DESIGN OF SPECIALITY MILK AND COMPETITIVE ADVANTAGE OF DAIRY PROCESSING FIRMS IN NAIROBI COUNTY

BY

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DECLARATION

This research project is my original work and has not been presented for any academic fulfillment in any other institution of learning.

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I dedicate this work to my family for their prayers and moral support.

ACKNOWLEDGEMENT

I would like to thank God for enabling me to reach this far and completing my studies. Secondly, I am grateful to my supervisors Mr. Lazarus Mulwa and Mr. Ernest Akelo who have guided and criticized my project through valuable discussions and their unreserved patient with me. I appreciate their time, energy and expertise.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATION AND ACRONYMS

TBC	Total Bacterial Count
KCC	Kenya Corporation Creameries
KDB	Kenya Dairy Board
GDP	Gross Domestic Product
SALL	Sameer Agricultural & Livestock Limited
UHT	Ultra Heat
UOD	User Oriented Design
CAD	Computer Aided Design
SET	Social-Economic-Technological
CBD	Central Business District
WMP	Whole Milk Powder
ROI	Return on Investment

ABSTRACT

The milk industry in Kenya is a source of income and food and a major contributor to the national GDP. However, the processing firms in the industry face product design problems which affect their competitiveness. The purpose of the study was to establish how the design of specialty milk influence competiveness of the processing firms. The targeted population was 11 milk processing firms in Nairobi county and 40 consumers of specialty milk selected randomly to confirm the responses given by firms. The mixed method was selected for acquiring and analyzing the results of the research. Quantitative data was collected from 40 respondents via questionnaire and analyzed via SPSS. Qualitative data was collected through interviews on 7 firms among all the 11 processing firms and content analysis was conducted. The result of the study showed that product design of specialty milk is a major contributor to gaining competitive edge. By examining the consumer perception towards the brands they consume, it was found that design elements like packaging, colour, graphics and information influence the decision making and attracts consumer attention but more importantly consumers are concerned with health factors, taste and smell of the milk they consume. Based on the findings, processing firms could gain competitive edge by working on their product design to be unique and cooperating with consumer's requirements. Further research could investigate on other competitive product/service design requirements in different industries.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Consumer market advance each year, and competition increases steadily among different types of product and goods. Every firm tries to invent new products and keep on developing the current products to gain a competitive edge by providing what the end consumers want (Knesia, 2013). One of the most important marketing tools is product design which allows companies to have more priorities and be different among competitors (Lorenzo, 1986). The ability to compete with other firms depends on their capability to design viable product ideas and translate them into success (Canadian, 2012). Product design is a cycle of continuous improvement that relates to many factors: customers' changes in taste and preferences, local and international competition, health issues, convenience and costs, standards conformance, environmental issues and technological advances (Akrani, 2012). Today, a company which does not invest in innovative product design, stand the risk of being displaced from its market position.

Product design is a non-price factor that determines the success of a product and its role changes throughout the product lifecycle (Murray, 2005). The product may create a need that never existed before (e.g., the introduction of Sony Walkman) or different products may compete in the same market (e.g., cars and buses collide for the same transportation services). Walsh (1992) more competitors enter the market as the product lifecycle matures and the chief role of product design differentiation is through appearance, ease of use, quality, reliability, performance, and reparability. The design importance as a non-price

factor is that: Consumers will select superior designed, highly characterized products when given a choice between two similar commodities of the same price and select cheaper of two products with identical design and aspects (Murray, 2005). Walsh (1992) the Design Innovation Group of Open University (DIGOU) and Manchester Institute of Science conducted studies in the UK on return on investment (ROI) in design. One study showed that 'sensitive design firms' had one percent higher profit margin, three percent higher return on equity, seven percent higher capital growth and twenty-eight percent higher turnover growth.

The functional demand on milk ingredients have created demand for specialty milk design which possess specific functional properties for specific uses (Glyn, Phillips & Williams, 2007). Dairy products are designed as functional and nutraceutical food to be consumed by people who are health conscious (Canadian, 2012). Primila, Akhilesh and Devendra (2015) stated that this could be done by incorporating required functional ingredients in processing cycle or modifying the products in protein/amino acid composition, alteration in lactose, fats and fatty acid modification, eliminating lactoglobulin from milk, decreasing allergies and adding therapeutic proteins. These dairy product design transformations increase consumption as specific utilities are met (Balakrishnan, 1996).

Kenya dairy processing firms have not yet managed to reach the level of these technologies fully hence the need for this study. The social-environmental changes and eating behavior has contributed to pressure on the dairy products to add unique values and be in a position to compete with other energy drinks (Mburu, 2016). To be positioned in the market and meet the demand of its consumers, dairy products has to be designed in a way that increases their properties according to the environmental needs. The product innovations are

expensive and risky, but with proper research, the success justifies the costs and risks (Dickson, 1995).

1.1.1 Product Design

There is rising interest of scholars and management in design following the increase of awareness in the education realm (Merrit & Lavelle, 2005). Trueman and Jobber (1998) producers derive many benefits from designed products. Effective design has the capability of matching the product or service characteristics with what the consumers require, ensuring consumers' requirements are met at an affordable cost and reduce time in designing of new products. The study will research in detail product design as it defines the appearance of a product, specifies materials to be used, determines dimension and tolerance and sets performance standards. There are key stages in design processes: design activities (how design decisions should be made), design Choices (how functional and formal product properties are affected by design decisions) and design results (How product properties influence firm performance) (Macpherson, 2010).

1.1.2 Design Results

Design results regarding consumer response, financial performance, and operational efficiency are related to design choices on commercial, finance and operational performance. According to Lorenzo (1986), sound design has the capability of positively affecting the competitive performance of a product. Dickson, Schneir and Lawrence (1995) showed that CEOs who invest in design activities experience strong organizational competitiveness. Gemser and Leenders (2001) added that improved levels of design integration and product development influence profits and turnover growth.

Whyte et al. (2003) outlined areas where marketing and design integration is desirable and the underlying conditions. Perks et al. (2005) further showed that an organization that considers design as a crucial aspect of the new product development process could display strong financial and competitive performance. Veryzer (1995, 1999) regarded product form as the first opportunity to capture the customer impression of a product. Based on traditional experimental studies, research documented how product aesthetics influence customer preferences, their brand understanding, and categorization and their buying decisions. Cox and Cox (2002) later showed that visually complex product designs tend to add their preferences with repeated exposure. Kumar and Garg (2010) recently proved how consumers prefer designs that match or balance their attentional resources levels needed and visually evaluating the design pleasantness. Landwehr et al. (2011) elaborated how product "facial" expression can trigger pleasure and arousal to consumer liking the product.

The results of a product design create a competitive advantage through evoking consumer attention to investigate the content and information about the actual product (Rundh, 2009).

1.1.3 Competitive Advantage

Product design is the fundamental determinant for product quality, performance, cost and speed through which improved and new products are brought to the market. Council (1991) added that this makes design excellence a primary means through which firms can gain profitability and competitiveness. Studies on US firms propose that designing for competitive edge need the commitment to continuous advancement, following a tailored product realization progress, use design practices to implement their parallel redundancy protocol (PRP) and promote a supportive design surroundings (Stalk, 1988). The main

issue to win competitive battles is the corporate doubting their ability and the challenges they are facing.

Competitiveness can be analyzed using past performance indicators (Hartmann, 1997) like market share, product cost, productivity, gross margin, net income, return on assets, total factor productivity, (Farole, 2010; Kortelainen, 2011) financial performance (sales growth, profit, ROI), non-financial performance (customer satisfaction, employees growth, balanced scorecard and benchmarking). Profitability, productivity and market share are traditional indicators of competitiveness, but studies have shown they are inadequate when alone at the firm level. This scenario is relatively similar to the dairy processing industry in measuring competitive advantage (Bojnec, 2003; Gaytan & Benito, 2014; Voulgaris & Papadogonas, 2013). Notta (2011) on the study of food, uses productivity, profitability and market share. Woodford, Greer, and Phillips (2014) survey on dairy farming sector uses yield to measure competitiveness. To measure the competitiveness of South Africa commercial milk producers (Toit, 2010) uses profitability. The success of product measures is mostly tied to firm performance variables such as market share, quality, sales, innovativeness, brand advancement, profit and agility to market (Amaldoss & Jain, 2008; Verma, 2001;Verganti, 2007).

