PACKAGING DESIGN - APPLICATION OF STANDARDS AND BENCHMARKING IN THE GHANAIAN FOOD PACKAGING INDUSTRY

By

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DECLARATION

I hereby declare that this submission is my own work towards the Masters degree and that, to the best of my knowledge, it contains no material previously published by another person or material which has been accepted for the award of any other degree of the University, except where due acknowledgement has been made in the text.

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ABSTRACT

The objectives of this research was to evaluate extent of development and state of the Ghanaian food packaging industry, ascertain whether manufacturers are aware of existing standards in product food packaging and know the level of compliance to labelling and food packaging standards in the industry. A survey involving the use of questionnaires and interviews were used to collect data from 530 respondents in Accra and Kumasi. The major

findings of this research reflected the poor perception consumers have about Ghanaian food packages and the packaging industry at large. SMEs and local food packaging producers exhibited inadequate knowledge of packaging and labelling standards. The remedies proposed by packaging experts to the above lapses are not farfetched. On identifying what constitutes a standard food package, 60.2% of consumers knew what to look out for. The well-informed consumer can therefore compel manufacturers to comply with standards by avoiding their products. Understanding of standards within the Ghanaian food packaging industry needs to be heightened. The industry and the nation as a whole, is yet to understand the implications of standards on products in terms of food packaging. The low level of compliance therefore calls for the engagement of duty bearers to formulate a national policy for the packaging sector and implement the existing standards through voluntary certification systems spearheaded by the Institute of Packaging (IOPG) in close collaboration with the Ghana Standard

Authority and the Ministry of Trade.

Keywords: Food labelling, Food Packaging Standards, Packaging Design.

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CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Over the years, major African countries endowed with rich natural resources have done more than necessary to export their raw materials and products to foreign countries. However, attempts of exporting particularly food have to a very large extent, been negatively affected by the incidence of poor labelling and non-adherence to packaging standards. Ghana is a typical example. The issue is not with product quality. One reason is the absence or non-enforcement of packaging standards and specifications (International Trade Centre, 2006).

Accurate, easy-to-read, and scientifically valid nutrition and health information on food labels is an essential component of a comprehensive public health strategy to help consumers improve their diets and reduce their risk of diet-related diseases (Silverglade & Heller, 2010).

However, in the USA, Food and Drug Administration (FDA) Commissioner Dr. Margaret Hamburg recognized in a 2009 speech to the National Food Policy Conference, that "The public health importance of food labelling as an essential means for informing consumers about proper nutrition has not been substantially addressed since the FDA implemented the Nutrition Labelling and Education Act, more than 16 years ago." Hamburg (2009) also noted, "We've seen the emergence of claims that may not provide the full picture of their products' true nutritional value. It will be important to re-establish a science-based approaclrto protect the public."

Indeed, misleading claims, ranging from promises that a food can "strengthen" one's immune system to misleading pictures on the fronts of food labels that misrepresent the type and quantity of fruits and vegetables in a processed food are out of control and interfere with the consumer's ability to make healthy food choices (Hamburg, 2009).

The case is not different on home soil. According to Ismaila (2010), the problem of poor packaging or sub-standard packaging of locally produced and packaged consumer products still persists. These, among others, put the local Ghanaian manufacturer's packaged products in a hit-or-miss ente*prise and in a strong market competition with imported packaged products on the local and international markets.

In her doctoral thesis Obeesi (2010) inferred that, "a country's exports would not be accepted internationally if the product including its packaging does not meet laid down and internationally accepted standards. Ismaila (2010) continues by saying "the market competition and the consumers' desire for quality products compel manufacturers to ensure quality in both their products and packaging. However, poor adherence to quality practices and • regulations could lead to poor packaging." An initial investigation conducted by the researcher reveals that the issue of standards and its application in the local food packaging industry is a long-standing problem.

