

**DETERMINANTS AFFECTING VALUE ADDITION OF DAIRY
PRODUCTS: A CASE STUDY OF SELECTED DAIRY
ENTREPRENEURS IN SOTIK DIVISION, BOMET COUNTY**

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DECLARATION

I, hereby declare that this research project is my original work and has not been presented in any university or college for examinations/academic purposes.

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DEDICATION

This project is dedicated to my husband and children who supported me emotionally, financially and gave me morale to go on to pursue my studies despite the tough going. I love them all.

May God Bless you

ACKNOWLEDGEMENT

I wish to acknowledge the affectionate love from the almighty God for giving me health and strength to carry out this project.

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DEFINITION OF TERMS

Lactoperoxidase System (LPS):- recommended by Food and Agriculture Organization for preservation of raw milk is a safe method that can be used in situations where no cooling facility is available or affordable

Value addition:- is as a process of increasing economic value and appeal for a commodity. Value is added by changing a commodity's form, color, taste and other such methods to increase the shelf life of perishables.

Value:- is the worth of a product can also be added by capturing the market at the right time

Value-added product: - is anything that you are able to differentiate from the competition so that consumers are willing to pay more for the product because of that difference.

ACRONYMS

ACP: - African Caribbean and Pacific

AGOA: - African Growth Opportunity Act

AI:-Artificial Insemination

APT:-Active Packaging Technologies

COMESA: - Common Market for Eastern and Southern Africa

EAC: - East African Community

EPZA: - Export Processing Zones Authority

FAO: - Food and Agriculture Organization

GI:-Gastro Intestinal

HIV:-Human Immunodeficiency Virus

KCC: - Kenya Cooperative Creameries

LAB:-Lactic Acid Bacteria

LPS: - Lactoperoxidase System

ML: - maize crop-lablab intercrop

MSE:-Micro and Small Enterprise

WTO: - World Trade Organization

ABSTRACT

The Kenyan dairy industry is based mostly on smallholder milk production. About six hundred thousand smallholders produce some seventy percent of the country's marketed milk. Approximately fifty six percent of this milk is sold raw in the unregulated informal market; leading to public concerns about hygiene and safety. The aim of the study was to investigate determinants affecting value addition of dairy products in Sotik Division. The specific objectives were to examine the effects of cost of inputs on value addition of dairy products, investigate the effects of marketing skills on value addition of dairy products, examine the effects of entrepreneurial skills on value addition of dairy products and explore the effects of technologies on value addition of dairy products. This study used descriptive survey which is a method of collecting information by interviewing or administering a questionnaire to a sample of individuals. The subjects of the study were eighty small scale dairy entrepreneurs operating in the Sotik Division. The division was stratified into six locations in which the subjects reside. The primary data was collected through administering questionnaires to the respondents. Secondary data was collected through reviewing previous studies. The data was analyzed by use of both quantitative and qualitative method of data analysis. The quantitative measures were used to generate descriptive statistics to analyze for frequencies, means and percentages while the qualitative measures was analyzed through summarizing key findings, explanations interpretations and making conclusions. The results were reported using descriptive statistics such as frequency tables. The findings of the study indicated cost of transport, raw materials and labour as key determinants in value addition of dairy products. It indicated that high cost of these inputs has hampered the growth of the dairy enterprises. The study also found out that the dairy entrepreneurs do not have adequate marketing and entrepreneurial skills. They also did not access technology on value addition. All these have adversely affected the value addition of dairy products. To address these issues it is recommended that the road network is improved and the dairy entrepreneurs can be encouraged to come together to form groups or cooperatives so that they can transport together hence take advantage of economies of scale. It is also recommended that the relevant counties (where dairy enterprises can thrive) should therefore put in place programmes and policies that address these issues so as to enhance value addition of dairy products and hence spur the economic growth of the respective counties. Further research should be done to identify challenges affecting women entrepreneurs, effect of government policies on dairy enterprises and value addition technologies that are relevant, accessible and affordable.

CHAPTER ONE: INTRODUCTION

1.0 Background Information

The role of the micro and small-scale retailers (SSRs) sector in the development process has been at the center of development debate for the last three decades in Kenya and elsewhere in the developing world. Economic hardships experienced in the formal sector in Kenya and indeed in other developing countries have contributed to the enthusiasm now associated with the MSEs sector. Increasingly, the sector is perceived as a critical component in the creation of much needed skills, employment, and generation of livelihoods for a growing number of people within the urban as well as the rural sector. In the rural sector most of the MSEs are agro based with the dairy industry being one of the major ones.

Kenya has one of the largest dairy industries in sub-Saharan Africa. Developments in the industry span over a period of 90 years and have undergone various evolutionary stages. In 1962 to 2012, it was dominated by the large-scale farmers, while in 1972 to 2012 smallholder farmers have increasingly dominated the sector, contributing over 80% of the total milk production. (Export Processing Zones Authority, 2005)

Up to 1992, the dairy industry in Kenya was under government control, which gave the policy guidelines, set prices, determined the players in the industry and set the market rules among other things. Kenya Co-operative Creameries (KCC) enjoyed a protected monopoly in the marketing of the milk and dairy products. Since milk market liberalization in 1992, competition in milk processing and marketing has increased significantly in the industry. Since then, the Board has licensed over 40 private and dairy co-operative processors to process and market milk and milk products.

The dairy sector provides many opportunities for entrepreneurs. Milk is a farm produce that can generate cash on a regular basis; however most dairy entrepreneurs sell raw milk which give them low profit margins. One way the dairy entrepreneurs can increase their profit margins is through value addition of the raw milk. Value addition can be defined as a process of increasing Economic value and appeal for a commodity. Value is added by changing a commodity's form, color, taste and other such methods to increase the shelf life of perishables. Value of a product can also be added by capturing the market at the right time (Odero-Wanga et al.2009). This may include transporting the product to places where it can earn more income, or storing it and selling when there is high demand. Value addition minimizes wastage and improves quality of a commodity which realizes better prices. Value addition on milk can therefore increase purchasing power of dairy entrepreneurs thus improving their standards of living.

Despite the milk market liberalization, dairy microenterprises faces a number of challenges, especially, since the near collapse of the Kenya Co-operative Creameries (KCC) in the 1990s that left farmers with no outlet for much of their production. Some of the constraints within the sector include: lack of capital, low levels of skills on milk processing, competition from well-established processors to mention a few. These constraints have hampered the growth of the microenterprises on value addition of milk to its' full potential.

1.1 Statement of the Problem

The Kenyan dairy industry is based mostly on smallholder milk production. About 600 000 smallholders produce some 70% of the country's marketed milk. Approximately 56% of this milk is sold raw in the unregulated informal market; leading to public

concerns about hygiene and safety (EPZ, 2009). This means milk is not processed while the few who have attempted processing are doing it at a limited scale; this therefore is an indication that there are determinants affecting the dairy microenterprises. The past studies (Mburu L.M et al, 2007) have always concentrated their research mainly on the contributions of dairy products to economical lifestyles of people, but have not addressed the fact that small scale dairy entrepreneurs faces a lot of challenges, particularly on poor marketing skills, legislation among others. Part of the explanation relates to entrepreneurs' inaccessibility to appropriate dairy value addition technologies. Many did not address the impact of such new technologies and entrepreneurial skills on value addition of dairy products (Mburu L.M et al, 2007). Since fresh raw milk is highly perishable, milk losses along the informal value chain were high resulting from spillage and spoilage due to the poor road network, long distance to markets, inadequate refrigeration, and lack of milk collection due to glut in the wet season. Also, due to inadequate regulations, poor hygiene of milk at all levels of production and marketing is a common problem.

If these determinants are not identified and addressed, opportunities for adding value to milk those small scale entrepreneurs would have otherwise exploited will be lost. This will in the end hinder the achievement of vision 2030; which has identified value addition in agriculture as important in achieving economic growth. Therefore this research study seeks to establish determinants affecting value addition of dairy products.

1.2 Objectives of the study

The aim of the study was to investigate determinants affecting value addition of dairy products in Sotik division.

1.2.1 Specific objectives

- a) To examine the effects of cost of inputs on value addition of dairy products
- b) To investigate the effects of marketing skills on value addition of dairy products.
- c) To examine the effects of entrepreneurial skills on value addition of dairy products
- d) To explore the effects of technologies on value addition of dairy products

1.2.2 Research questions

- a) What are the effects of cost of inputs on value addition of dairy products?
- b) What are the effects of marketing skills on value added dairy products?
- c) What are the effects of entrepreneurial skills on value addition of dairy products?
- d) What are the effects of technologies on value addition of dairy products?

1.5 Significance of the study

To scholars; this research study is very significant to scholars in that, it will enable them to further knowledge that exists in the field.