Effects of product design involve consumer feedback on assessment and choice, firm performance and the success level of product variables (Alba, 2011). In dairy processing, a competitive advantaged firm will be recognized through the value of its product to the consumer. A great way of finding strategic advantage is observing the customers preferences and their purchasing patterns. Swink (1998) summarized characteristics of

qualifying orders that we might apply in our dairy firms to product information, quality conformance, flexibility, development costs, and delivery reliability.

1.1.4 Dairy Processing Firms in Nairobi

Dairy processing firms in Kenya were established way back in the colonial era when dairy commercialization was introduced. This was through the importation of exotic herds to upgrade local cattle, policy establishment, the institutional and regulatory framework in the industry among others (William, 1992). Kenya Corporation Creameries (KCC) was the pioneer processing firm incorporated in 1925 (Muriuki et al., 2003). KCC established deports in many Kenyan parts to distribute milk products and accommodate farmers and dairy societies. It processed fresh liquid milk, butter, powder milk, ghee, cream, yogurt, cream and cheese and became a household name and enjoyed a monopoly status for more than 60 years not keen to pursue product design innovations.

Since 1992 liberalization, the industry has tremendously grown leading to informal small-scale milk traders who deal with raw milk marketing producing over 80% of national milk (Muriuki, 2011). The collapse of the monopoly of Kenya Co-operatives Creameries (KCC) in 1992, lead to the emergence of new processors. According to the Kenya Dairy Board statistics in 2010, there were an estimated 27 processors in Kenya. Muriuki et al. (2003) found that the dairy industry contributes 14% agricultural GDP and 6-8% of country GDP making Kenya one of the largest milk producer in Africa (FoodBusinessAfrica.com, 2013). This agricultural subsector is a crucial player in Kenya's economic growth with an estimated 5 billion liters of milk produced annually (Foodworld, 2013).

In Kenya, the dairy processing industry is dominated by four key players; New KCC, Brookside Dairy Ltd, Githunguri Dairy Co-operative Society and the Sameer Agriculture and Livestock Limited (Daima) (KDB, 2018). The four processors command a significant market share with Brookside processing approximately 600,000 liters per day, New KCC 450,000litres/day, Githunguri 150,000litres/day and Sameer Agricultural and Livestock Ltd (SALL) 170,000litres/day (FoodBusinessAfrica.com, 2013).

Large dairy processing firms are moving towards mergers and acquisition of small and medium levels dairies. Dankit and Njoroge (2014) found that Brookside Dairy has performed buy-outs of other dairies like Ilara, Delamere, Spinknit (Tuzo) and Buzeki (Molo milk). The company has registered more market growth rate of 43% compared to the other three market leaders. New KCC rides on a strong brand awareness since it has been in existence for many years since 1925 and operating with small-scale farmers (FoodBusinessAfrica.com, 2013).

The output products from dairy processing companies include; pasteurized and long life liquid milk, fermented milk (cheese and yogurt), flavored milk, cheese, milk powder, ghee, cream and butter (FoodBusinessAfrica.com, 2013). Table 1 shows a matrix of what major dairy industries produce. The processors face challenges like milk fluctuations leading to low milk supply, a high cost of production and processing, and competition among others. In the recent past, there has been an increased investment in milk processing to the exacerbating demand for dairy products (Dankit, 2014). Innovative re-designing and development of existing and new products have also been invested by the dairy processing firms to increase sales and market shares.

Kenya milk processors face challenges in the supply of milk as rainfall patterns dictate it (oversupply in January, May and December and scarce in September and October) (Njarui, Gatheru, Wambua, Nguluu & Mwangi, 2010). Njarui et al. (2010) further added that some processors are constrained in producing some selected milk products due to lack of equipment, power, lack of skilled workforce and low demand for their products. Poor road infrastructure hinders quick transportation of milk increasing the costs and lowering the profit margins (EPZ, 2005). Another major constraint is the high fuel cost that is VAT taxed.

1.2 Research Problem

Product design conditions the accomplishment of the universal firms and ability to stand for competition globally (Brondoni, 2015). This takes shape by recognizing the design of products with new characteristics that are desired by customers and adjusts with time and space. Product designing, therefore, means designing an offer that best define the specific unique features with customer and competitors' information. Firms need to focus on product design processes to maintain profit limits and cope with competition (Chiva, 2009). Christiaans and Almendra (2010) mentioned that the functionality of the new design serving the changing market and responding to market dynamics and shorter product cycles is essential. In the last few years, Korean chaebols (Kia, KTF, Hyundai, Daewoo Electronics, Samsung Electronics, and LG) have become sensitive to design trends and are transitioning to design core competence (Borja & Young, 2009). Payam (2010) found that in Iran, dairy companies are faced with design issues as many products fail due to trial and error systems. The issue is solved through R&D departments which conduct analysis on products design development.

Good dairy product design is one that considers the consumers taste and preferences, packaging, texture, fat content, health benefits, appearance, set standards of performance and sets dimensions of tolerance (Brondoni, 2015). Mburu (2016) suggested that there is the need for dairy processing firms to develop differentiation and market segmentation strategies regarding products and services to be in the market continuously. Unique products with added value will go through the competitive test (Gideon & Phillip, 2011). Poor quality of milk delivered in dairies is a big challenge to the processors. They reduce milk acceptability, shelf life and the ability to export the products. This is contributed by the problem of milk adulteration by unscrupulous farmers and traders by adding chemicals and water (FoodBusinessAfrica.com, 2013).

Local studies have been done in the area of dairy products but non that has focused on dairy product design. A research was done by Kimeu (2013) on challenges facing the dairy sector highlighted that dairy companies face international competitor's problems due to inadequate processing and packaging methods. Donaldson (2006) added that lack of products that adequately meet consumer needs creates a tremendous entrepreneurial opportunity to improve on product design. Studies by Mburu (2016); Odondi (2001); Bii (2017); Langat (1997); Kiarie (1993) focused on general aspects of operations and marketing of dairy firms in Kenya. This is the gap the study seeks to fill the research question: What are the design aspects in milk products that attract consumers and help processors gain a competitive advantage?

1.3 Research Objectives

The general objective is to establish how product design can be used as a competitive edge by dairy processing firms. The study will be guided by the following specific objectives:

i) To determine the dairy products design elements which are key to customers preferences.

ii) To establish design elements which dairy processing firms choose in designing their products.

iii) To establish the effect of product design elements and competitive advantage in the dairy processing industry.

1.4 Value of the Study

The findings of this study will be of value to the future researchers and academicians who are interested in studying how specialty product design in the dairy processing industry contribute to the performance of a company. Given there no specific studies done on dairy products designs, this study will add insight on innovative positional strategies that help understand the product meaning in the eye of viable consumers and the selected target market segment (Kim, 1999). The study will be beneficial to informal and formal processors who endeavor to explore the dairy market in depth. Companies that adopt product design innovations win improved business performance, reputation for quality, empowers the product, brand, and marketing, boost customer loyalty and improves environmental records and regulation compliance (Dankit, 2014).

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter gives an overview of previous studies on related product design topics researched on. It will discuss theoretical studies, product design, and design for competitive advantage, empirical studies, and conceptual framework.

2.2 Literature Review

The study will be based on the product design theory as an art, and a science and will elaborate on how applicable it can be used by dairy processing firms to achieve a competitive edge.

2.2.1 Product Design Theory

Hevner (2004) states that the theory of design focuses on "how to do something." This theory gives explicit prescriptions on designing and developing artifacts whether in managerial or in technological interventions. Cross (2001), shows how design work can proceed without reflecting on theory and must keep in mind that design knowledge resides in product materials, forms and finishes with design attributes. However, Gregor (2007) agrees with Cross (2001) but insists that design research need development of more formal knowledge of configuration and shape. Gregor (2007) added that theoretical design morphology studies are essential to add to the informal knowledge. According to Zeng (1999), there is so much progress in different disciplines among them philosophy,

engineering, computer science, psychology, etc. in many aspects like natural phenomena, design model computation, and cognitive models. The design is a creative act with a style that can be assessed with information processes while others cannot. New design or development can be due to demand or motives, malfunction or failure on existing products or complaints about an existing product (Zeng, 1999).

