to create awareness that entrepreneurship is an attractive and alternative source of employment to the growing number of graduates leaving colleges and universities in Kenya each year. It also suggests that the well educated business owners are able to understand concepts on value addition.

The findings of this study contribute to existing knowledge that inputs (resources), technological innovation and markets are key drivers in the product diversification and performance relationship. The study provides evidence that a smallholder dominated economy can participate in product diversification towards high value products. The product diversification theory was developed and has been majorly used in developed countries based on review of literature. The findings of this study show that the theory is also relevant to developing countries and more so to sectors facing excess raw materials that can be converted into value added products. The theory can be used in the informal dairy sector which is smallholder dominated and which absorbs most of the excess milk that is rejected by the formal dairy sector during periods of milk glut in Kenya.

It has been noted that there is little authoritative quantifiable data on milk at the national level which impedes evidence-based discussions on dairy policy making (Intergovernmental Authority on Development Center for Pastoral Areas and Livestock Development, 2013). Little attention has also been given to mainstream and support the informal dairy sector despite its strong dominance compared to many other sectors in Kenya (Baiya & Kithinji, 2010). The findings of the study provide useful insights on the implications of related product diversification into value added products in the informal dairy sector in developing countries. The findings also add to the available limited evidence that legalizing the informal sector in developing countries instead of

criminalizing it can result in improved gains to the SSMVs and therefore to the economy as a whole.

In an attempt to overcome some of the limitations of the entropy index developed by Palepu (1985) that is used to measure related product diversification, the study developed an improved measure which is referred to in this study as percentage related diversification index (PDR). The percentage related diversification index (PDR) is based on the assumption that an enterprise diversifies in equal proportions among a particular number of products (n). As a result, it is therefore possible to determine the maximum value for complete related diversification. The percentage related product diversification for each milk trader and for all the traders in the sample group can then be calculated. This measure aids in the interpretation of the index in form of a percentage enabling easier understanding by scholars and practitioners in business and industry.

5.4 Recommendations

5.4.1 Recommendations for Industry Players and Stakeholders in the Dairy Sector

Industry players, KDB as well as key actors in the dairy sector have a major role to play to continue offering more support to the SSMVs. They should take a more proactive approach especially in training the SSMVs on value addition of milk into higher value added dairy products so that during periods of milk gluts, the excess milk does not go to waste but is converted to profitable products. This can be done at group level or based on regional clusters. With most banks requiring a business plan as a pre-condition to financing, training should be provided on its preparation and sensitization done by sector players on the need for record keeping. This is because it was noted that a large number of the dairy enterprises do not keep records. Formal financial institutions should be sensitized on the need to embrace the informal dairy sector in financing given that it is legal in Kenya and has been cited as contributing greatly to the economy. The banks can have a segment on the informal dairy sector and relax collateral requirements to it.

Given that the SSMVs get regular cash flow with payment for dairy products sold being done almost immediately, they can be encouraged to deposit their sales proceeds into an account held with the bank. The SSMVs can then be provided with loans based on the amount of money deposited from the proceeds. This can also act as an incentive to encourage saving from which further investments and expansion of the businesses can be done.

Assistance should be given to the SSMVs to procure simple equipment for the processing of products like cheese. The traders can also be assisted to acquire advanced equipment like milk and yoghurt dispensers which ensure that quality dairy products are offered to consumers. This can be done at individual level or by clustering the traders into groups, with the equipment being owned jointly by the group. Processing of the value added products can then be done at group level with government and key stakeholder support. This will enhance efficiency and quality control of the processed products. However, success in undertaking value addition to milk must be pegged on creating consumer awareness on the need to diversify their diets from just consuming milk and on key nutrients found in products like yoghurt and cheese. For instance, vitamin K2 found in cheese and butter has been cited as having the ability to prevent some diseases (Lock, Destaillats, Kraft & German, 2008). Promotion of informal dairy processing ability through innovative and affordable technologies should therefore be promoted by stakeholders in the dairy sector in Kenya.