To the entrepreneurs; Upon achievement of the objectives, the management of these microenterprises use the findings, conclusions and recommendation made by the researcher to address the current problems affecting microenterprises in value addition of dairy products. By so doing the gap has been filled and therefore the unresolved issues will have been addressed. This will help the management to a greater extend, in an effort to achieving the set goals, mission and making its vision a reality, by providing quality service in value addition in their dairy products.

To the community; by achieving the objectives, the community will first benefit to a greater extend since, quality services will be addressed to them. The health of individuals

will have improved since; the owners of microenterprises will have made greater advances in managing value addition of dairy products. The community also will benefit by the organization giving them an opportunity to work with them and by so doing their living standards will have improved.

To the Government; the microenterprises having made up to their expectations will be in a position to pay taxes the government will benefit through revenue collection and taxes brought about by these enterprises thereby enhancing its economic levels of the country and providing quality health services to all.

1.6 Scope of the study

The study aimed at establishing determinants affecting microenterprises on value addition of their dairy products. This study was done at Sotik Division, Bomet County in Great Rift Valley. It was done in the month of April to August 2013 and targeted a population of 80 microenterprises within Sotik region.

The subjects of the study were small scale dairy entrepreneurs operating in the Sotik Division. The entrepreneurs handled between 20 -1000 litres of milk per day. They had been operating their business for at least one year.

1.7 Delimitation of the study

Some of the limitations of this study included the failure of the respondents to answer clearly leading to results that may not have accurately reflect the real situation; To reduce this happening, the interview schedules were pretested and improved so as to capture clear responses.

CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

This chapter provides an extensive review of the literature and research studies done on the same areas. It is divided into literature review on theoretical framework and empirical review

2.1 Theoretical Review

The traditional and commercial market systems are contrasting models for processing and marketing of dairy products identified in past theoretical framework studies (Staal S.J et al,2008). The traditional market system, is also referred to as the informal or unorganized system, and the commercial market system, is sometimes called the formal or organized system. Again, both systems can exist simultaneously and can be integrated to some degree. Traditional milk and dairy product market systems can be characterized by the following common features:

- Diffuse market structure, consisting of many small-scale market agents- Many market agents handle only small quantities of milk and dairy products daily and are found in large numbers where demand exists. They typically operate mostly independently; there tends to be a limited role for collective organization.
- Artisanal processing, labour-intensive handling and transport methods-Processing methods are based on indigenous traditional technology, primarily using labour rather than capital. Labour-intensive distribution methods are generally associated with short-distance market chains, even though there may be multiple intermediaries. Small quantities traded require small product demand points, thus shorter distances to travel. There is little or no integration with international markets.

- **Low-cost products, mostly liquid and limited in diversity-** Market agents tend to focus on a limited range of products, mostly relatively low cost. Products are often variable in quality.
- **Great diversity in market behaviour and roles-** In any given location there can exist a myriad of different types of market agents, each occupying a particular market niche and providing a specific market service, sometimes to a subset of customer types. Associated with a lack of vertical integration, some agents provide only bulking or transport services, or even contracted traditional processing.
- **No voice or role in dairy policy making-** This is a systematic and consistent feature of traditional milk market systems, which they share with other sectors operating in the informal economy. Partly as a consequence, there is generally no recording or monitoring of these systems.

In contrast, commercial milk market systems typically have the following features:

- **Concentrated market structure, consisting of relatively few large-scale, vertically-integrated market agents-** Large-scale businesses integrate a number of market services, from bulking through processing to distribution. There is often a large role for collective organizations, such as co-operatives and co-op federations.
- **Industrial processing based on capital-intensive technologies at all market Levels-** Processing is based on heavy capital investment, using industrial methods dependent on large volumes. Large-scale collection and distribution is also associated with long-distance market chains and sometimes close integration with international markets. Large volumes require large-scale net-demand centres, thus longer distances to travel.

- Value-added products, mostly non-liquid and diverse- Commercial market products tend to exhibit a great range of forms and types, mostly with significant value addition. As a consequence they have higher costs than traditional market products. Products tend to be less variable in quality than traditional products.
- Little diversity in market enterprise types- Large-scale commercial dairy processing and marketing enterprises tend to be similar across sites and countries, although adapted to suit the products of demand in their target markets.
- Loud voice and large role in dairy policy making- Commercial market players are typically well connected to government and have a high public profile. They are usually monitored and their activities recorded.

Another theoretical framework states that modeling farm households' choice of whether to enter into dairy products markets and their choice of the level of market participation is conditional upon their entry into the market (Key et al. 2000). This theoretical framework extends the standard household model by incorporating the assumption that households face large transaction costs in food markets which influence their decision to enter into the market and their level of market participation conditional upon their entry into the market. In this regard, Key et al. (2000) identified two types of transaction costs: fixed and proportional transaction costs.

Fixed transaction costs are assumed to determine household's decision whether or not to enter into the market. Often the problem is that high fixed transaction costs can result in market failure in which case the households fail to enter into the market. For example, high fixed transaction costs due to lack of transport and communication infrastructure, distance and/or trade barriers make costly for the households to discover trading

opportunities and hence fail to enter into the market. On the other hand, proportional transaction costs are costs which vary with the volume of transaction and determine households' decisions on by how much to participate in the market conditional upon their market participation decisions.

2.2 Value addition of Dairy products

Value addition in dairy products is the incremental value that is realized by the producer from an agricultural commodity or the product as the result of a change in its physical state; differentiated production or marketing, as demonstrated in a business plan; product segregation; the economic benefit realized from the production of farm- or ranch-based renewable energy. Incremental value may be realized by the producer as a result of either an increase in value to buyers or expansion of the overall market for the product. In short, a value-added product is anything that you are able to differentiate from the competition so that consumers are willing to pay more for the product because of that difference. The process of adding value to the dairy products include; heat treatment, cooling to fermentation temperatures, inoculation with selected microbial starter cultures, fermentation, refrigeration, mixing and packaging.

The dairy industry in Uganda is growing and presents potential opportunities for investment and poverty alleviation. Uganda has an advantage of a favorable climate for dairy production, implying that it has potential to further increase its milk production provided the challenges in the dairy sector are addressed(Afrisa,2012) .The sector is faced with a challenge of inadequate skills in improved production technologies, processing and value addition, which could be a source of revenue. There is also lack of

adequate extension services, artificial insemination and lack of adequate feed resources, all of which hinder the genetic potential of dairy animals.

To increase productivity there is need to improve all year-round fodder availability and strategic supplementation of legumes. This will ensure increased milk production and its products such as yogurt, butter, cheese, ghee and ice cream whose demand is steadily increasing. Several items typically come to mind when thinking about value-added dairy products. Some are relatively easy to produce, while others require greater investments in equipment, knowledge/training, and production time. Some of the common value-added dairy products include: - Cheese, Yogurt, Butter, Ice cream and Bottled milk

Value addition to dairy products is an age-old practice in most of the countries in the world today. Many of the value added functional dairy foods are designed to decrease chances of diseases, managing the disease conditions and promoting health of the consumers. Some Western countries are already marketing a variety of such foods incorporated with specific health promoting factors and food ingredients derived from fractionation of milk employing emerging technologies like ultra-filtration, infiltration, microfiltration, nanofiltration, reverse osmosis, fat fractionation, electro dialysis etc.

Dairy products incorporated with specific milk fractions commonly known as functional dairy foods provide nutrition as well as health benefits. They are also termed as nutraceuticals, health foods, medical foods, pharmacy foods, refreshing foods, bio foods, designer foods, performance foods, mood elevating foods; supplements etc. Milk proteins prove to be better than plant proteins in terms of quality and absorption characteristics in

human being. Some of the past studies (Chandan, 2000) have identified several ways of adding value to milk.

One way of adding value to milk is by use of probiotics. Probiotics refer to the viable mono or mixed cultures of microorganisms, which on ingestion in certain doses exert beneficial health effects to the host by improving the properties of indigenous micro flora in the gastro-intestinal (GI) tract. Probiotics are mostly selected from lactic acid bacteria (LAB) group in which lactobacillus species normally predominate because of their capacity to grow rapidly and tolerate acid environment. Probiotics put up ecological barriers to the infective bacteria. Production of water and bacteriocins by these organisms prevents proliferation of pathogens. They can prevent diarrhea. LAB are extensively used in foods because of their role as preservatives, nutritive and therapeutic agents. They enhance longevity of humans and are natural inhabitants of GI tract. Probiotics for application in value added dairy foods may include different lactobacilli.