Many disciplines have also approached design research problems including industrial designs and architecture. Cross (2001) traces the science of design back in the 20th-century movement of modern design noting that ‘Design Science' probably was introduced in the 1960s by Buckminster Fuller who held a design science revolution. Gamma (1995) mentioned that design patterns approach sought to describe problems and solutions that arose from context forces. Fernadez (1998) added that design patterns apply to a range of disciplines and system analysis. A further relevant approach of the theory of design appears in management (Aken, 2005). A theme with many research on design is vital in addressing the problems and framing solutions to practitioners through an iterative and reflective research process (Aken, 2004).

The Science aspect of design allows people to gain a better understanding of design processes while the art aspect will enable designers' maintain their creativity in a rationalized process (Kirschman, 1196). The main aim of scientific design theory is to disclose and discover the order of design processes. The formulation of design starts with design requirements and ends with a product description. In the process of designing, requirements are represented by design specifications which generate a candidate product. Halser et al. (2004) added that information on product requirements has to come from the

consumers. The study will establish whether consumer perception matters in the design of a product.

Kabecha (1998) documents the innovativeness of product design in the informal sector to improve on the know-how machinery and appropriate tools to foster growth. Although product design as an art and science have been widely used, no research has systematically focused on dairy product designs features and how they affect the competitiveness of the processors. This theory can be applied by the dairy processing firms in Kenya in developing more formal design processes and understanding the design patterns to find a solution to problems.

2.3 Product Design in Dairy Products

Design has been effectively used in dairy products, and all the types of products available in different outlets scream for attention and communicate to tastier, healthier and better benefits than the competitors (Gelici, Lutters, Klooster & Weijzen, 2012). According to tetrapak.com (2015), the material designed for packaging dairy products should be able to enhance efficient milk distribution, maintain product hygiene, reduce dairy product spoilage and waste, protect nutrients and flavors and convey product information.

According to Prima et al. (2015) modern era consumers are aware of their health and processors need to design milk products in a way that it adds particular nutritive value to compete with today's demand. Gulati, Kitessa, Ashes, Simos and Wynn (2000) added that milk has to be designed or enriched with modified content from the constituent milk to be classified as humanized milk or milk with therapeutic purposes by reducing fat content,

enhancing omega fatty acids, altering lactose (Milk sugar), decreasing milk allergies and refining bovine milk (baby formula milk).

Dairy products for all the processors are designed the same and compete for the same consumers. Odondi (2002) found that products are in two categories milk (Ultra Heat Treated-UHT, cultured, homogenized and flavored) and Milk products (Ghee, Yoghurt, Powder, Cheese, Butter, and cream). Packaging is more the same, and all processors choose from Tetra Rex, Tetra Classic, Sachets, cups, and bottles depending on the target market (Auma, 2011). To gain competitive advantage, the processors need to add value to their products through design innovation and development.

2.4 Literature Review

Taiwan computer and electronics (Asus, Acer, HTC and Bnq) are noted for their diverse modern designs in appearance, quality, and functionality. Cooper and Kleinschmidt (1987) to maintain competitiveness, product designers need to continuously address environmental changes and set innovative goals in developing new products. Crawford (1994) added that product design strategy refers to the way company processes its new product. Song and You (1999) further added that design is a practical response to organization innovations. To achieve new product market, HSU (2006) explored the Taiwan Computer and Consumer electronic industry by helping them achieve their goals in the market through implementing innovative strategies and new product development.

Michael, Scott and Creusen (2014) found that firms like Puma, Apple and Dyson has been complemented by academic research on product design. They further added that assessing customer needs through the concept of user-oriented design (UOD) encourages their

explicit consideration of the product. In addition to which firms can achieve success in addressing customer needs throughout the product lifecycle (Kahn, 1998). In addition to the above contribution, Regal Marine, one of the largest powerboat manufacturer achieve its mission through differentiating its products concerning quality, innovation and unique features leading to increased sales (Mohammed, 2015). The company can meet the issue of competitiveness, and the changing consumer tastes through the use of computer-aided design (CAD) software that helps provide good value to the customers.

Frankie and Skreier (2008) argued that trade-offs between the variety of products to increase customers appeal and component sharing reducing costs of production is preferable when the designed product is more visible to customers. Desai et al. (2001) found that coordination of design, marketing and manufacturing departments help in balancing revenues and costs from component sharing. Krishnan and Gupta (2001) added that product platforms for extreme market diversity are not appropriate. Product modularity improves manufacturing flexibility, quality and cost and can also increase acceptance to changing customer demands and improve the performance of the new product (Lau et al., 2010).

Rundh (2009) product design is influenced by consumer behavior which is determined by demographic and lifestyle factors. Changes in the size of household influence the consumer lifestyle leading to firms adapting to designing quantities that fit the consumer preferences and needs (Ksenia, 2013). EU (2006) added that governments around the world pay keen attention to environmental problems and are suggesting and implementing solutions. The product design directive describes the minimization of waste and encourages the recycling of packaging materials.

Cagan and Vogel (2002) developed the user-centered approach that uses social, economic and technological (SET) factors to identify product opportunities and exploit the targeted market. Further, Cagan & Vogel added that for a product to sell, it must form value to the consumers' eyes which may be broken down to aesthetics, emotions, product identity, quality, impact, ergonomics, and core technology. According to Löfgren (2005) packaging has a powerful and unique tool that persuade consumers to buy a product before consuming. Moskowitz, Reisner, Lawlor and Deliza (2009) suggested that this persuades the consumer at the point of purchase despite there being the challenge of a competitive environment. Young (2004) added that product design through packaging could generate product expectations which in turn affects consumers' perception and purchase decision on the brand. Expectations emerge from package design cues such as word, materials, symbols, colours, images, and shapes (Langley, Turner & Yoxall, 2010). The identification of signals that help a product design stand out and communicate to consumers and match their needs might offer possibilities for consumer product satisfaction.

The product design characteristics and features highlight the originality and uniqueness of a product through packaging. Visual (size/ shape and graphics) and informational elements influence the consumer buying decisions (Silayoi & Speece, 2007). Graphics include colour combination, image layout, colour, product photography, and typography. All these combinations communicate image with detail information about the product (Herrington & Capella, 1995). In a supermarket, the positioning and differential perception of the graphics can be the cause of missing or identifying a product (Silayoi, 2007). Cheskin (1957) mentioned that the selection of colour and combination of colour is a vital element of design since it is usually memorable and vivid. The colour creates a meaningful effect

on the capacity of the consumer to identify the product, the information on the package and differentiate from other types and company names (Garber, 2000). According to Koch and Koch (2003), colour on food packaging can influence product perception and expectations. The right choice of colour serves as an important factor in changing product selection and the brand impression (Gofman, 2010). The size and shape of a package is a significant factor in making volume judgments, (Silayoi, 2007) consumers perceive packages that are elongated to be larger and hence the products.

The information element is core when designing packaging for products. Communication of information help consumers decide against purchasing processes. Coulson (2000) gives an example of information significance when labeling food to communicate on healthy eating which offers the consumer an opportunity to consider alternative products and make the right choice. Inaccurate or misleading information can lead to contrary results through small fonts and dense writing styles (Hausman, 2010). McNeal (2003) deem that technology creates packaging according to consumer behaviors and attitudes and trends and should be presented visually.

Firms can achieve greater success when they address consumer needs that are connected to the product-market life-cycle (Khan, 1998). This demands for understanding the relationship between product designs, cross-cultural differences, and innovation (Moon, Miller & Kim, 2013). Ksenia (2013) found that the modern market has a wide variety of product designs and is a reliable sector of industry and customers are fundamental element of a market achievement allowing growth and development. For a firm to design an appropriate product or service, it's important to understand consumers' perception, their behaviors and meet their requirements (Solomon & Hogg 2010). This follows the consumer

segmentation to meet their demands and can be done in different ranges like demography (gender, age, religion, social-class), geographic (area), psychographic (personality, self-image, habits) and behavioral (benefits, product usage).