1.2 Statement of the Problem

Although much has been done with regards to standards in packaging, a careful observation has revealed that local manufacturers are not implementing these standards. It has been found out that, consumers are also more careful about issues concerning their health. A field survey conducted by the researcher (2013) revealed that out of 500

consumers sampled from Accra and Kumasi, 458 were conscious of their health when buying pre-packed products. This represents 92% of the sample population. On the issue of consumer health, The User's Manual on Codex: A Contemporary Approach to Food Quality and Safety Standards (Food and Agricultural Organization of the United Nations, undated) stated that:

> Several unsuccessful attempts were made to standardize food internationally and, thereby, harmonize food requirements globally. Those attempts did, however, eventually lead to the establishment of the Codex Alimentarius Commission (CAC) in i 962 by the Food and Agriculture Organization (FAO) of the United Nations and the World Health Organization (WHO) to implement the joint FAO/WHO Food Standards Program. In brief, the purpose of the Program is to protect the health of consumers, ensure fair practices in the food trade and coordinate international food standardization work.

While trade without borders is putting pressure on the packaging industries, which in turn respond in terms of fast-changing packaging technologies and practices. National regulatory bodies are not keeping up in pace, thereby limiting trade access specifically of developing countries (Manalili, Dorado, & Otterdijk, 2011).

International trade giants such as U.K and U.S have put in stringent measures to curb health-issues for thgiLC0Đsumers. The law in the UK on food labelling is multifaceted and is spread over many reforms and parliamentary acts, making the subject complex (Centre for Food Safety, 2005). Codex Alimentarius also published a document on food labelling which is supposed to be followed by the food industry internationally (Codex

Alimentarius, 2005). In the U.S., the Food and Drug Administration has many regulations that must be followed when it comes to packaging and labelling of food. The goal is to improve the safety of food distributed in the United States and to give consumers important infor:mation about the food they purchase.

Recently, many foreigners have taken residence in Ghana and Ghanaian expatriates are also returning home. Most of them have acquired refined taste; they are discerning, discriminating, and quality-conscious shoppers. Indigenous packaged products must of a necessity be standardised because of the presence of these foreigners/expatriates. In spite of over a decade's effort made by stakeholders to resolve the issue of poor packaging and labelling of locally made products, Ismaila (2010), noted that the problem still persists among the manufacturers in the SME bracket.

International Standards ensure that products and services are safe, reliable and of good quality. For businesses, standards are strategic tools that reduce costs by minimizing waste and errors and increasing productivity. They help companies to access new markets, level the playing field for developing countries and facilitate free and fair global trade (ISO, 2012).

In the globalized marketplace, following the creation of the World Trade Organization, a key challenge facing developing countries is a lack of national capacity to overcome technical barriers to trade and to comply with the requirements of agreements on sanitary and phytosanitary conditions, which are now basic prerequisites for market access embedded in the global trading system. With a view to meeting this challenge, developing countries need significant technical assistance to develop institutional infrastructure

related to standards, metrology, testing and quality in order to be an able partner in the global trade regime (UNIDO, 2006).

Most small and medium sized Ghanaian businesses have difficulty sourcing affordable quality packaging for their products. Few have the ability to create packaging that meets international standards (USAID, 200). One reason is the absence or non-enforcement of packaging standards and specifications (International Trade Centre, 2006).