Another way of adding value to milk is through enrichment with plant products. Extenders from cheap vegetable sources may be used in dairy products for value addition. Addition of potato/ sweet potato starch in the preparation of gulabjamun; soya- or groundnut proteins in chhana, paneer or gulabjamun; and refined vegetable oil in ice-cream to replace milk fat not only reduces the cost of the products but also saves valuable milk solids for alternate uses. Extracts from herbs like tulsi, dandakalash, mint, brahmimi etc.; fruits such as mango, grapes, pineapple, nuts etc. and vegetables such as carrot, beans etc. are being also used in certain Indian dairy products to aid in health management.

Addition of Additives can also add value to milk. Use of additives in small quantities during production, processing, packaging and storage of dairy products may bring about certain desirable changes. For example, emulsifiers and thickeners provide physical form and texture; preservatives and antioxidants prolong shelf life; vitamins, minerals and nutrients contribute towards health; flavours, colours and sweeteners improve sensory quality etc. Food industry is currently using more than 3000 additives naturally occurring antimicrobial compounds (biopreservatives), free-radical trapping agents, oxygen scavengers, chelating agents etc. can play vital role in the production of value added dairy products. Biopreservatives may be of microbial, plant or animal origin. They help in extending shelf life and safety of foods. Biopreservatives produced by lactic acid bacteria such as nisin, pediocin, leuocin, sakacin, plantaricin, helveticin etc. are getting serious attention from researchers for biopreservation of foods.

Finally value can be added through intelligent packaging. This is incorporation of active substances into the packaging materials may permit the latter to perform functions such as antimicrobial activity, ethanol emission, scavenging of oxygen/moisture/ethylene etc. apart from providing the usual barrier and protective properties. Such active packaging technologies (APT) are designed to add value to the food products through enhancement of shelf life without adversely affecting their quality and safety. Among various APT, the oxygen scavenging system and antimicrobial system hold greatest promise. The former absorbs oxygen gas within the package thereby limiting the growth of aerobic microorganisms including molds and retarding oxidation of fat. The latter controls microbial contamination by extending the lag phase of specific organisms, decreasing the growth rate and total population of the microorganisms. Antimicrobial substances, gas

emission or flushing, radiation etc. can exert antimicrobial effects. The antimicrobial chemicals generally occupy the amorphous structural regions in the polymeric structure of the packaging materials without affecting mechanical strength and machinability (Chandan, R.C, 2000).

2.3 Cost of inputs

The increased costs of transportation and distribution systems due to the poor road network and long distance to markets resulted in high costs of inputs (supplements, animal drugs and vaccines, pesticides, fertilizers, and herbicides) and their unavailability. In addition, the high costs of other services such as AI, animal health, electricity supply, extension and training, and credit had a negative impact on dairy development in the study area (Muriuki H, et al 2003). High cost and unavailability of electricity in rural areas reduced investments especially in cold storage facilities and processing of the highly perishable goods such as milk and dairy products. The cost of credit, limited use of land as collateral for financing farming, and the limited number of banks in the rural areas are some of the factors that made it difficult for farmers to access credit from formal banking industry.

Before market liberalization in the early 1990s, there was an organized milk collection and bulking system in the formal market, with two types of milk delivery to KCC facilities: by individual dairy farmers; or by dairy cooperative societies. With liberalization and the collapse of KCC, the collection and bulking system also collapsed. At present, collection and bulking is a complex of different systems depending on processors, intermediaries, the road network, milk sheds and many other factors (Muriuki

H.G, 2011).The transportation of milk depends on the amount and the buyer. Major processors have their own collection, bulking and transportation systems. Stainless steel (seamless) cans, and occasionally plastic cans, are used for bulking milk from individual suppliers and delivering it to processors' collection, bulking and cooling centres, from where it is transported in cans or by refrigerated tanks to the main processing plants.

The main challenges remain improvement of quality, reduction of wastage and costs along the value chain, and obtaining access to the export market. The terms of trade have remained bad for dairy farmers, and worsened after the crisis, when the costs of inputs, particularly feeds and veterinary services, increased while the price of milk rose by only a small margin. The feeding of dairy cattle has been poor for a long time. The dairy feeds available on the market are of low quality, and this, combined with their high prices, makes feed exorbitant (Muriuki H.G, 2011). The feed market has no effective mechanism for ensuring quality. Most farm inputs and services for smallholders are also of low quality, but sold at the prices for high quality. Poor AI services in most areas, combined with low conception rates, genetic regression due to the use of bulls of unknown value and production losses resulting from long calving intervals, make breeding expensive.

2.4 Marketing of milk

Most of the milk produced during the wet season was not marketed due to the poor road network and long distance to the markets. Since milk is highly perishable and farmers did not have the means to invest in milk cooling equipments, the high volumes of milk produced during the wet season were therefore associated with high-post harvest losses. Milk production is marketed through the formal sector which is considered by farmers to be more reliable in terms of milk prices and payments for milk delivered than the informal sector (Sarah .R et al (2008). This was mainly due to low milk processing

capacity of the formal sector. As a result, the only alternative was for farmers to sell the surplus milk through the informal sector at lower prices. In addition, poor organization of milk collection, processing and marketing systems seriously undermined the potential of smallholder dairy producers to exploit urban markets.

Beginning a new farm business can be both exciting and challenging. With well-conceived planning efforts, but these challenges can be minimized. The planning process affords an opportunity to identify the product and coordinate marketing and production efforts to create a consumer-producer win-win situation. Along the way, it's critical to pay close attention to all costs involved so that you can accurately evaluate potential profitability. Business and marketing planning is undoubtedly time consuming in the short run, but if you make the time and dollar investment, the new venture will have a better chance of success. Despite a decrease in purchases of traditional dairy products (for example, fluid milk, butter, and ice cream), specialty dairy products are showing growth and consumer interest. So, consumers are not completely abandoning dairy products; they are simply turning to different ones.

Specialty or niche products typically sell at a higher retail price because they are perceived to be of higher quality or are processed using select production practices. General growth in the specialty foods market can be attributed to a handful of factors, including consumers' preference for higher-quality food products, increased familiarity with new products through travel and/or media exposure, and heightened interest in food production practices such as local or organic.

The higher preference by consumers for raw milk as compared to processed milk, provides an opportunity for the informal sector and hence the smallholder dairy

production system to be competitive. The Lactoperoxidase System (LPS) recommended by Food and Agriculture Organization for preservation of raw milk is a safe method that can be used in situations where no cooling facility is available or affordable. However, policies to support use of LPS as a method of milk preservation have not been made.

The Kenya highlands produce the highest amount of milk due to larger population of dairy cattle than any other region in Kenya. Due to the low consumer prices, fresh milk can be marketed among the populous poor urban dwellers and the milk deficit rural areas. On the other hand, the increases in disposable income, and changes in consumer preferences (tastes) among the urban dwellers has created a high domestic demand for high value food items such as milk and milk products creating market opportunities for indigenous production. In addition, due to the large regional markets which have arisen through regional integration (EAC, COMESA, AGOA, WTO, ACP) and the preferential treatment provided to products from member countries there is great potential to improve smallholder dairy production and marketing in this area. Full exploitation of the existing and emerging milk and dairy product markets will broaden trade and income base for the area and the country in general. To effectively exploit these opportunities, the main challenges will be to improve quality and safety, increase efficiency and competitiveness in production and marketing of milk and dairy products.

The existing road network needs to be improved and expanded to reduce cost of dairy production and hence increase marketed milk beyond the 65% level. A lot of emphasis in improvements and expansions of the road network should be directed towards upgrading of the feeder roads which link the farms to the milk collection centre. Upgrading of the feeder roads which are impassable during the rainy season will significantly increase the

collection and marketing of milk from farm. Fast transportation and marketing is important due to the perishable nature of milk and its products. Also, transportation of inputs and other dairy production support services would benefit from expanded and improved road network. The road network can be improved and expanded not only by the central government but also by local communities through innovative partnerships including those with the private sector.

2.5 Entrepreneurial skills

Many authors base their innovation studies on Schumpeter's theories and many publications modify his typology just slightly. Innovation is defined as an 'implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations'(Tacken G.M.L et al,2009)

According to Joseph Schumpeter, the five types of innovation are product innovation-the introduction of a new good (or service)- that is one with which consumers are not yet familiar- or of a new quality of a good; process innovation-the introduction of a new method of production, which need by no means be founded upon a discovery scientifically new, and can also exist in a new way of handling a commodity commercially; marketing innovation-the opening of a new market that is a market into which the particular branch of manufacture of the country in question has not previously entered, whether or not this market has existed before;organisational innovation-the introduction of an adapted organization, like cooperation with customers, suppliers or knowledge centres and the conquest for a new source of supply of raw materials or half

manufactured goods again irrespective of whether this source already exists or whether it has first to be created(Tacke G.M.L et al,2009)

The dairy industry offers a wide range of products from raw milk to the specialist products aimed at special markets or consumers and offers ingredients to other industries. Consumers are rather conservative and cautious in accepting entirely new food products, and prefer to look for new benefits in more or less familiar products (Jongen and Meulenber, 2005). Consequently, innovation is more successful in applying new technologies, or new products formulations, that fulfill consumer needs than in radically new products.