There is an increasing demand for functional foods that are natural and balanced food (Hasler, Bloch, Thomson, Enrione & Manning, 2004). Technology is enabling dairy products to be designed as functional and nutraceutical food to be consumed by people who are health conscious. Primila, Akhilesh and Devendra (2015) stated that this could be done by incorporating required functional ingredients in processing cycle or modifying the products in protein/amino acid composition, alteration in lactose, fats and fatty acid modification, eliminating lactoglobulin from milk, decreasing allergies and adding therapeutic proteins.

According to Auma (2011) firms presents their products in a way to influence consumers purchasing decisions which are compelled by packaging colour, quality of the product. Taste, smell, quantity, and design. Auma (2011) added that personal consumer characteristics including lifestyle, personality, and demographics (age, occupation, education, marital status, income, and location) which determines the choice of the brand the consumer purchase. Kerubo (2011) found that social factors affecting a firm include believes, attitudes, value, lifestyle and opinions towards the external environment of a firm. The emerging social issues are strong instigators of industrial changes as consumers are concerned about sugar, salt, saturated fat, carbohydrates, chemical additives, cholesterol, and nutrition value food producers. Shifting of the societal concerns, lifestyle and attitudes alter the competition pattern favoring those that respond quickly to being creative with products targeted to new conditions and trends. Based on knowledge about the product

usage and benefits, consumer education level determines what they purchase (Auma, 2011).

2.6 Conceptual Framework

Mugenda and Mugenda (2003) define the conceptual framework as a scheme of variables (concepts) that the researcher operationalizes to achieve a set of objectives. It's an illustration that shows the independent and dependent variables relationship. From the empirical studies, independent variables discussed in detail will be divided into:

Specialty product design elements that are key to consumers: Functional use; demographic and lifestyle, health factors (fats and lactose level, allergic consumers), brand compatibility with consumer class, original home of the consumer, Appearance; Psychological (brand product perception/ emotional, attitude), Packaging Design: Graphic design features (word, material used, colours, images, shape) and Aesthetics, quality delivered; texture, taste and smell

Specialty product design elements considered when designing dairy products: Environmental factors (electricity, accessibility, packaging, waste minimization), Consumer needs, processes flexibility/cost and quality, differentiation factors, informational elements, visual elements (size, shape, graphics), Consumer segmentation

Dependent variables from empirical studies will be the competitiveness of the dairy processing firms and growth of the company's market share. In addition to this, economics factors moderate how the independent variables influence the dependent variables.

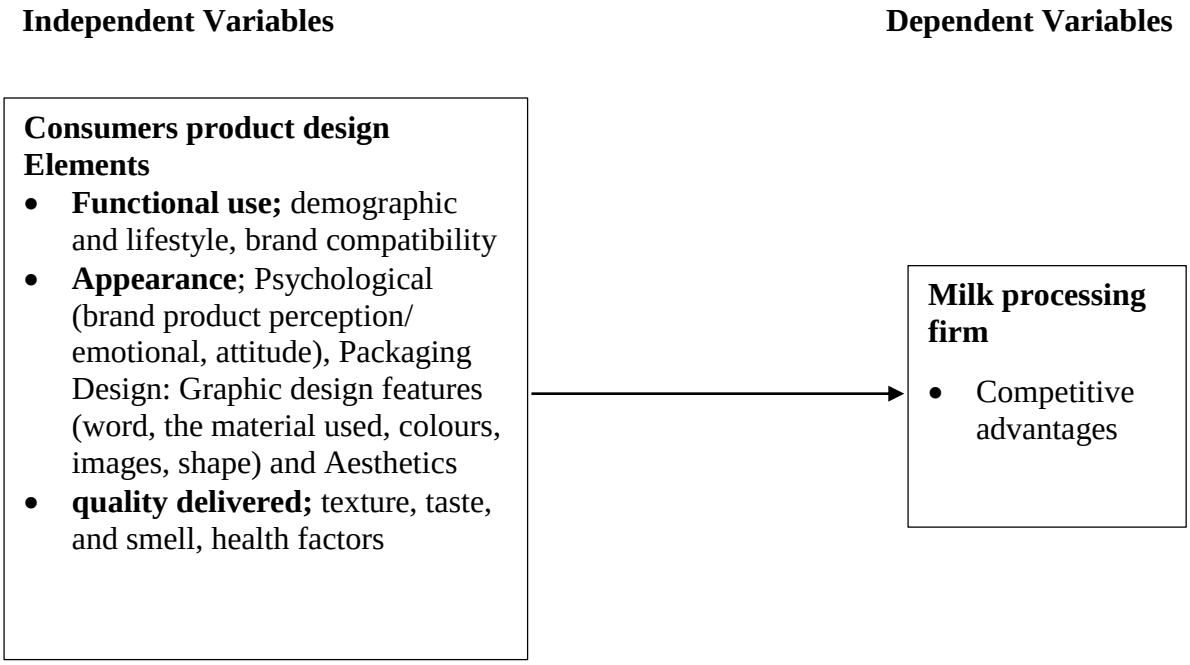

Figure 1 Conceptual framework

Source: Researcher (2018)

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Research Design

The study used a mixed methodology research design where quantitative research was employed on questionnaires and qualitative findings were obtained from the interview guides. The mixture assisted in getting a comprehensive view of specialty milk product design. Cooper and Schindler (2001) found that a detailed study answers the question of how, who, what, where and when of an occurrence as connected to the study topic. The study was formulated to intentionally determine how specialty milk product design can influence the competitiveness of dairy processing firms in Nairobi County.

3.2 Target Population

The population of interest in this study were all the dairy processing firms in Nairobi County which total to 11 and consumers of specialty designed milk from different estates in Nairobi County. Nairobi was chosen for this study because it has a high concentration of consumers of processed milk and has significant milk processors branches (KDB, 2004). The firms in Nairobi provided information that can be generalized to represent the rest of the regions in Kenya. Appendix IV shows the number of processors to be used in this study as provided by different supermarket suppliers. The study targeted all the 11 dairy processing firms for the survey.

3.2.1 Sampling

The study used simple random procedure to sample consumers of specialty processed dairy products. A sample size of 40 consumer respondents was used for this study to confirm the response from the firms.

3.3 Data Collection

For this research purpose and to achieve the desired objectives, primary and secondary data were used. The secondary data contributed more towards the background information to build the project constructively and comprehend on the survey outcome. Most of the secondary data were collected from KDB. Primary data was collected through interviews with the heads/ representatives of the design department. The guide included sets of questions in a logical series that were conducted via emails.

Secondly, a questionnaire survey was conducted on specialty milk consumers. It involved visiting hypermarkets in malls, supermarkets in estates, minimarkets and shops in different areas in Nairobi. This was done to confirm whether the firm response was the same as that of the consumer. Research assistant was used to administer the questionnaires. Pre-testing was conducted to ensure accuracy of the questionnaires. The questionnaires were divided in two sections: - Section A had questions on respondents' personal details and section B will had questions asking about the design elements that influence consumer options to the special milk brands they prefer. Likert type scale was used in ranking the choices of dairy brand purchased by consumers to assess the degree of importance where 1=not at all important and 5=most important.

3.4 Data Analysis

The data was collected through interview guides and questionnaire, sorted and edited. Statistical Package for Social Scientist (SPSS) was used to conduct analysis of the data collected through the interview and questionnaire. The first objective of determining the dairy products design elements that are key to consumers was analyzed using frequencies and percentages. To assess the relationship between product design and competitive advantage as perceived by the respondents', regression analysis was used. Tables were used to represent the rate of response and variable information considered in establishing the factors considered by dairy processing firms when designing products. Mean Scores were used to determine the importance of all the factors individually while standard deviation evaluated the significance of statistical factors. The data collected through the consumers' questionnaire was analyzed through regression where percentages and tables represented the rate of response and variable information considered in section A. Section B was analyzed through Mean Scores to determine the importance of all the factors individually. The Interview guides were analyzed through content analysis. Secondary data from KDB was collected to establish the competitiveness of the dairy firms, was analyzed through content analysis.