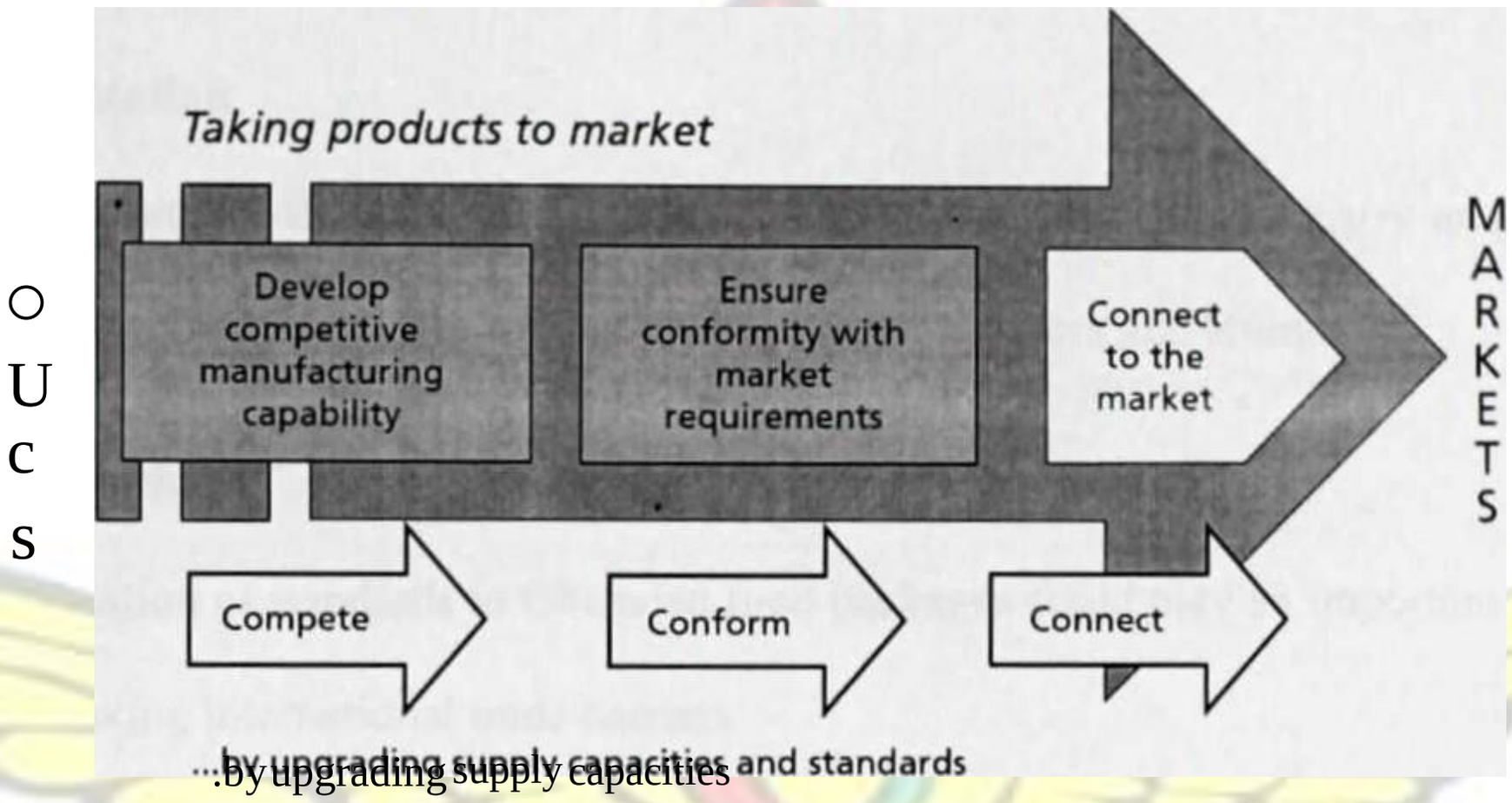


Figure 1.1: The process of taking products to the market. SOURCE: UNIDO, 2006.

1.3 Importance of the Study

Currently the state of the Ghanaian food packaging industry with regards to standards application is a problem. The study would provide a benchmark for local manufacturers to refer to during product packaging to enable them to meet international packaging regulations. The research would serve as a reference guide for packaging design professionals, SMEs, packaging design students, policy makers and further research.

1.4 Objectives

The objectives of this study seek to:

1. Evaluate extent of development and state of the Ghanaian food packaging industry.

2. Ascertain the awareness of manufacturers on existing standards in food packaging.

3. Access the level of compliance to labelling and food packaging standards in the industry.

1.5 Research Question

1. Are available standards adhered to and why if not?

1.6 Delimitation

The research will focus on the confectionery food packaging industry and also, the ethnography of the industries/institutions will dwell in Accra and Kumasi.

1.7 Assumption

1. Application of standards in Ghanaian food packages could play an important role in breaking international trade barriers.
2. Standardized food packages could contribute to the socio-economic development of Ghana.

1.8 Organization of Chapters

Chapter One of this research covers the Introduction. Review of Related Literature will be handled in Chapter Two, while Chapter Three covers the Methodology. Chapter Four will cater for Analysis and Discussion of Data. Summary, Conclusion and Recommendation(s) will finally be covered in Chapter Five.