As the range of dairy products is becoming wider, producers need to develop new ways to attract consumers, resulting in an increased importance of packaging innovation. Consumers demand not only healthy and tasty products but also convenient, complex, and creative solutions. Packaging partly fulfils those requirements.

Some of the dairy products innovation include: new product development in milk which concentrated on healthier milks addressing fat and cholesterol; organic milk with low fat varieties, new flavourings and single-serve products; for cheese the orientation of innovation was on health and convenience (functional cheese, individually wrapped portions, new blends, long-life packaging, table-ready packaging) whereas new yoghurt products comprise mainly new flavours (wintery flavours such as plum, cinnamon, American heritage flavours and exotic fruits); there is also intense competition to differentiate between health benefits;

2.6 Use of appropriate technologies

The high cost and inaccessibility of AI services causes households to use natural breeding methods and hence unable to sustain genetic improvement. Natural breeding method resulted in genetically inferior animals due to inbreeding and the use of bulls of inferior genetic potential negatively affected performance of the offspring. On the other hand, since improved fodder production and conservation were low, the dairy stock relied mainly on inadequate and poor quality natural pastures with low levels of supplementation (Kimigo J, et al 2008). The poor adaptability of common fodders and grasses due to low temperatures and frequent frost in upper highlands and frequent drought in lower highlands resulted in shortage of animal feeds and hence the farms were overstocked. The poor access to extension services, and the limited knowledge and skills on animal husbandry among the household heads due to the high levels of illiteracy (35%) resulted in poor performance of the dairy stock. Dairying was not competitive due to high costs of production and the use of inappropriate technologies, and hence poor performance of the sector. According to Kimigo J, et al (2008) Most of the milk is marketed fresh through the informal sector. Since fresh raw milk is highly perishable, milk losses along the informal value chain were high resulting from spillage and spoilage due to the poor road network, long distance to markets, inadequate refrigeration, and lack of milk collection due to glut in the wet season. Also, due to inadequate regulations, poor hygiene of milk at all levels of production and marketing is a common problem. Consumption of fresh milk is therefore associated with health risks since it is an excellent media for bacteria and has the potential to transfer zoonotic diseases to consumers. Failure to meet international food-safety and quality standards due to the domination of milk marketing by the informal sector hampered efforts to participate in regional and

international markets resulting in low milk prices and hence sub-optimal dairy production in the study area. On the other hand, marketing of milk through the formal sector is limited due to the high costs of processing, value addition and increased shelf-life and packaging of milk and dairy products.

The various farmer co-operatives, self-help groups, private processors, and other partners could be used to provide support services for dairy production in the study area. With improved and expanded road network, there is a great potential to increase access by farmers of essential dairy production services and technologies. Increased use of AI, extension, animal health, training, and credit services will enhance the use of modern farming inputs and appropriate production technologies and hence increase dairy productivity. The improved fodders adapted to the low temperatures and frequent frost bites need to be established in the upper highlands while the suitable fodders for dry areas need to be established in the lower highlands.

The supplementation of dairy stock must be practiced judiciously depending on the basal diet offered and the desired level of production. Training of farmers and the other participants who are involved in milk value chain will have a positive impact on adoption of appropriate technologies hence higher dairy productivity. Greater participation of the community and private sector should be encouraged to supplement government efforts to enhance provision of the support services and technologies to farmers. However, better coordination and greater involvement of all key players must be emphasized while the management, accountability, and any investment must be done to the interest of the farmers.

2.7 Summary

This study will largely borrow from the traditional and commercial market systems identified in the theoretical review; this is because the study will focus on individuals operating independently but adding value to their products. The above theories concentrates on costs of inputs as a major determinant in an enterprise; the proposed conceptual framework will consider the effects of other determinants like marketing skills, technology and entrepreneurship skills on value addition of dairy products enterprises.

The empirical review has established determinants affecting production of milk; this study therefore seeks to establish the determinants affecting value addition of dairy products.

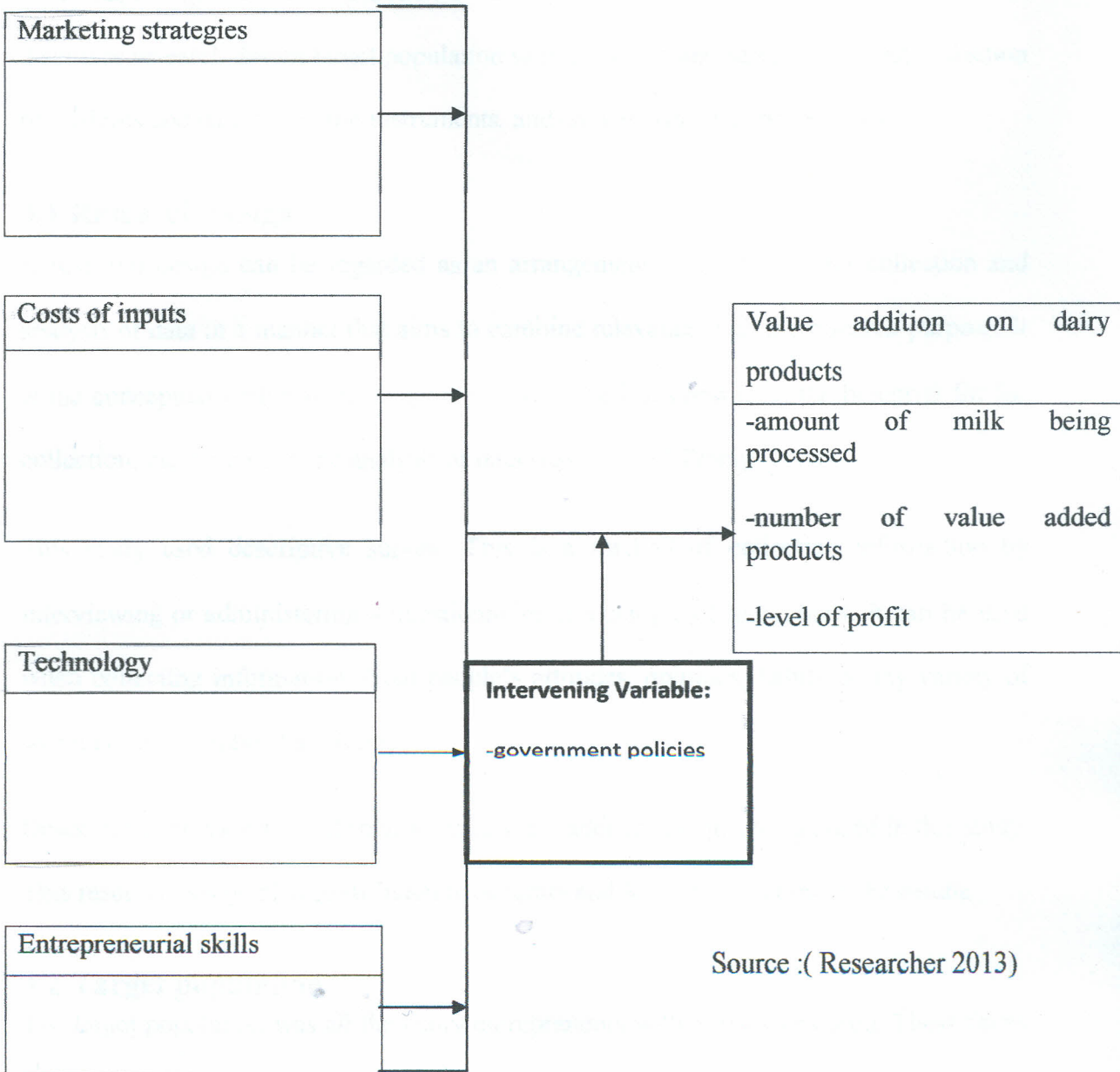
2.8 Measurement of variables

All the independent variables were first operationalized. After operationalization of the variables, measurement was done through use of likert scale questions.

2.9 Conceptual Framework

Independent variables

Dependent variable



Source :(Researcher 2013)

The independent variables determine the level of value addition of dairy products; however this will be influenced by other factors like government policies.

CHAPTER THREE: RESEARCH METHODOLOGY

3.0 Introduction

This chapter outlines the methodology and procedures used to obtain research data it discusses research design target population sample design and sample size data collection procedures and data collection instruments, and data analysis and presentation.