3.4.1 Analytical Model

The following linear multiple regression model was used for data analysis to test if the effect of the independent variables were significant or not. The regression model was as follows:

$Y = \alpha + \beta 1x1 + \beta 2x2 + \beta 3x3 + \varepsilon$

Where:

Y is the competitive advantage as measured by the brand mostly consumed by consumers

α is the constant

β is the regression coefficient

x1, is the functional use measured by health factors brand compatibility

x2, is the appearance measured by perception on packaging design, graphic features, material used and design communication

x3, is the quality of the product measured by taste and health factors

ε is the error term

CHAPTER FOUR

DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

The chapter presents results and detailed discussion of the study, which set to establish how specialty milk product design can be used as a competitive edge by dairy processing firms. The analysis was based on the gathered data collected through interviews and questionnaires. Interpretation of each finding on milk specialty product design is clearly discussed on how it can lead to competitiveness of dairy processing firms.

4.2 Demographic Characteristics

Under the independent variable specialty product design elements that are key to consumers is demographic characteristics. This section sought to determine the demographic characteristics of the respondents, including how they relate to specialty product design and competitive advantage by processing firms. Auma (2011) notes that personal consumer characteristics like demographics (age, occupation, education, marital status, income, and location) determines the choice of the brand the consumer purchase. The characteristics to be discussed are age, location, employment, household population and household income.

4.2.1 Location

The study sought to establish the location of the respondents and whether they are distributed evenly to buy specialty processed milk. The results are presented in table 1 below.

Table 1 Location

	Frequency	Percent
Jamhuri	8	20.0
Karen	5	12.5
Kileleshwa	5	12.5
Buru Buru	6	15.0
South C	2	5.0
Githurai	7	17.5
Kahawa Sukari	4	10.0
Others	3	7.5
Total	40	100.0

Source: Research Data, 2018

It is evident that consumers are located in various estates within Nairobi County. Jamhuri has the highest number at 20% with Githurai following closely at 17.5%. The consumers in Buruburu were 15% while those in both Karen and Kileleshwa each had 12.5%. Kahawa Sukari had 10% while South C had the least representation at 5%. Consumers in other estates within the county not highlighted made up 7.5%. From the data, it is evident that specialty milk can get market from all the estates (high-end to low-end) in Nairobi County.

4.2.2 Age

The study sought to establish the age group that consume the most of specialty milk and whom demands are high.

Table 2 Respondent's age

Age	Frequency	Percent
18-28 years	13	32.5
29-38 years	16	40.0
39-48 years	6	15.0
Above 48 years	5	12.5
Total	40	100.0

Source: Research Data, 2018

From the table 2 above majority (40%) of the respondents were aged between 28 to 38 years which is the active working group with dependants. 32.5% were aged between 18 to 28 years while those between 39 to 48 years were 15%. Those above 48 years came last at 12.5%. According to the literature reviewed, understanding the consumers' perception, behaviours and meeting their needs is dependent of demographic factors such as age. Therefore, it was critical for this study to determine the age of the respondents as it provided information on whether the firms are meeting the requirements of the respondents or not.

4.2.3 Household Size

The study sought to establish the household population in terms of members under the same roof and establish how many in a house hold that can consume specialty milk.

Table 3 Household size

House hold members	Frequency	Percent
1 Person	3	7.5
2 People	5	12.5
3 People	6	15.0
4 People	10	25.0
5 People	7	17.5
6 People	3	7.5
7 People	4	10.0
8 People	1	2.5
10 People	1	2.5
Total	40	100.0

Source: Research Data, 2018

The findings, as shown in table 3 above revealed majority of the households (25%) had four members, five members at 17.5%. Those with three and four members followed closely at 15% and 12.5 % respectively, while those with seven members stood at 10%.

Those with 8 and 10 members came last at 2.5%. Understanding the number of household members is important in giving insights to the consumers per household. Additionally, it can give a sneak peek on the average consumers who take specialty design milk products including what brands they purchase and reasons for their choice. Ksenia (2013) further adds that firms design quantities to meet consumer preferences and needs is usually influenced by household sizes.

4.2.4 Employment

The study sought to know the employment status of the participants as indicated in the table 4 below and identify those that can afford to purchase specialty designed milk.

Table 4: Employment

	Frequency	Percent
Employed	33	82.5
Unemployed	7	17.5

Source: Research Data, 2018

The majority of the respondents (87.5%) were employed while 17.5 % were unemployed. The results were important since they revealed that majority of the participants have an income thus increasing their purchasing power. This meant they were in a position to purchase specialty-designed milk and they would help in identifying various design elements that influence the competitive advantage.

4.2.5 Household Income

To achieve the study objectives, it sought to determine the monthly household income of the participants as indicated in table 5 below and establish their financial capabilities.

Table 4 Household Income

Income	Frequency	Percent
0-10,000	2	5.0
10,001-20,000	6	15.0
20,001-30,000	4	10.0
30,001-40,000	5	12.5
40,001 & Above	23	57.5
Total	40	100.0

Source: Research Data, 2018

Majority of the participants (57.5%) have a monthly household income of Ksh 40.001 and above. Those with monthly household income of 10,001-30,000 are 15% while those with between 20,001-30,000 10% of the total participants. Lastly, the households whose income range between 30,000 and 40,000 stands at 12.5% while those with an income of 10,000 and below are the least percentage at 5%. This is important in that it explains the financial capability of the household members and its influence in buying specialty milk. From the literature reviewed, for consumers to make purchases, the product in question must form value especially for it to be purchased.

4.3 Design, Brand and Preferences

This section offers analysis of information on specific factors on milk product design that influence the preference of the brand consumed. Its further helps in demystifying the independent variable; specialty product design elements that are key to consumers. This is considering that while packaging of milk and milk products is all the same by milk processors, Auma (2011) notes that processors need to add value to their products through design in order to gain competitive advantage. According the product theory, brands that provide solutions to existing problems are more preferred by consumers.

4.3.1 Specialty Processed Milk Purchase

This study sought to determine the number of participants who buy specialty milk and can provide credible information for the study.

Table 5 Specialty processed milk Purchase

	Frequency	Percent
Yes	29	72.5
No	11	27.5
Total	40	100.0

Source: Research Data, 2018

From the findings it is evident that majority (72.5%) of the respondents buy specialized milk while 27.5% of them do not. The results therefore indicate that those on the affirmative make up the larger population. Additionally, it proves the assertion by Gulati et al., (2000) that many modern era milk consumers are more inclined to specialty milk as they deem it healthier thus better.

4.3.2 Brand Bought

The study sought to know the brand that the consumers who purchased specialty processed milk bought. The brands consists of several local milk companies with plants within Nairobi County.

Table 6 Brand purchased

	Frequency	Percent
Ilara	7	17.5
Daima	3	7.5
Fresha	2	5.0
Tuzo	3	7.5
Bio	2	5.0
Mt. Kenya	3	7.5
Brookside	4	10.0
Local	7	17.5
None	1	2.5
New KCC	5	12.5
Molo	2	5.0
Lato	1	2.5
Total	40	100.0

Source: Research Data, 2018

As indicated in the table 7 above, majority (17.5%) of the respondents consume Ilara brand, tying at the same percentage with those who consume other local brands. The least bought is Lato at 2.5%. Other brands range between 12-5% and 5%. The results therefore indicate that there is an even in purchasing of the different brands by the respondents. Additionally, it supports the study from literature reviewed that dairy products are designed in an almost similar manner and compete for the same customers. Therefore, for the dairy processing firms to gain competitive advantage, focus on the product design and packaging design is crucial. The results are shown in table 7 below.

4.3.3 Brand Purchase Frequency

Still on the brand, the study sought to know how often the consumers bought the said brand and whether they are loyal to the design elements in the brand. Table 8 below helps us to understand how frequently the brand is bought.

Table 7 Brand purchase frequency

	Frequency	Percent
Always	27	67.5
Sometimes	13	32.5
Total	40	100.0

Source: Research Data, 2018

According to the findings, majority (67.5%) of the respondents stuck on buying the same brand always. However, a smaller number (32.5%) only bought the brand sometimes. This was therefore evidence of the fact that there were some design elements that made them stop purchasing their preferred brand.

4.3.4 Brand Switch Reasons

With regard to the frequency, the study sought to understand the design reasons for the switch from one brand to another or why the respondent would stick to one brand all the time. The findings in this category are linked to findings in 4.3.3.