The government of Kenya and key actors in the dairy sector in an effort to boost the economy and create employment especially in the informal sector, have a major role to play in helping the SSMVs find markets for their value added dairy products in order to encourage more of them to add value to milk. This must however be pegged on ensuring that the SSMVs produce quality dairy products. Emphasis must be placed also on quality packaging to ensure that the products are competitive in the market. The SSMVs can

also be sensitized on the need to embrace technology such as social media in the marketing of their dairy products.

5.4.2 Recommendations for Policy

Findings of the study revealed that the SSMVs mostly use equity capital from sales proceeds of other products and personal savings with very few of the enterprises using loans to finance their businesses. This hinders expansion of the businesses as the equity capital that these enterprises can raise if often very limited. The government of Kenya should formulate policies that address financing of the informal sector enterprises as well as increase the pool of funds through targeted group funding in the form of the youth enterprise fund and the women's fund. Sensitization should also be done on other government institutions that offer low cost financing to small scale businesses. Women are a key contributors in the informal dairy sector based on the findings of this study. Policies on gender that address women entrepreneurship should be formulated to address the challenges they face in business and ensure that they get the support they need to further enhance the growth of their enterprises. Policies on training the informal dairy sector participants on value addition should be drafted with an awareness that those trained could also serve as trainers to other SSMVs especially if done at group level creating a multiplicity effect. The policy framework on entrepreneurship training at institutions of higher learning should be strengthened to incorporate a business incubation model for students with innovative ideas to nurture their practical business skills.

5.4.3 Areas for Further Research

The study was conducted in Kiambu County which has the advantage of close proximity to Nairobi, the capital city of Kenya. This may make it have an advantage over other counties due to high demand for dairy products and better prices in the market. A study covering other counties known to be large producers of milk such as Nyandarua, Nakuru

and Eldoret to find out if they also have excess milk that can be used for value addition is therefore recommended in order to have a holistic picture on the implications of value addition to dairy products in the entire country. Programme specific and targeted strategies can then be formulated and implemented based on specific outcomes.

The sources of finances for use in product diversification needs to be explored in different parts of the country especially on sources like *chamas* (merry go rounds) and table banking concepts which are becoming preferred informal sources of funding businesses especially for women. This is because findings from this study indicated that most of the respondents in the study area were women. The performance outcome of total product diversification (related and unrelated product diversification) in terms of overall profitability of the informal dairy enterprises needs to be explored further taking into account that the SSMVs are diversifying into unrelated product diversification, in order to gain more insight into this relationship. This was beyond the scope of this study.

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APPENDICES

APPENDIX 1: LETTER OF INTRODUCTION

Dear Sir/ Madam,

My name is Ann Njeri Kariuki a PhD student of Jomo Kenyatta University of Agriculture and Technology. The topic of my study is, "Influence of Product Diversification Drivers on the Performance of Dairy Enterprises in Kenya." The research is in partial fulfillment of the requirements for the award of the degree of Doctor of Philosophy in Business Administration, Strategic Management. As part of my research, I wish to engage you as a participant in carrying out this study.

The information you provide will before academic purposes only and will be treated with utmost confidentiality. Neither your name nor that of your business will be used in any document based on this study. The questionnaire should take about 20 - 25 minutes to complete, and I hope that you will be in a position to spare me this time.

Thank you for kind assistance and contribution as I look forward to receiving your response.

Your's faithfully,

Ann Kariuki.

Post Graduate Student

APPENDIX 2: QUESTIONNAIRE

This questionnaire is designed to collect data from dairy entrepreneurs in Kiambu County, Kenya, to be used in investigating drivers of product diversification and their influence on dairy enterprise performance. The data shall be for academic purposes only, and will be treated with strict confidence. Your participation if facilitating this study is highly appreciated.