3.1 Research design

A research design can be regarded as an arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance with the research purpose. It is the conceptual within which research is conducted. It constitutes the blueprint for the collection, measurement and analysis of data (Kombo and Tromp, 2006).

This study used descriptive survey. This is a method of collecting information by interviewing or administering a questionnaire to a sample of individuals. It can be used when collecting information about people's attitudes, opinions, habits or any variety of social issues (Kombo et al, 2006).

Descriptive survey was used so as to effectively address the questions raised in this study.

This research design also contributed to accurate and fair interpretation of the results

3.2 Target population

The target population was all the Dairy entrepreneurs within Sotik Division. These Dairy entrepreneurs were involved in value addition of dairy products. According to the Ministry of Livestock, Sotik there were 80 dairy farmers doing value addition of dairy products in the different locations of Sotik Division.

3.3 Sample Design

The study area which is a division was stratified into locations. Sotik division has six locations and therefore there were six strata in this study. The purpose of stratification was to ensure that the subjects under study were as homogeneous as possible.

Since the target population of eighty was small, the research study therefore targeted all the eighty respondents as shown in the table below:

Table 3.1: Distribution of Target population

Location	No. of respondents
Rongena	12
Tembwo	12
Manaret	12
Chemagel	20
Kaplong	12
Yaganek	12
Total	80

Source: Ministry of Livestock, Sotik (2013)

These respondents were identified by getting their contacts from the Ministry of Livestock in Sotik.

3.4. Data Collection Instruments

Primary data was collected through structured interviews, which were administered to the respondents. Structured interviews involve asking every informant similar questions. The structured interviews used questions that were formulated before the interview; this resulted in comprehensive and systematic gathering of information.

The questions for the structured interviews composed of both open and closed ended questions. According to Mugenda (2003) open and ended questions give the respondent the freedom to respond in his or her own words.

3.5 Validity and Reliability of the Research Instruments

Reliability according to Mugenda (2003) implies the consistency and stability of measurement from one use of scale of the scale to the next. In this case, the interview schedule was pretested in the group outside the study. It ensured that the respondents understand each and every question hence the reliability enhanced. Cronbach's alpha was used to test reliability.

Validity is concerned with the extent to which an instrument measures what it is intended to measure. Validity was enhanced by ensuring that the domain of the characteristics measured were appropriately covered and done by discussing the reliance of the instrument with the supervisor.

3.6. Data Collection Procedures

A research permit was sought before collection of data. Then research assistants were engaged and trained on data collection. The research assistants then collect the primary data through administering interview schedules to the respondents. Secondary data was collected through reviewing previous studies.

3.7 Data analysis and presentation

Analysis is the process of simplification and interpretation of data. The questionnaires were screened for completeness and then coded and formatted. The data was analyzed by use of both quantitative and qualitative method of data analysis. The quantitative measures were used to generate descriptive statistics to analyze for frequencies, means

and percentages. The qualitative measures were analyzed through summarizing key findings, explanations, interpretations and making conclusions. The results were reported using descriptive statistics such as frequency tables, pie charts and graphs.

3.8 Ethical considerations

The respondents were assured of confidentiality of the information given. They were also assured that information collected was used purely for research purpose. The analysis of data was based on information collected and findings reflected the true picture.

CHAPTER FOUR: DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents the analysis of data collected, presentations and interpretation of the findings.

4.2 Biodata

Table 4.1: Gender of the respondents

Gender	Frequency	Percent
Male	50	62.5
Female	30	37.5
Total	80	100.0

Source: Researcher (2013)

The data collected revealed that majority of the respondents are males. 63% of the population indicated that they are males. Only 37% of the same population interviewed were females.

Table 4.2: Age bracket

Age bracket	Frequency	Percent
20-25 years	16	20.0
26-30 years	30	37.5
31-35 years	21	26.3
36-40 years	8	10.0
41 years & above	5	6.3
Total	80	100.0

Source: Researcher (2013)

The findings revealed that, majority of the entrepreneurs in Sotik division, operating the dairy business falls in the age bracket 26-30 years of age. 38% responded positively on this. The research data revealed that most of the entrepreneurs fall in the age bracket 31-35 years of age; this was responded by 26% of the total population interviewed. This

further showed that such kind of entrepreneurs have operated for such a very long time in the business. Moreover, research findings showed that only 20% of the remaining population is under the age bracket 20-25 years and therefore most of them are new to the business. The early investment in the entrepreneurship will enable them to earn a living through dairy business, this will sustain their livelihoods. The least population issued with interviewed indicted that they fall in the age bracket 36-40 years of age, hence an indication that the dairy business has helped them sustain their livelihoods. This was responded by 10% of the total population. Only 6% of the remaining population interviewed indicated that they have served in the dairy business for as long as 41 years and above.

Table 4.3: Level of education

Level of education	Frequency	Percent
Secondary level	42	52.5
Diploma level	12	15.0
Degree level	8	10.0
Masters level	18	22.5
Total	80	100.0

Source: Researcher (2013)

The data collected revealed that most of the entrepreneurs in Bomet County have attained the secondary school level in their academics. This was responded by 53% of the total population interviewed. This has caused slow or decline in their entrepreneurship since they lack enough knowledge on the profitable venture. 23% of the remaining population showed that they hold masters, preferably in entrepreneurship but these entrepreneurs are not in the dairy business full time. Most of them are civil servants and others in private organizations whereby they earn a basic income and therefore do not concentrate so

much on dairy business and the desire to add value has been a side hustle to them. Only 15% of the same population hold diploma thus, has full potential to move the dairy business to the next level. Respondents showed that those who hold diploma certificates are the most active in business and make profits. 10% of the same population studied has degree as their highest level of education attained.

Table 4. 4: Duration of service in business

Duration	Frequency	Percent
Below 2 years	22	27.5
3-6 years	38	47.5
7-10 years	11	13.8
11 years & above	9	11.3
Total	80	100.0

Source: Researcher (2013)

The research findings revealed that, majority of the respondents have served for quite a long time in the dairy business. 48% of the total population indicated that they have been in dairy business for 3-6 years. This showed that they have gained experience enough to survive in the business for quite a long time. Only 28% of the same population issued with questionnaires to fill showed that they have served for duration not more than 2 years. The population indicates that, they just started venturing in the business with an aim of maximizing profits in a short term or long term depending on the returns they get after buying and selling dairy products. Some of the respondents that constitute 14% of the total population studied showed that they have been operation in dairy business for a length of time up to 7-10 years. They have actually registered a record of dairy business despite frequent challenges they have been facing over a long period of time. 11% have served for 11 years and above.

4.3 Value Addition

Table 4.5: Volume of milk

Volume	Frequency	Percent
20-50 liters	72	90.0
50-100 liters	8	10.0
Total	80	100.0

Source: Researcher (2013)

From the data collected, the research findings showed that majority of the respondents handle 20 to 50 liters of milk daily. This was responded by 90% of the total population interviewed. Only 10% of the same population showed that they handle 100 liters daily. These are farmers as well as dairy business entrepreneurs. The research findings showed that, most of the dairy entrepreneurs in this region add value to the dairy products by mainly pasteurization and packaging. Others add valued by converting raw milk into fermented milk commonly known as mala

4.4 Effects of cost of inputs

Table 4.6: Means of transport

Transport	Frequency	Percent
Public	12	15.0
Private	68	85.0
Total	80	100.0

Source: Researcher (2013)

Most of the entrepreneurs in Bomet County use their own means to deliver their milk products to the market. This was responded by 85% of the total population interviewed. It showed that self delivery with own means is cost effective since capacity of the milk

delivered is utilized. The remaining 15% of the population showed that they use public means since most of them do not own the machinery to deliver their milk products.

Table 4.7: Packaging materials

Packaging	Frequency	Percent
Polythene	54	67.5
Bottles	26	32.5
Total	80	100.0

Source: Researcher (2013)

The research findings revealed that most of these entrepreneurs package their milk products with polythene bags since they sell them locally. This was responded by 68% of the total population interviewed. Only 32% of the remaining population indicated that they do pack their milk products with bottles and sell them locally.

Table 4.8: Number of employees

Employees	Frequency	Percent
None	74	92.5
1-5 employees	4	5.0
5-10 employees	2	2.5
Total	80	100.0

Source: Researcher (2013)

Most of the respondents indicated that they do not have extra human labor since what they earn can only sustain them thus, do not have extra profit to gather for extra human labor engaged to perform such normal duties. This was responded by 93% of the total population studied. Only 4% of the same population showed that they have employed up to 5 employees to help them deliver and carry out normal dairy activities. The remaining

2% of the population showed that they have employed 5-10 employees to assist them in delivering quality milk products to the market.