Table 8 Reasons for the Switch

	Frequency	**Percent**
Expensive	2	5.0
Availability	6	15.0
Don't have it regularly	1	2.5
From local farmers	1	2.5
Health	3	7.5
None	27	67.5
Total	40	100.0

Source: Research Data, 2018

Majority of the respondents (67.5%) stated that they had no reason at all for switching. Other reasons like the previous product being expensive, availability, failure to have it regularly, purchase from local farmers and health were evenly distributed at 5%, 15%, 2.5%, 2.5%, and 7.5% respectively. While most of the factors are not related to design, reasons for switching such as health can be acted upon by improving the design of the products, thus giving the particular brands a competitive edge. Cost and accessibility also fall under the independent variable, specialty product design elements considered when designing dairy products. Table 9 below has the results.

4.3.5 Likelihood to Change Brand

The study sought to establish the likelihood of the participants to change their brand from the current one on the scale of 1-10 as represented in tables 10 and 11 below. The findings indicated in the tables 10 and 11, show there is a minimal likelihood of most of the respondents to change to another brand.

Table 9 Likelihood to change brand

Scale	Frequency	Percent
0	6	15.0
1	5	12.5
2	9	22.5
3	3	7.5
4	3	7.5
5	3	7.5
6	1	2.5
7	2	5.0
8	3	7.5
9	2	5.0
10	3	7.5
Total	40	100.0

Source: Research Data, 2018

Table 10 Mean of likelihood to change brand

N	40
Mean	3.78
Std. Deviation	3.238

Source: Research Data, 2018

The findings show that 15% of them stated there was no likelihood whatsoever for them to change. As indicated by table 11, the mean for the likelihood to change is 3.78. This is further enhanced by the fact that the values in the range are far away from the mean and thus a standard deviation of 3.238. As such, it is evident that there are some design elements lacking in particular brands and available in others hence causing the change.

4.3.6 Specialty Milk Consumption

The study sought to establish whether the respondents are familiar with the specialty product provided through images provided in the questionnaire. The findings are shown in table 12 below.

Table 11 Specialty Milk consumption

	Frequency	**Percent**
Yes	13	32.5
No	27	67.5
Total	40	100.0

Source: Research Data, 2018

From the findings indicated in the table 12 above, only 32.5% of the respondents reported to have consumed the milk in the given pictures while 67.5% had not. The respondents who had never consumed the specialty milk on the questionnaire stated that they have never

seen it and some mistook them for yoghurts and cooking creams. This indicates a flaw in both product design and packaging design as both did not communicate the product information effectively.

4.3.7 Visual Design Characteristics- Attention

The study sought to establish the design characteristics about the packages that first caught the respondents' attention and whether the visual characteristics can silently communicate about the product. The results are indicated in the table 13 below.

Table 12 Design characteristics

	Frequency	Percent
Graphics/Image	18	45.0
Colour	13	32.5
Product Information	9	22.5
Total	40	100.0

Source: Research Data, 2018

According to the findings indicated in the table 13, majority (45%) of the respondents first noticed the graphics or image while 32.5% of the respondents' attention was drawn by the color. Product information trailed at 22.5%. The results indicate that different people pay attention to various design elements when purchasing specialty milk. However, it is evident that the design or image of the packaging is a big influence while few consumers pay attention to the product information. The literature reviewed supports that various aspects of the packaging including its size, shape, graphics and colour influence consumer decisions about particular brands.

4.3.8 Product Recognition

Other than what drew the attention of consumers, the study sought to establish how the respondents recognized the product without any assistance or introduction.

Table 13 Design Recognition.

	Frequency	Percent
Image	13	32.5
Colour	12	30.0
Product name	15	37.5
Total	40	100.0

Source: Research Data, 2018

According to the results as indicated in the table 14, majority (37.5%) of the respondents recognized the product design by the product name, (32.5%) by image and 30% by colour. The reviewed literature points out that the image and a visual product name influence the recognition of particular designs. In addition, the right colour is usually vital in changing product selection and the brand impression.

4.4 Brand Consumed Agreement

The study sought to establish whether specialty designed milk tends to communicate value additions and generate product expectations, in turn influencing purchasing decisions of products. Respondents were asked about their extent of agreement to the various statements and to indicate their response on a Likert scale (5-very important, 4-important, 3 not important and unimportant, 2-slightly important, 1-not important) and the results are shown on the table 15 below.

Table 14 Design Recognition

	Mean	Std. Deviation
Rate the design of product choice	3.25	1.428
Rate the package design	3.15	1.231
The packaging design is communicating	2.33	1.185
Packaging material and ease of use is essential to you	2.95	1.176
Packaging information influence	2.4	1.277
Health factor influence	4.5	0.961
fat content	3.25	1.276
rate the taste of brand	4.05	1.154

Source: Research Data, 2018

From the results, as the respondents indicated that health factors in the brands were an important influence to their choice at a mean of 4.50 and a slight standard deviation of 0.961. The taste of the brand was also considered as important at a mean of 4.05 and standard deviation of 1.154. Majority of the respondents rated the design of their brand as important at a mean of 3.25 with a standard deviation 1.428. On packaging, the respondents rated the package designs as not important at a mean of 3.15 and standard deviation of 1.231. On the other hand, they considered the packaging design as slightly important in communicating about the product design at a mean of 2.33, with a standard deviation of 1.185. Both the packaging material, including its ease to use and packaging information were considered slightly important at a mean of 2.95 and 2.40 with a standard deviation of 1.176 and 1.277, respectively. Lastly, the respondent did not consider fats and amino acids to be important to them as indicated by a mean of 3.25 with a standard deviation of 1.276. From the results, it is evident that design characteristics have varying influence on the brand purchased, considering that none of the issues raised was considered very important from the indicated means. However, health factors and taste stood out as the main factors

influencing the purchase of specialty designed milk. This is in agreement with Prima et al., (2015) that consumers in the modern era are conscious of their health thus for processors to compete with the demand, they need to ensure the design adds nutritive value. The packaging design and packaging information were the factors that the consumers considered as least important. In regard to this, following Silayoi (2007) assertion that packaging design and information are critical in influencing the purchasing of a particular brand, processors should focus on improving this aspect of their designs in order to gain a competitive edge.

4.5 Product Design Elements and Firm Competition Relationship

The study sought to establish the relationship of specialty product design and competitiveness of the processing firms. Regression model was used to analyze the findings.

4.5.1 Regression Model Summary

Table 16: Regression Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.758[a]	.574	.539	.26064

a. Predictors: (Constant), quality, appearance, functional use

Source: Research Data, 2018

Table 16 gives the model from where the equation that could fit the data was obtained. From the table, a positive correlation existed as shown by the correlation coefficient value i.e. (r=0.758) between the dependent and independent variables. Majority of data points represented by 57.4% were represented and explained by the model with the effect from

quality, appearance and functional use. From these results therefore, the undetailed factors in this research to the competitive advantage was 42.6%. This therefore makes it open for other research to be conducted to look into details for other factors whose effects are 42.6% to the Competitive advantage among the Dairy Processing Firms in Kenya.

4.5.2 ANOVA Results

Table 17 ANOVA Results

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.301	3	1.100	16.197	.000[b]
	Residual	2.446	36	.068		
	Total	5.747	39			

a. Dependent Variable: Competitive advantage

b. Predictors: (Constant), quality , appearance , functional use

Source: Research Data, 2018

From table 4.3.1, the linear relationship among the variables in the regression was determined by examining the Analysis of Variance (ANOVA) results obtained from the analysis. The value of significance was found to be statistically significant at a level of less than 0.05, suggesting that there is a linear relationship among the variables.

4.5.3 Regression Coefficients

Table 15 Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.395	.345		4.042	.000
	functional use	.214	.121	.317	1.765	.086
	appearance	.214	.125	.277	1.715	.095
	quality	1.049	.211	1.118	4.971	.000

a. Dependent Variable: competitive advantage

Source: Research Data, 2018

From the regression model obtained above, holding all other factors constant, competitive advantage among the Dairy Processing Firms in Kenya would be 1.395. In addition, it means that when functional use increases by one unit, competitive advantage increases by 0.214 units. When appearance increases by one unit, competitive advantage increases by 0.214 units, and finally, when quality increases by one unit, competitive advantage increases by 1.049 units. Overall, only quality had significant effect on competitive advantage as explained by $p<0.005$ while the effect of the functional use and appearance had insignificant effect on competitive advantage.