1.9 Abbreviations

CAC: Codex Alimentarius Commission

DgMEs: Developing Market Economies

DMEs: Developed Market Economies

FAO: Food and Agricultural Organization

FDA: Food and Drug Administration (USA), Food and Drugs Authority (Ghana)

GSA: Ghana Standards Authority

HACCP: Hazard Analysis and Critical Control Points

ISO: International Organization for Standardization

IAPRI: International Association of Packaging Research Institutes

NPC: National Packaging Covenant SME:

Small and Medium scale Enterprises SPC:

Sustainable Packaging Coalition

SPA: Sustainable Packaging Alliance

UNIDO: United Nations Industrial Development Organization

WHO: World Health Organization

CHAPTER Two

REVIEW OF RELATED LITERATURE

2.1 Introduction

This chapter reviews literature from different sources related to the topic. It provides overview of the global packaging industry, food labelling laws and regulations. It briefs readers on the Codex Alimentarius, ISO, HACCP (Hazard Analysis and Critical Control Points), FDA and GSA. The rest of the literature covers issues concerning benchmarking, sustainable packaging and provides highlights on the Ghanaian packaging industry.

2.2 Overview of Packaging

We often say, "Clothes make the man." What we mean is that we often base our judgment of a person on his appearance. By the same token, products are often judged by their packages (Wright & Warner, 1966). The package is the physical container or wrapper for wrapping a product. A package represents the size, shape, and final appearance of a product at the time of sale which makes-it important to product planning. It is estimated that 10 percent of a product's retail price is spent on the actual package development and design (Faresse, Kimbrell & Woloszyk, 2003).

If there is an industry sector that is equally, if not more dynamic than the food sector, it is none other than the packaging industry says Hubpages (2010). It is undergoing

transformation almost every day with new technologies, better than before, taking the place of old ones. Consumer behaviour, product demand and the current level of global

warming are all going to have a direct impact on the future of packaging, concludes Hubpages (2010).

The packaging industry of developing countries is a market with a value of US$ 15.4 billion (Manalili, Dorado, & Otterdijk, 2011). The value of the contribution of Developed Market Economies (DMEs) on the trade of packaging in Developing Market Economies (DgMEs) is almost the same as that traded among DgME countries for paper, plastic and wood. In the case of glass, the contribution of DgMEs is even higher than that of DMEs. This shows that developing countries are almost on an equal footing with developed economies in terms of value of packaging materials traded globally. This is partly attributable to the fact that most packaging companies of DMEs have country operations in DgMEs. Another possible explanation is that packaging developments in DgMEs is also a reflection of product demand in DMEs as the former supplies the latter, at least in the case of most agricultural produce (Manalili, Dorado, & Otterdijk, 2011).