Table 4.9: Cost of inputs

Cost of inputs	Frequency	Percent
Transport	62	77.5
Packaging materials	4	5.0
Labor	8	10.0
Chemicals	1	1.3
Raw material (milk)	5	6.3
Total	80	100.0

Source: Researcher (2013)

The data collected revealed that some respondents experience high cost of inputs on value addition of dairy products. Transportation is seen as the most expensive as compared to other inputs. This is due to poor roads and other infrastructure that is otherwise could have facilitated the delivery of dairy products to the market. This was responded by 76% of the total population interviewed. Human labor is considered the second most limiting factor as a cost of input. People rarely give in to put their best efforts in delivering quality service in high risk business venture like dairy business. This was responded by 10% of the total population studied. The research findings further revealed that most of the entrepreneurs in this region face high cost of inputs on milk (raw material) This was responded by 6% of the same population. Only 1% of the remaining population indicated that they lack chemicals to add value to the dairy products .

Table 4.10: inadequate transportation

Transportation services	Frequency	Percent
High extend	66	82.5
some extend	10	12.5
low extend	4	5.0
Total	80	100.0

Source: Researcher (2013)

From the data collected, the research findings revealed that inadequate transportation services as a cost of service rendered affect the process of value addition of dairy products to a very high extend. This was responded by 83% of the total population interviewed. 12% of the population showed that transportation services affect value addition to some extent. The remaining 5% of the population indicated that it affect value addition to a low extent.

Table 4.11: inadequate extension services

Extension services	Frequency	Percent
High extent	62	77.5
Some extent	12	15.0
Low extent	6	7.5
Total	80	100.0

Source: Researcher (2013)

The research data revealed that entrepreneurs lack extension services offered by the government. This has in one point led to decline in the profits or annual turnover in dairy business. The farmers lack dairy skills management and therefore over time they hardly get this extension services. This has affected the overall performance of dairy business in Bomet County to a very high extent. This was responded by 78% of the total population.

15% of the same population indicated that lack of extension services affect value addition of the dairy products to some extent. 8% showed that it affect value addition of dairy products to a low extent.

Table 4.12: Insurance cost

Insurance	Frequency	Percent
High extent	19	23.8
Some extent	8	10.0
Low	32	40.0
None	20	26.3
Total	80	100.0

Source: Researcher (2013)

Insurance of the risk associated with dairy business is lacking in the region of Bomet. Entrepreneurs hardly know the importance of insuring their business against risks such as theft, perishability among others. This has affected value addition of dairy product to a high extent. This was responded by 24% of the total population. Only 10% indicated that it affects the process of value addition to some extent. 40% of the same population interviewed showed that it is on low extent it does affect value addition of dairy products. The remaining population indicated that it does not affect value addition of dairy products; this was presented by 26% of the population.

Table 4.13: Machinery

Machinery	Frequency	Percent
High extent	60	75.0
Some extent	14	17.5
Low extent	6	7.5
Total	80	100.0

Source: Researcher (2013)

Unavailability of enough machinery for processing of dairy products has caused delays and collapse in value addition of dairy products to a very high extent. This was responded by 75% of the total population issued with questionnaires to fill. Only 18% of the same population indicated that the machinery for cooling, processing and packaging makes works more easily and thus value addition of dairy products is achieved but, now the enterprises within Bomet lack such machinery and therefore the research data revealed that it has affected value addition to some extent. 8% indicated that inadequate machinery has affected value addition of dairy products to low extent.

Table 4.14: Training on value addition

Training	Frequency	Percent	Valid Percent	Cumulative Percent
Valid High extent	66	82.5	82.5	82.5
Some extent	6	7.5	7.5	90.0
Low extent	8	10.0	10.0	100.0
Total	80	100.0	100.0	

Source: Researcher (2013)

Most of the entrepreneurs in Bomet County lack enough skills on dairy business. A reason enough as to why they have stagnated on the same level for quite a longer time. Most of these dairy businessmen have lack behind in the technology which could have otherwise helped them to grow. This was responded by 83% of the total population interviewed who showed that it affect value addition to high extent. Only 10% showed that it affect value addition of dairy products to low extent. The remaining 7% showed that lack of training on value addition of dairy products affect its performance and growth to some extent.

Table 4.15: Access to credit

Credit	Frequency	Percent	Valid Percent	Cumulative Percent
High extent	58	72.5	72.5	72.5
Some extent	18	22.5	22.5	95.0
Low extent	4	5.0	5.0	100.0
Total	80	100.0	100.0	

Source: Researcher (2013)

The research data revealed that lack of access to credit facility in financial lending institution has contributed greatly to developments in value addition of dairy products. This is because the cash flows are volatile, it depends on the seasons. There is boom and loom, depending on the weather and the business performance in the region. 73% of the total population responded positively to this. It affect the process of value addition to some extent, 22% of the total population responded to this. Only 5% showed that it affect the process of value addition to low extent.

The above findings indicate that costs of inputs are high because of poor road networks, unavailability of the necessary inputs and inadequate support from the government. These high costs of inputs have affected the level of value addition of dairy products.

4.5: Effects of marketing skills

Table 4.16: Sale of products

Sale of products	Frequency	Percent
Farm	16	20.0
Local market	54	67.5
Supermarket	10	12.5
Total	80	100.0

Source: Researcher (2013)

The research findings revealed that most of the dairy entrepreneurs sell their products in the local market. This was responded by 68% of the total population interviewed. 20% of the same population interviewed indicated that they sell their milk products within their farms. About 12% of the population studied sells their products through the supermarkets.

Table 4.17: Price factors

Price factors	Frequency	Percent
Market prices	61	76.3
Production costs	4	5.0
Others	15	18.8
Total	80	100.0

Source: Researcher (2013)

The data collected reveal factors that most of these dairy milk entrepreneurs consider in pricing the product. 76% showed that they do pricing according to what the market sells or buy. Most of these entrepreneurs consider production and transportation costs. This will help them to balance their revenues. 18% indicated that they do compare the sale of milk with the season of production. In rainy season, a lot of milk is produced therefore the buying price tend to fall and on the dry season, there is scarcity of milk due to food insecurity to the dairy cattle hence the scarce resource is sold expensively. Only 5% of the remaining population considers transportation and other production costs.

Table 4.18 Product promotion

Promotion	Frequency	Percent
Word of mouth	43	53.8
Do not promote	21	26.3
Free samples	16	20.0
Total	80	100.0

Source: Researcher (2013)

From the data collected, most of the respondents promote raw milk by the use of mouth. This was responded by 54% of the total population issued with questionnaires to fill. Only 26% do not promote their milk products. The remaining population, 20% offer free samples to customers as a way of marketing raw milk to customers.

From the data collected, the research findings revealed that different marketing strategies affect value addition of dairy products. The quality of milk delivered to customers affect the perception towards that particular supplier. Furthermore, the research findings showed that the location of the supplier is considered the primary challenge; this was agreed by majority of the respondents. Most of the advertisement made is by use of mouth to mouth since they cannot afford to advertise by media. The research findings further showed that dairy milk entrepreneurs face marketing issues which involve; poor roads infrastructure and poor marketing skills.

The research findings indicate that majority have inadequate marketing skills as indicated by how they set their prices and how they promote their products. These poor marketing skills have affected value addition of dairy products as indicated by very few value added products.

4.6 Effects of entrepreneurial skills

Table 4.19: Product innovation

Product	Frequency	Percent
Strongly agree	16	20.0
Agree	30	37.5
Undecided	28	35.0
Disagree	6	7.5
Total	80	100.0

Source: Researcher (2013)

The research findings revealed that entrepreneurial skills affect value addition of dairy products. It showed that 38% of the population agreed to this. In the process of adding value to the milk products, product innovation in terms of packaging is the key entrepreneurial skills that affect the process of adding value to the milk products. Only 35% of the total population issued with questionnaires was undecided. Most of the respondents saw the sense in product innovation as the most important entrepreneurial skill, aimed at enhancing value addition to dairy products. This was strongly agreed by 20% of the population issued with the same questions to fill. Only 7% disagreed.

Table 4.20: Process innovation

Process	Frequency	Percent
Strongly agree	42	52.5
Agree	22	27.5
Undecided	10	12.5
Disagree	6	7.5
Total	80	100.0

Source: Researcher (2013)

The research findings showed that process innovation helps a great deal in ensuring value addition of dairy products is achieved. 53% of the total population strongly agrees. From the data collected the research findings further revealed that most of the dairy products entrepreneurs agreed on process innovation as one of the entrepreneurial skills aimed at ensuring value addition on dairy products. This was presented by 27% of the same population. 13% were undecided. Only 7% of the population disagreed.