4.6 Analysis of Qualitative Data

This section looks at the analysis of qualitative data in regard to specialty design in dairy products and how it affects the competitiveness of milk processors. The data was collected through interviews where an interview guide was used to facilitate the process. The

analysis represents information obtained from seven processors operating within Nairobi County.

4.6.1 Basic Information

This question sought to know the name of the company, the designation of the interviewee and the number of years they had worked for the company. The companies were Brookside, Edoville, Githunguri, Meru, New KCC, Daima and Bio food products limited. The interviewees held various positions, where the majority (3) were sales and marketing officers, two were human resource managers and then there was a production manager and a graphic designer. They had worked in the organizations for an average of six years with the one who had been employed for most years at eight and the least one for three years. It is important to note that the dairy processing firms' interviews did not have designers to develop the packaging design apart from one (Bio Foods Ltd.)

4.6.2 Product Design

The study established that none of the companies had a design department. As such, some of them outsource when they want to conduct product designing but most of them use the sales and marketing department. The study further noted that product's design are not often reviewed. The main reason that stood out for carrying out product design review is when the competition in the market has increased and the product performance reduces. The study additionally noted that it would also occur after research and innovation of new designs or when the current design becomes outdated. Functional use, appearance and quality of the product stood out as the main reasons considered in implementing design elements. Market research outcomes were noted as the main determinants of the manner in

which the product design are implemented. The target group of a particular product was also noted to be a major determinant applied by close to all the companies. For instance, interesting graphics such as cartoons and bright colours were considered for products targeting children since they are captivating. Additionally on the target group, there was a concern on allergies where Githunguri dairy company noted that they considered the safety of all users in terms of allergic reactions. As such, they captured information related to this on the graphics and the product information when implementing design elements. Additionally, from the literature discussed, product designers in dairy processing firms need to continuously address environmental changes and set innovative goals in developing new products to maintain competitiveness (Kleinschmidt, 1987).

4.6.3 Health Factors

It was evident that health factors were a key consideration in designing of the products across the companies. The packaging material used is expected to preserve the dairy product's quality by protecting the food against physical and bio chemical changes. Additionally, to prevent the consumers from allergies, the companies use non-biodegradable packaging materials. Auma (2011) further ascertains that lately, consumers have been quite keen on the nutritional value and health benefits of the products that they purchase, including milk.

4.6.4 Design Elements on Sales

The study sought to understand how the process of colour, image and graphics influenced the sale of products. All the seven companies stated that the process first involved the identification of the target group. Therefore, by basing the design process on the

preferences of the target groups, it is evident that it has a great influence on the sales. Further, the colour image and graphics have been identified as standing out in shelves and therefore contributing to increase in sales of the particular products. In this effect, Silayoi (2007) notes that the colour and graphics of a package on a supermarket shelf makes identification of the particular product easier.

4.6.5 Products Design and Target Groups

The study sought to understand whether designs of products were dependent on target groups. This was in regard to dependents and households, and the younger and older generation. All the seven companies agreed that they considered the target groups of their various products in coming up with the designs. This is because every target group reacts differently to the design of projects. For example, if a product is meant for a family, it will capture the sense of a family in its design and the same applies to all other products. In this regard, Ksenia (2013) notes that it was important for firms to understand the target group of their particular product to design it according to their preference. Further, from the literature discussed above, we can deduce that product design should be complemented by academic research and assessing customers' needs through user-oriented design.

4.6.6 Texture, Taste and Smell Design

The study sought to understand how taste, smell and texture were factored in during designing of the products. The firms had different means of ensuring this was achieved, during processing of the produce by incorporating various flavors and essences. The additives used during the processing of the produce also influenced the texture. The marketing team on the other hand decides upon the texture of the packaging the design.

The packaging is usually in such a way that it captures all the contents of the product inside, have an edge for the product over their competitors. Additionally, it sought to know the major design factors considered by the various firms before designing their products. The factors varied across the firms though a number of them were the same. They included;- type of product, nature of product e.g. low fat, lactose free, nature of the target group, materials to be used including availability and cost, aesthetics, colour schemes, flavours and colour schemes to be adopted by the project.

4.6.7 Testing of Designs

The study further sought to understand how the companies tests new designs. It was found that the companies first did the testing internally within the companies to get the opinion of the staff. After incorporating their reviews, they conduct test promotions done by the consumers with the guide of a review sheet. The reviews of the customers are then considered and those deemed appropriated incorporated in the final designs.

4.6.8 Product and Package Design Safety

The study noted that new necessities for dairy products safety had little or no influence on the product and package design for most firms. Five of the seven firms actually indicated that new necessities did not influence their product package design in any way. They only ensure that the package designs are safe to use on the package. However, Brookside stated that they had a certain level of influence since they had to incorporate new technologies in the package designs. New KCC on the other hand noted that due to the changing environments, product safety influences the package design to reduce on losses through spillage, damage and contamination through handling and transport. In the literature

discussed above, tetrapack.com (2015) stated that the material for packaging dairy products should be able to enhance efficient milk distribution, maintain product hygiene, reduce dairy product spoilage and waste, and protect nutrients and flavours. This is an aspect the dairy processing firms have not fully taken advantage of, despite using the packaging materials in the market leading to losses through product damage and spillage during distribution.

4.7 Quantitative and Qualitative data merger

The findings of qualitative and quantitative data show that firms do not consult with the consumers when designing their products. From the findings, firms design products when they face competition or when their products are outdated. The quantitative data confirms that what matters most about the products they consume is heath and taste factors. They are also not so familiar with specialty milk designs and why the brands are unique. The packaging designs are of less importance to the consumers, yet the firms come up with some expensive packaging but they don't attract them. This proves that some of the designs that the firms comes up with are not of importance to the consumers because they are not aware of them thus affecting their competitive advantage.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The chapter presents the summary, conclusions and recommendations of the study. It comprises of a brief summary of the study as it was conducted, conclusions drawn from the main findings and recommends on viable steps to enhance product design so that it can be used as a competitive edge by milk processing firms. Finally, it offers suggestions on areas for further research.

5.2 Summary of the Findings

The study set out to establish how specialty product design could be used as a competitive edge by dairy processing firms. To accomplish this, it was driven by three major objectives that is; to determine dairy products design elements that are key to consumers, to establish design elements that the dairy processing firms choose in designing their product and to establish the effect of product design elements and competitive advantage in the dairy processing industry. To achieve the objectives, the study used both primary and secondary sources of data in gathering information. In primary, it employed the use of both questionnaires and interviews. Questionnaires sought to get people's perception on design of specialty milk and how it influenced their purchasing choice. It also sought to know among various local brands, the brand of their preference and the design properties that they consider. The data collection was done outside hypermarkets, supermarkets and minimarkets within various parts of Nairobi County to get diverse views. Other than this,

the study also used interview guides in seven dairy processing firms within Nairobi County. This sought to get their views on various elements of specialty design products that they produce and if and how it gives them a competitive edge over other firms.

From the findings it is evident that majority of the respondents consume specialty designed milk with a low likelihood to switch from their current brands. Graphics, colour and product information were the main considerations that attract consumers' attention often. The study further revealed that health factors and taste were their main considerations when choosing the brands they consume. The findings also revealed that of the seven dairy processing firms where interviews were conducted, none of them has a product-designing department. Additionally, it was realized that the products were rarely reviewed, and the main reason for carrying out product reviews was based on competition and to ensure their growth in the market share. Functional use, appearance and quality of the product were the main considerations that the study noted influenced company's implementation of design elements. Additionally, market research outcomes especially considering competitor products were determinants in the implementation of products design.

On target groups, the study noted a general agreement that the product's target group highly influenced the mode of design. Further, texture, taste and smell were highly considered in the design, incorporated at various stages of the processing of the specific product. Lastly, the study found that in order to gain a competitive edge, new designs were first tested internally, before having test promotions and then the reviews were included in the final designs.