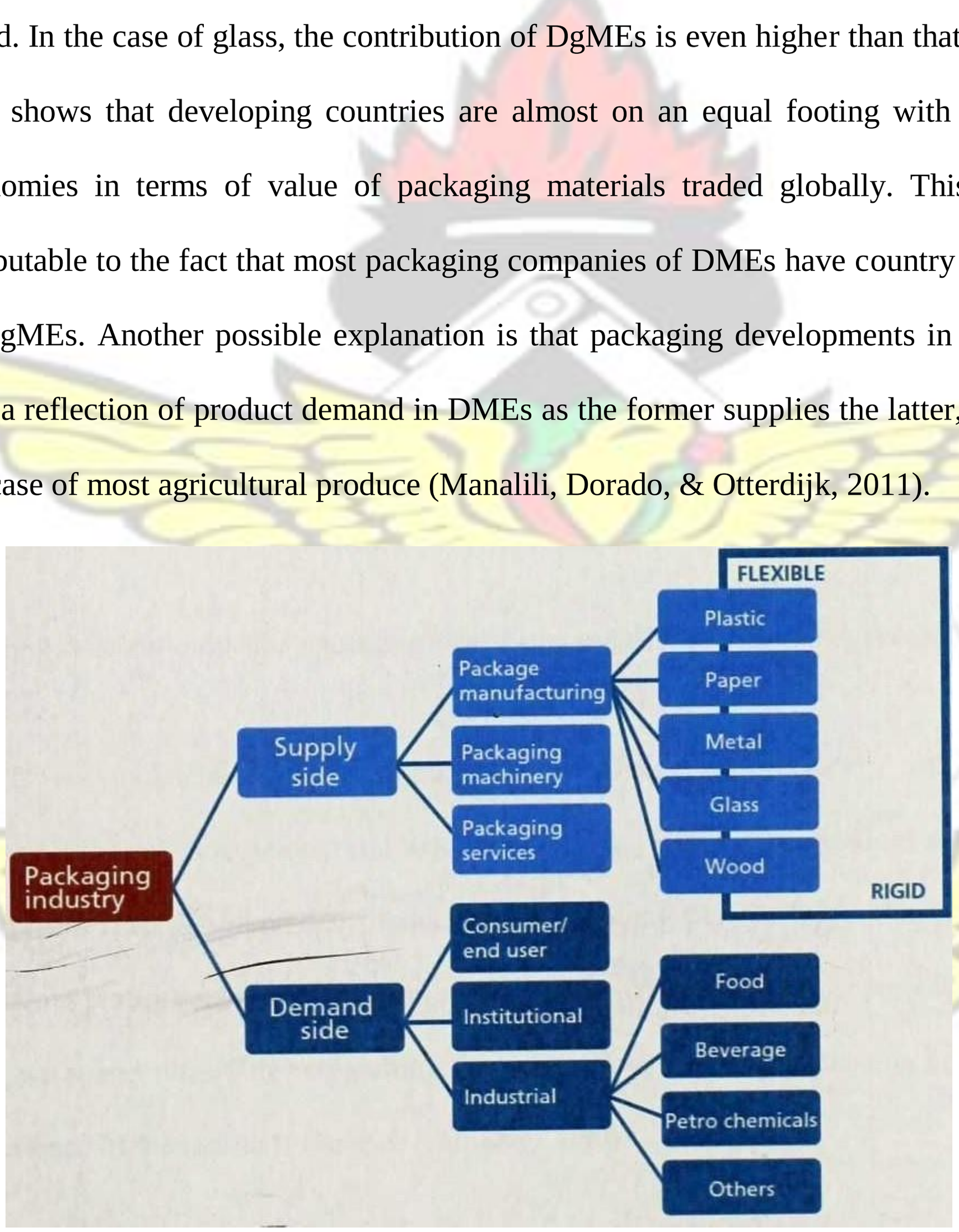


Figure 2.1: Overview of the packaging industry. Source: PIRA International, 2009.

In recent years, packaging has developed well beyond its original function as merely a means of product protection and now plays a key marketing role in developing on shelf appeal, providing product information and establishing brand image and awareness. As packaging's role in the marketing mix gains momentum, so research into this arena becomes increasingly important (Louw & Kimber, undated).