Table 4.21: Market innovation

Market	Frequency	Percent
Strongly agree	52	65.0
Agree	18	22.5
Undecided	10	12.5
Total	80	100.0

Source: Researcher (2013)

Market innovation is one of the entrepreneurial skills that must be done in order to ensure value addition of the dairy products is achieved. 65% of the population strongly agreed. 23% of the remaining population agreed to the market innovation as one of the entrepreneurial skill that is aimed to ensuring value addition of dairy products is achieved. Only 12% of the same population was undecided.

Inadequate entrepreneurial skills has affected the level of value addition of dairy products as it was observed that very few respondents were innovative in terms of their products, processes and markets.

4.7 Effects of technologies

Table 4.22: Use of technologies

Technologies	Frequency	Percent
Packaging	40	50.0
Pasteurization	30	37.5
Fermentation	10	12.5
Total	80	100.0

Source: Researcher (2013)

The data collected revealed that use of technologies enables quality process and process of value addition to dairy products is enhanced. 50% of the population indicated that

packaging of value added dairy products is the key to ensuring that dairy enterprises is performing and thus technology ought to be embraced. Pasteurization is another technological advancement mean to add value to the dairy products. This was indicated by 38% of the total population interviewed. Only 12% of the same population indicated that fermentation of dairy products is one of the technological advancement.

The findings established that very few technologies were used. This affected the level of value addition of dairy products as was seen by the presence of very few value added products.

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summaries of the findings

5.1.1 Background information

Majority of the entrepreneurs in Bomet County are males, few are females. Most of these males operating on the dairy business fall in the age bracket of 26-30 years of age. The other majority of entrepreneurs fall in the age bracket of 31-35 years of age showing that such kind of entrepreneurs have operated for such a long time in the business. The early investment in the entrepreneurship will enable them to earn a living through dairy business, this will sustain their livelihoods. Most of these dairy entrepreneurs have attained secondary school level as their highest level of education. Most of these entrepreneurs have been in the business for a period of 3-6 years.

The research findings further showed that majority of the respondents handled 20 to 50 liters of milk daily. The least population handled 100 liters daily. These are farmers as well as dairy business entrepreneurs. The minority uses their own transport to deliver milk products to the market. Moreover, most of the respondents showed that they package milk products in polythenes and bottles, since packaging materials are expensive and they lack skills to do package themselves with an aim of adding value to dairy products.

5.1.2 Effects of cost of inputs

The data collected revealed that some respondents experience high cost of inputs on value addition of dairy products. Transportation is seen as the most expensive as compared to other inputs. This is due to poor roads and other infrastructure that is otherwise could have facilitated the delivery of dairy products to the market. Human

labor is considered the second most limiting factor as a cost of input. People rarely give in to put their best efforts in delivering quality service in high risk business venture like dairy business. The research findings further revealed that most of the entrepreneurs in this region face high cost of inputs on milk (raw material) as they experience packaging challenge as this may render the dairy business weak. Dairy entrepreneurs lack chemicals to add value to the dairy products.

Most of the dairy milk entrepreneurs experience challenges in an attempt to add value to the dairy products. The cost of service is one of the factors that hinder the development and the growth of small scale enterprises dealing with dairy products in the county. Inadequate transport is the most challenging factor, since the means of transport is expensive. The road network in the region has not been developed to facilitate the faster delivery of raw milk to the production plant. Most entrepreneurs in this region lack extension services meant for them. The government extension officers have slowly neglected their duties to educate farmers on the importance of value addition on dairy products. Most of the dairy vendors lack financial support to purchase enough machinery to facilitate value addition on dairy products. Cost of insurance is also high thus most farmers do not afford. Moreover, most of the dairy entrepreneurs in Bomet County lack good training on value addition on dairy products.

It is very clear that machinery is the most important technique in dairy value addition; therefore this has not been achieved due to inability to access credit facility from financial institutions.

5.1.3 Effects of marketing skills

The research findings revealed that most of the dairy entrepreneurs sell their products in the local market. The population interviewed indicated that they sell their milk products

at farm level. Others take their products to nearby markets where they have established selling points whereas very few sell through the local supermarkets.

The data collected reveal factors that most of these dairy milk entrepreneurs consider in pricing the product. Most of these entrepreneurs consider the market prices. In rainy season, a lot of milk is produced therefore the buying price tend to fall and on the dry season, there is scarcity of milk due to food insecurity to the dairy cattle hence the scarce resource is sold expensively. They also consider production and transportation costs. This will help them to balance their revenues.

The research findings revealed that different marketing strategies affect value addition of dairy products. The quality of milk products delivered to customers affect the perception towards that particular supplier. Furthermore, the research findings showed that the location of the supplier is considered the primary challenge; this was agreed by majority of the respondents. Most of the advertisement made is by use of mouth to mouth since they cannot afford to advertise by media.

5.1.4 Effects of entrepreneurial skills

The research findings revealed that entrepreneurial skills affect value addition of dairy products. In the process of adding value to the milk products, product innovation in terms of packaging is the key entrepreneurial skills that affect the process of adding value to the milk products. Most of the respondents saw the sense in product innovation as the most important entrepreneurial skill, aimed at enhancing value addition to dairy products.

The research findings showed that process innovation helps a great deal in ensuring value addition of dairy products is achieved. From the data collected the research findings further revealed that most of the dairy products entrepreneurs agreed on process

innovation as one of the entrepreneurial skills aimed at ensuring value addition on dairy products.

Market innovation is one of the entrepreneurial skills that must be done in order to ensure value addition of the dairy products is achieved. The remaining population agreed to the market innovation as one of the entrepreneurial skill that is aimed to ensuring value addition of dairy products is achieved.

5.1.5 Effects of technology

The data collected revealed that use of technologies enables quality process and process of value addition to dairy products is enhanced. packaging of value added dairy products is the key to ensuring that dairy enterprises is performing and thus technology ought to be embraced. Pasteurization is another technological advancement meant to add value to the dairy products. Fermentation of dairy products is one of the technological advancement.

5.2 Conclusions

5.2.1 Background information

Most of the dairy milk entrepreneurs are males, few are women. These entrepreneurs are age between 30-36 years thus, have served in the dairy business for up to 6 years. Moreover these entrepreneurs handle up to 50 liters of milk on a daily basis; The fact that few have operated the business for a longer period implies that dairy entrepreneurship faces sustainability issues; this is further justified by small volumes of milk being handled on a daily basis

5.2.2 Effects of cost of inputs

These are farmers as well as dairy business entrepreneurs. The majority uses their own transport to deliver milk products to the market, this means high cost of inputs as they do

not take advantage of economies of scale. The transportation costs are increased further due to poor roads and other infrastructure that otherwise could have facilitated the delivery of dairy products to the market. Moreover, most of the respondents showed that they package their milk products in polythene bags and bottles, since packaging materials are expensive and they lack skills to do packaging themselves. These types of packaging may not be the safest form of packaging milk products; hence reducing the attractiveness of the value added dairy products.

Human labor is considered the second most limiting factor as a cost of input as people rarely give in to put their best efforts in delivering quality service in a high risk venture like dairy business. Most of the entrepreneurs in this region also face high cost of inputs on milk (raw material) and this could be attributed to the high costs of feeds and medicine for the dairy cows. Dairy entrepreneurs lack chemicals to add value to the dairy products as they are not even available in the local markets hence becomes costly to access these chemicals.

Most of the dairy milk entrepreneurs experience challenges in an attempt to add value to the dairy products. The cost of services is one of the factors that hinder the development and the growth of small scale enterprises dealing with dairy products in the county. Inadequate transport is the most challenging factor, since the means of transport is expensive. The road network in the region has not been developed to facilitate the faster delivery of raw milk to the production plant. Most entrepreneurs in this region lack extension services meant for them. The government extension officers have slowly neglected their duties to educate farmers on the importance of value addition on dairy products. Most of the dairy vendors lack financial support to purchase enough machinery

to facilitate value addition on dairy products. Cost of insurance is also high thus most farmers do not afford. Moreover, most of the dairy entrepreneurs in Bomet County lack good training on value addition on dairy products. Based on the above findings it can be concluded that the costs of inputs are high and have had a negative impact on value addition of dairy products which can be deduced by the fact that few entrepreneurs can sustain their business and those who manage to continue operate at a very low capacity.

5.2.3 Effects of marketing skills

Marketing skills affect value addition of dairy products. The majority of the respondents sell their products in the local markets and at their farms, this means they may not reach as many customers as possible. In regard to price the majority considers the market price when pricing their products meaning they may even sell their products at a loss. Furthermore the entrepreneurs do not advertise their products while the few who attempt to advertise do so by word of mouth which may not be very effective. Again it can be concluded that sustainable value addition of the dairy products cannot be achieved without effective marketing skills.