5.3 Conclusions

Based on the findings, the study concludes that consumers consider various specialty product design elements when purchasing their preferred milk brand. It notes that the considerations in this case according to the findings should be health factors, appearance, packaging design, graphics, colour, and aesthetics including quality and texture, smell and taste. Additionally, the study concludes that specialty design elements relating to the firms like accessibility, waste minimization, cost flexibility, consumer segmentation, differentiation factors and quality should also be considered. As such, it concludes that milk-processing firms need to consider consumer views and incorporate the same in the designs of their products in order to compete with rival firms and facilitate growth in the market share.

Additionally, the study concludes that none of the milk processing firms within Nairobi County has a design department. Further, the findings revealed that the firms rarely reviewed the products designs. However, the reasons for conducting the reviews were noted to be due to the competition and introducing of better designs by competitor brands in the markets. It was noted this was done after conducting market research to assess the gap and identify new entrants. The study further concludes that the target group of a particular design was a high consideration in design, and if the groups design expectations were met, the study concludes that the sales of those particular products would automatically go up. Finally, the study therefore concludes that specialty product design elements can be used as a competitive edge by milk processing firms.

5.4 Recommendations

In view of the major findings and conclusions drawn, the following recommendations have been made for actions to be taken with the view of promoting the use of specialty design elements as a competitive edge by milk processing companies.

Set up design departments within milk processing firms- it was noted that the firms lack design departments and as a result, product designs were rarely reviewed. By setting up the departments, the firms will take an active role in regular reviews of the designs in relation to consumer needs. Additionally, it will ensure prompt actions on any issues raised on the designs present without having to outsource which will take a longer duration and using the appropriate expertise.

Make consumer health information more appealing- considering that consumers revealed the health of product as a major determinant of the brand they purchase, brands should ensure that they present the health information in a manner that is more appealing and more visual to capture the attention of the consumers. This will therefore ensure that the sales of the brand's product automatically increase thus giving them an edge over their competitors.

Lastly, the study recommends that the firms should be keen on ensuring that they establish new designs regularly, considering that consumer needs are met due to market evolution. By noting that consumers are always curious about new designs, appealing designs will ensure they keep on buying the products hence maintaining a company's competitive edge.

5.5 Limitations of the study

Some of the firms' respondents were not willing to share information as they thought it would expose their weaknesses to their competitors. This was sorted out by assuring to them the purpose of the study was confidential and academic only. The respondents filling in the questionnaires in some places were asking for payment before they give in answers.

5.6 Suggestions for further research

The research was conducted on milk processing firms in Nairobi as a representative of other firms in Kenya and according to the findings, design of products is not invested on. Accordingly, further studies could be conducted on how product/ service designs influence consumers buying behavior.

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Appendix I: Transmittal Letter

University of Nairobi,

P. O. Box 30197 - 00100,

Nairobi, Kenya.

Dear Sir/Madam

RE: INTRODUCTION LETTER

I am a Master of Business Administration student at the University of Nairobi, specializing in Operations Management. I am surveying "DESIGN OF SPECIALITY MILK AND COMPETITIVE ADVANTAGE OF DAIRY PROCESSING FIRMS IN NAIROBI COUNTY**"**. As a requirement for the completion of my coursework, I am required to do a research project, and I would like your organization to be part of my study.

The information provided will be confidential, and the results of the report will be used solely for academic purposes. I, therefore, request you to allow me to collect data required for the study.

Thanks in advance.

Yours faithfully,

Miriam Mukundi

Appendix II: Interview Guide for Design department heads

My name is Miriam Mukundi. I am a postgraduate student at University of Nairobi and carrying out a study on how specialty dairy products design influence competitiveness of milk processors. The information given will be treated with utmost confidentiality and will be used for academic purposes only.

1. What is the name of the company? What is your designation? How long have been working for the organization?
2. Do you have a designing department? YES/ NO
3. How often are products design reviewed?
4. How do you implement design elements (functional use, appearance and quality of the product)?
5. What health factors do you consider in designing your products? Explain
6. How does the process of colour, image, and graphics influence the sale products? (provide figures)
7. Does your dairy products design depend on the target groups? (dependents and households, young/ old generation)
8. How do your firm ensure texture, taste and smell are factored in when designing your products.
9. What are the major design factors do you consider before designing your products?
10. How does your company test new designs?
11. How do new necessities for dairy products safety influence on the product and package design?

Appendix III: Consumer Respondents Questionnaire

My name is Miriam Mukundi. I am a post graduate student at University of Nairobi and carrying out a study on dairy products design. Information collected in this questionnaire is for studies on processed dairy product design as a review on dairy firms. The questionnaire is divided into two sections; A and B. Complete both parts to make the information valid. The information given will be treated with utmost confidentiality and will be used for academic purposes only.

SECTION A

This section seek to collect information on characteristics likely to influence consumer preference on milk brand used. Kindly complete this part by marking (✓) in the box. Answer all questions.

1. Which area do you stay?
2. How old are you?

   18-28 years ( ) 29- 38 years ( )

   39-48 years ( ) Above 48 yrs ( )

3. How many people are in your household? (Specify)…….
4. Are you employed? YES ( ) NO ( )
5. Below is income categories, specify the category that best fit your family income per month in Ksh.

   0-10,000 ( )
   10,001-20,000 ( )
   20,001- 30,000 ( )
   30,001- 40,000 ( )
   40,001 and above ( )

SECTION B

This section seeks to gather information on the specific factors on milk product design that influence the preferences of the brand consumed. Answer all the questions accordingly.

1. Do you buy specialty processed milk?

   YES ( ) NO ( )

2. If yes, which brand do you buy? (Specify)

   ……

3. How often do you buy the brand you consume?

   a). Always ( )

   b). Sometimes ( )

4. If sometimes, what are the reason(s) for the switch?

   ……

5. On a scale of 0-10, how likely are you to change to another brand?
6. Please take a look at the below image of special processed milk

Choose your answer by making the best alternative

a. Have you ever consumed the milk above? Yes ( ) No ( ). Give reason for your answer ……

b. What first caught your attention?

Graphics/ image ( ) Colour ( ) Product Information ( )

c. How did you recognize the product design

Image ( ) Colour ( ) Product name ( )

7. Specialty designed milk tend to communicate value additions and generate product expectations influencing the purchasing decision of the products. Do you agree with the statement in regard to the brand you consume? Tick appropriately how you agree with the following statements (5-very important, 4-important, 3 not important and unimportant, 2-slightly important, 1-not important)

	5	4	3	2	1
a. How would you rate the design of your product choice	( )	( )	( )	( )	( )
b. How would you rate the packaging design	( )	( )	( )	( )	( )
c. The packaging design is communicating about the product	( )	( )	( )	( )	( )
d. Packaging material and ease of use is essential to you	( )	( )	( )	( )	( )
e. Packaging information influence your brand choice	( )	( )	( )	( )	( )
f. Health factors in these brand influence your choice	( )	( )	( )	( )	( )
g. Is fat & amino acid content a concern to you	( )	( )	( )	( )	( )
h. How would you rate the taste of this brand	( )	( )	( )	( )	( )

Appendix IV: List of processors to be used for the study

Name	**Product Brand name**	**Products**
Brookside	Ilara, Tuzo, Molo Milk and Delamere	UHT milk, flavored milk, flavored fruit yogurt, butter, ghee, maziwa lala, milk powder, and cream
New KCC	New KCC	Fresh and UHT milk, maziwa lala, flavored milk/ yogurt, cheese, butter, ghee, cream, powdered milk
SALL	Daima	Maziwa lala, UHT milk, yogurts, cream, flavored milk, butter, ice creams
Githunguri	Fresha	Yogurts, UHT milk, cream, maziwa lala, ghee, butter.
Bio Food	Bio	Fruit yogurt, probiotic yogurt, skimmed flavored milk
Kinangop dairy		Fresh milk, Yoghurt, maziwa lala, whole cream
Lattana Dairy	Lattana	Fresh Milk and Yoghurt
Pascha Uplands	Pascha	Yoghurt, fresh milk, maziwa lala
Eldoville Dairies	Eldoville	Cheese, Yoghurt, butter, cream, maziwa lala, whey cool
Meru dairy coop	Mt. Kenya	UHT, fresh milk,
Aspendos Dairies	Mountain Fresh	Fresh milk, yoghurt