PART ONE: DAIRY ENTREPRENEUR BACKGROUND

Name of Entrepreneur _____

Location and Address _____

Email Address or Tel No. _____

Gender _____

Religion _____

Marital Status _____

Highest Level of Education Attained _____

PART TWO: VALUE ADDITION

1. Please indicate the percentage contribution that the following dairy products and any other products that you sell make to your total sales.

S/No.	Name of product	Percentage contribution to Total Sales (%)
a)	Fresh liquid milk	
b)	Milk based drinks	
c)	Mala	
d)	Yoghurt	
e)	Cream	
f)	Butter	
g)	Cheese	
h)	Ice cream	
i)		
j)		
k)		
	TOTAL	**100**

PART THREE: ACCESS TO INPUTS

2. Please indicate the proportion of financing used specifically meant for introducing new varieties of products over the last 3 years from the sources listed as well as any other source.

	Years 2012- 2014	
	Source of funding	**Percentage (%)**
a)	Owner Savings	
b)	Family members and friends	
c)	Sale proceeds from other products sold	
d)	Cooperative Society	
e)	Loan from a bank	
f)		
g)		
	TOTAL	**100**

3. Please indicate the extent to which you agree or disagree with the following statements with regard to the inputs you use for increasing the variety of products you sell using a "yes" or "no".

		Yes	**No**
a)	I get a lot of milk that can be used for value addition	☐	☐
b)	I do not have the skills required to add value to milk	☐	☐
c)	Extension officers provide the training required on producing a variety of dairy products	☐	☐
d)	I do not know where I can obtain training on adding value to milk	☐	☐
e)	It costs a lot of money to obtain training on adding value to milk which I cannot afford	☐	☐

4. Please rate your perceptions on level of access to inputs for purposes of increasing the variety of products that you sell by indicating your position with a tick on the scale ranging from "strongly disagree" to "strongly agree".

		Strongly Disagree	Disagree	Moderately Agree	Agree	Strongly Agree
a)	If I had excess milk, I would produce more dairy products	☐	☐	☐	☐	☐
b)	If I had finances to purchase raw materials, I would produce more dairy products	☐	☐	☐	☐	☐
c)	If extension officers provided the training needed, I would produce more dairy products	☐	☐	☐	☐	☐
d)	I would not be willing to pay in order to obtain any training on producing a variety of dairy products	☐	☐	☐	☐	☐
e)	If I obtained more finances, I would produce more dairy products	☐	☐	☐	☐	☐

f) What is your perception on the extent to which availability of finances for use in product
diversification affects the profitability of your business?

_____

g) List any skills you may have used in producing diversified milk products that have affected sales.

_____

_____

PART FOUR: TECHNOLOGICAL INNOVATION

5. Please indicate with a tick, the machinery/ equipment you have that helps you in producing more dairy products

S/No.	Machine/Equipment	Tick
a)	Thermometer	
b)	Lactometer	
c)	Refrigerator	
d)	Freezer	
e)		

6. Please rate your perception on a five-point scale, the level of technological innovation for use in product diversification by indicating your position with a tick on the scale ranging from "much lower" to "much higher".

		Much Lower	Lower	Moderate	Higher	Much Higher
a)	If I had finances, my capital investment in new machinery and equipment would be	☐	☐	☐	☐	☐
b)	If I had the necessary tools, my use of machinery and equipment to make modifications to already existing products would be	☐	☐	☐	☐	☐
c)	In my area, my rate of early adoption of new machinery and equipment for use in value addition is	☐	☐	☐	☐	☐
d)	If I was able to pool resources with others, my level of investment in machinery and equipment for use in dairy product diversification would be	☐	☐	☐	☐	☐
e)	If I was trained on how to use machinery and equipment to produce dairy products, my level of use of the latest technology would be	☐	☐	☐	☐	☐
f)	If I did not have technical support, my level of constructing innovative equipment and machinery for use in value addition and product diversification would be	☐	☐	☐	☐	☐