5.2.4 Effects of entrepreneurial skills

Entrepreneurial skills affect value addition of dairy products. In the process of adding value to the milk products, product innovation in terms of packaging is the key entrepreneurial skills that affect the process of adding value to the milk products. Most of the respondents saw the sense in product innovation as the most important entrepreneurial skill, aimed at enhancing value addition to dairy products.

However, process innovation helps a great deal in ensuring value addition of dairy products is achieved. most of the dairy products entrepreneurs agreed on process

innovation as one of the entrepreneurial skills aimed at ensuring value addition on dairy products. Market innovation is one of the entrepreneurial skills that must be done in order to ensure value addition of the dairy products is achieved.

5.2.5 Effects of technology

The data collected revealed that use of technologies enables quality process of value addition to dairy products to be enhanced. Proper packaging of value added dairy products is the key to ensuring that dairy enterprises is performing as it leads to value added products that are safe and attractive to the consumer. Pasteurization and fermentation are other technological advancement meant to add value to the dairy products. Based on the study and observation of the enterprises it can be concluded that fewer technologies applied means lower level of value addition of dairy products. This could be attributed to lack of knowledge of these technologies and high cost of implementing the technologies.

5.3 Recommendations

Female participants need to be encouraged to enhance and motivate other women in the region to invest in dairy milk production and value addition as this is the most profitable venture that aim at improving their livelihoods. To enhance cost effectiveness, dairy milk entrepreneurs are encourage to use both private and public means to deliver their milk produce in the market. Most of the dairy milk entrepreneurs experience challenges in an attempt to add value to the dairy products. The cost of service is one of the factors that hinder the development and the growth of small scale enterprises dealing with dairy products in the county. Inadequate transport is the most challenging factor, since the means of transport is expensive. This simply implies that road network needs to be improved. To address the high cost of transport the dairy entrepreneurs can be

encouraged to come together to form groups or cooperatives so that they can transport together hence take advantage of economies of scale.

Dairy enterprises can become a major driving force of the rural economy; however this has been hindered by several challenges which have been identified by the study to include inadequate marketing skills, inadequate entrepreneurship skills and lack of appropriate technologies. The relevant counties (where dairy enterprises can thrive) should therefore put in place programmes and policies that address these issues so as to enhance value addition of dairy products and hence spur the economic growth of the respective counties

In addition, access to credit, appropriate training in value addition and marketing would help the dairy entrepreneurs sell high quality products that will not only fetch higher prices but will also be able to reach a wider market. Consequently, this would enhance their income and improve their livelihoods and that of their families.

5.3.1 Suggestion for further research

Based on the findings that more men are involved in the dairy enterprises than the women, research should be undertaken to establish specific challenges that affect women entrepreneurs. Also the findings identified few government services that affect the value addition enterprises, research should therefore be undertaken to establish the effects of government policies on the dairy enterprises.

Finally the findings indicated minimal usage of technologies in value addition of dairy products, therefore research needs to focus more on value addition technologies that are relevant and appropriate for dairy enterprises, with more consideration put not only on relevance but also on affordability and accessibility of such technologies.

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APPENDIX I-QUESTIONNAIRE

Instructions

Please respond to the following questions with outmost confidence by ticking (V) where appropriate and giving comments, suggestions and opinions on space provided. Finally, answers given will be treated with confidence thus will be used for academic purposes ONLY.

SECTION A: BIODATA

1. Please indicate your Gender.

Male

Female

2. In which age bracket do you fall in?

(a) 20-25 years

(b) 26-30 years

(c) 31-35 years

(d) 36-40 years

(e) 41 years & above

3. Which level of education did you attain?

a) Secondary level

b) Diploma level

c) Degree level

d) Masters level

e) Other

4. For how long have you been running your dairy enterprise?

a) Below 2 years

b) 3-6 years

c) 7-10 years

d) 11 years & above

SECTION B: VALUE ADDITION

5. How much milk do you process in a day?

- 20-50 liters.....
- 50-100 liters.....
- Over 100 liters.....

6. Please indicate the number and type of value added products.

.....
.....

7. What other type of value addition do you do?

.....
.....

8. How much profit do you get from your dairy enterprise in a month?

.....

SECTION C: COST OF INPUTS

9. What form of transport do you use to ferry your products?

- Public.....
- Private.....
- Other(specify)

10. What packaging materials do you use?

- Polythene.....
- Tetrapak.....
- Bottles.....

11. How many employees do you have in your enterprise?

- None.....
- 1-5.....
- 5-10.....
- Above 10.....

12. State your level of agreement on the statement below using the following ratings: Strongly Agree- 5, Agree-4, Undecided-3, Disagree-2, and Strongly Disagree-1. Cost of inputs affect value addition of dairy products.

Cost of inputs	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
Transport					
Packaging materials					
Labour					
Chemicals					
Raw material(milk)					

13. State the extent to which unavailability of inputs and services listed below affect value addition of dairy products. High extent-4, to some extent-3, low extent-2 not at all-

Unavailability/cost of service	High extent	To some extent	Low extent	Not at all
Inadequate transportation services				
Inadequate extension services				
Inadequate machinery				
Cost of insurance				
Trainings on value addition				

Access to credit				
------------------	--	--	--	--

14. what other inputs do you use in your dairy enterprise?

.....

15. How does the cost of these inputs affect your enterprise?

.....

.....

.....

SECTION D: MARKETING

16. Where do you sell your products?

- Farm
- Local market.....
- Supermarket.....
- Other(specify).....

17. What factors do you consider when pricing your product?

- Market prices.....
- Production costs.....
- Others(specify)

18. How do you promote your products?

- Word of mouth.....
- Radio.....
- Free samples.....
- Do not promote.....
- Other(specify)

19.State your level of agreement on the statement below using the following ratings:
Strongly Agree- 5, Agree-4, Undecided-3, Disagree-2, and Strongly Disagree-1

Different marketing strategies affect value addition of dairy products

Marketing strategies	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
Pricing of product					
Quality of product					
Place where product is available					
Advertisement of the product					

20.What other marketing issues affect your enterprise?

.....

21.How do you deal with these issues?

.....

SECTION E: ENTREPRENEURIAL SKILLS

22.How often do you introduce new products to the market?

.....

23.Have you changed the method of producing your products in the recent past? YES/NO

If yes, explain.....

.....

24. Have you ventured into new markets in the recent past? YES/NO

If yes, explain.....

.....

25. How do you cooperate with your suppliers and competitors?

.....

.....

.....

26. State your level of agreement on the statement below using the following ratings:

Strongly Agree- 5, Agree-4, Undecided-3, Disagree-2, and Strongly Disagree-1

Entrepreneurial skills affect value addition of dairy products.

Entrepreneurial skills	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
Product Innovation					
Process Innovation					
Market Innovation					
Organization Innovation					

27. How do innovations affect value addition of dairy products?

.....

.....

.....

SECTION F: TECHNOLOGY

28. Can you list the technologies you apply in your dairy enterprise?

.....
.....

29. Where do you get information on technologies for value addition?

.....
.....

30. How does use of technology affect value addition of dairy products?

.....
.....

31. Do you have any challenges as far as use of technologies? YES/NO

If yes, explain.....

.....
.....
.....

32.State your level of agreement on the statement below using the following ratings:
Strongly Agree- 5, Agree-4, Undecided-3, Disagree-2, and Strongly Disagree-1

Use of technologies affect value addition of dairy products

use of technologies	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
Packaging					
pasteurization					
Fermentation					
Yoghurt					

33. State any other technologies not stated above that may affect value addition of dairy products.....

34.Please comment on what can be done to enhance enterprises dealing with value addition of dairy products.

.....

.....

.....

.....

.....

.....

.....

APPENDIX II-OBSERVATION TOOL

SECTION A: PROCESSING OF MILK

1. Location of processing facility

.....

2. Type and condition of equipments being used

.....

.....

3. Amount of milk being processed

.....

4. Number and type of value added products being processed

.....

5. Number of employees

.....

SECTION B: MARKETING

6. Location and condition of business premise

.....

.....

7. Type of licenses in the business premises

.....

8. Type and prices of value added products being sold

.....

.....

9. Volume of sales for each value added product

.....

APPENDIX III-LETTER OF INTRODUCTION

DAISY .C.RONO
KENYATTA UNIVERSITY
SCHOOL OF BUSINESS
P.O. BOX 43844-00100
NAIROBI

TO WHOM IT MAY CONCERN

RE: REQUEST YO VISIT YOUR INSTITUTION

I am a Master's Degree student of Kenyatta University, School of Business and I am conducting a research project on the **determinants affecting value addition of dairy products**. I therefore request you to assist me to collect data in your location.

I assure you that the information is used for academic purposes only and a copy of the same will be availed to your office.

Yours faithfully

Daisy Rono