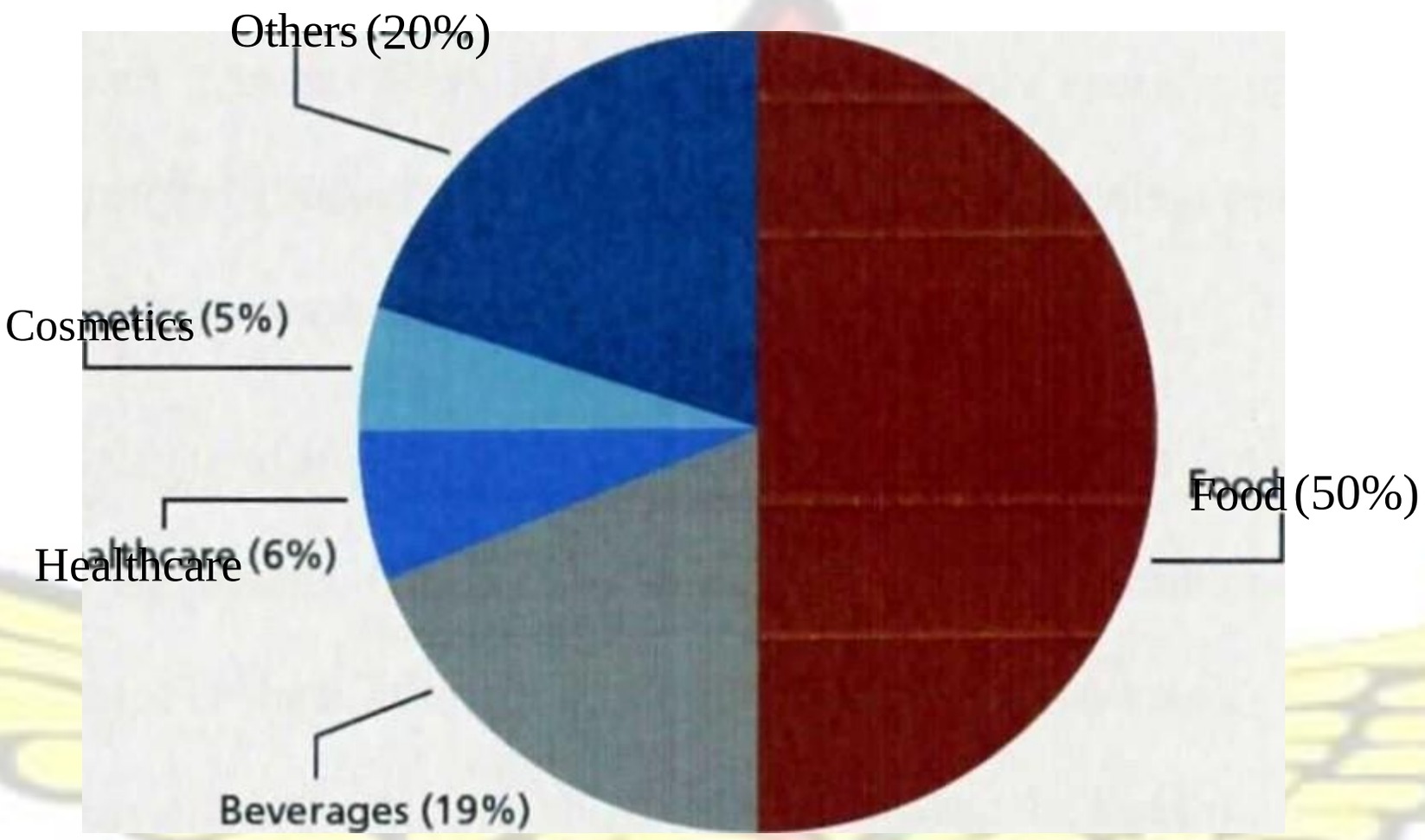


Figure 2.2: Global consumer packaging industry, by end use. Source: PIRA International, 2009.

"Never underestimate the importance of packaging. Marketers often measure consumer brand perceptions and ignore the pack. Yet we know from the way that consumers-react to unbranded products that packaging plays a huge role in reinforcing consumer perceptions. Packaging helps to drive the way consumers experience a product. Yet, we spend little time researching the connections between packaging and the direct experience of the product" (Rice & Hofmeyr, 2000).

2.3 Definitions of Packaging

The definitions of 'packaging' vary and range from being simple and functionally focused to more extensive, holistic interpretations. Packaging can be defined quite simply as an extrinsic element of the product —ah attribute that is related to the product but does not form part of the physical product itself.

"Packaging is the container for a product — encompassing the physical appearance of the container and including the design, colour, shape, labelling and materials used" (Arens, 1996). Most marketing textbooks consider packaging to be an integral part of the "product" component of the 4 P 's of marketing: product, price, place and promotion (Cateora & Graham, 2002).

Some argue that packaging serves as a promotional tool rather than merely an extension of the product. Others consider packaging to be an attribute that is not related to the product. For them, it is one of the five elements of the brand — together with the name, the logo and/or graphic symbol, the personality and the slogans.

While the main use for packaging can be considered to be protection of the goods inside, packaging also fulfils a key role in that it provides us with a recognisable logo, or packaging, so that we instantly know what the goods are inside. From the consumer perspective, packaging plays a major role when products are purchased — as both a cue and as a source of information. Packaging is crucial, given that it is the first thing that the public sees before making the final decision to buy (Louw & Kimber, undated).