g) Indicate your opinion on the extent to which you think technology affects the decision to

produce diversified dairy products

i) _____

ii)_____

PART FIVE: ACCESS TO MARKETS

7. Please indicate your position on the level of access to markets for diversified dairy products

		Yes	**No**
a)	I have contracts to supply dairy products with certain customers	☐	☐
b)	My dairy products are purchased directly from my shop and I don't have to search for markets elsewhere	☐	☐
c)	My dairy products never go bad	☐	☐
d)	Most of the time, I run out of stock within a few hours of selling my dairy products	☐	☐
e)	Customers flock to my shop to buy my dairy products	☐	☐

8. Please rate your perceptions on the level of access to markets for the products that you sell by indicating your position with a tick on the scale ranging from "strongly disagree" to "strongly agree".

		Strongly Disagree	**Disagree**	**Moderately Agree**	**Agree**	**Strongly Agree**
a)	If I had more customers, I would sell value added dairy products	☐	☐	☐	☐	☐
b)	I find it very easy to sell milk compared to value added dairy products	☐	☐	☐	☐	☐
c)	I find it very easy to sell value added dairy products compared to milk	☐	☐	☐	☐	☐
d)	I struggle to convince customers to buy my value added dairy products	☐	☐	☐	☐	☐
e)	I have been experiencing fluctuating demand for my value added dairy products	☐	☐	☐	☐	☐
f)	I experience stiff competition in the market for milk, hence presenting an opportunity to sell diversified dairy products	☐	☐	☐	☐	☐
g)	I experience increased demand for products that compliment value added milk products from my customers	☐	☐	☐	☐	☐

h) List three strategies you have adopted to influence customer adoption of any value added milk products in the last three years.

i) _____

ii) _____

iii) _____

PART SIX: DAIRY ENTERPRISEPERFORMANCE

9. Please rate your dairy enterprise's performance during the last 3 years on the following attributes by indicating your position with a tick on the scale ranging from "strongly disagree" to "strongly agree".

		Strongly Disagree	**Disagree**	**Moderately Agree**	**Agree**	**Strongly Agree**
a)	My sales for milk per litre are more in relation to sales of value added milk products per litre	☐	☐	☐	☐	☐
b)	My profits have improved over the last 3 years due to value addition to milk	☐	☐	☐	☐	☐
c)	I think I would not be where I am in wealth accumulation if not for value addition to milk	☐	☐	☐	☐	☐
d)	My business has had an advantage over competitors over the last 3 years due to value addition to milk	☐	☐	☐	☐	☐
e)	The costs of adding value to milk have increased substantially which has reduced my profits	☐	☐	☐	☐	☐
f)	I have experienced a steady growth in sales over the last 3 years due to value addition to milk	☐	☐	☐	☐	☐
g)	My rate of return on profits per week is more in selling fresh milk compared to that of value added dairy products	☐	☐	☐	☐	☐

10. Please indicate the level of profitability per litre enjoyed by the sales of milk and value added products over the last 3 years by indicating your position with a tick on the scale.

Profit of Fresh Milk Per Litre						**Profit of Value Added Milk Products Per Litre**					
2012		**2013**		**2014**		**2012**		**2013**		**2014**	
Range (Kshs)	**Tick**	**Range (Kshs)**	**Tick**	**Range (Kshs)**	**Tick**	**Range (Kshs)**	**Tick**	**Range (Kshs)**	**Tick**	**Range (Kshs)**	**Tick**
0-4		0-4		0-4		0-4		0-4		0-4	
5-10		5-10		5-10		5-10		5-10		5-10	
11-14		11-14		11-14		11-14		11-14		11-14	
15-20		15-20		15-20		15-20		15-20		15-20	
21-24		21-24		21-24		21-24		21-24		21-24	
25-30		25-30		25-30		25-30		25-30		25-30	
30+		30+		30+		30+		30+		30+	

Thank you for your participation