A more holistic definition of packaging found by the researcher is as follows: Packaging has been defined as 'all products made of any materials of any nature to be used for the containment, protection, handling, delivery and presentation of goods, from raw materials to processed goods, from the producer to the user or the consumer'. The ultimate

test of packaging is whether or not it performs its essential task—to contain, preserve and protect the product and to provide information about the contents of the package (Packaging Council of Australia, 2005).

Interestingly, Patsula Media (2007) has analyzed the definition of packaging critically. According to the publisher, "putting a widget in a box, covering the box with a few pictures and labels, and calling it packaging, is dangerous. Packaging is much more than that." Patsula Media adds that, "packaging has protective and distributive functions. It makes product contents convenient to use, safe to use and easy to store. It also performs an integral role in all advertising, promotion, and marketing efforts, and more than any other single factor is responsible for creating a company's image."

The advertising side of business, therefore, is acutely interested in packaging. Moreover, packaging is an important industry in its own right. Estimates place the annual bill for: packages in the United States as high as 25 billion dollars. Packaging is a field undergoing great change, with new ideas appearing on the marketing scene every year. Thus, knowledge of the role of packaging is essential to the well informed advertising man (Wright & Warner, 1966).

2.4 —Categorization-of-Packaging

Traditionally, three broad categories of packaging have been identified (Packaging Council of Australia, 2005):

l. Consumer or.rimary packaging i.e., packaging which constitutes a sales unit to the final user or consumer at the point of purchase.

2. Grouped or secondary packaging i.e., packaging which constitutes, at the point of purchase, a grouping of a certain number of sales units, whether the latter is sold as such to the final user, or consumer, or whether it serves only as a means to replenish the shelves at the point of sale. It can be removed from the product without affecting its characteristics.

3. Transport or tertiary packaging i.e., packaging designed to facilitate handling and transport of a number of sales units or grouped packaging in order to prevent physical handling and transport damage.

Increasingly, manufacturers are looking to merge—or better co-ordinate—the functions performed by these levels of packaging in order to reduce costs and facilitate good presentation. Packaging suppliers are helping to develop innovative ways to achieve this with the total cost being less than the sum of the original parts and with functionality either unimpaired or improved (Packaging Council of Australia, 2005).

2.5 History of Food Packaging

Modern food packaging is believed to have begun in the 19th century with the invention of canning by Nicholas Appert. After the inauguration of food microbiology by Louis Pasteur and colleagues in the 19th century, Samuel C. Prescott and William L. Underwood worked to establish the fundamental principles of bacteriology as applied to canning processes (Wilsen—2007).

These endeavours to preserve and package food were paralleled by several other packaging-related inventions such as cutting dies for paperboard cartons by Robert Gair and mechanical production of glass bottles by Michael Owens. In the beginning of the

20th century, three-piece tin-plated steel cans, glass bottles, and wooden crates were used

for food and beverage distribution. Some food packaging innovations stemmed from unexpected sources. For example, Jacques E. Brandenberger's failed attempts at transparent tablecloths resulted in the invention of cellophane. In addition, wax and related petroleum-based materials used to protect ammunition during World War Il became packaging materials for dry cereals and biscuits (Twede & Selke, 2005).

Many packaging innovations occurred during the period between World War I and World War Il; these include aluminium foil, electrically powered packaging machinery, plastics such as polyethylene and polyvinylidene chloride, aseptic packaging, metal beer cans, flexographic printing, and flexible packaging. Most of these developments helped immeasurably in World War Il by protecting military goods and foods from extreme conditions in war zones.

Tin-plated soldered side-seam steel progressed to welded side-seam tin-free steel for cans, and 2-piece aluminium with easy open pop tops were invented for beverage cans, spearheading the exponential growth of canned carbonated beverages and beer during the 1960s and 1970s. The development of polypropylene, polyester, and ethylene vinyl alcohol polymers led the incredible move away from metal, glass, and paperboard packaging to plastic and flexible packaging (Lord, 2008). Later 20th century innovations include active packaging (oxygen controllers, antimicrobials, respiration mediators, and odour/aroma controllers) and intelligent or smart packaging.

Distribution packaging is already influenced by the potential role of radio frequency identification for tracking purposes. Products such as retort pouches and trays, stand-up flexible pouches, zipper closures on flexible pouches, co extrusion for films and

bottles, and an inexorable drive by injection stretch blow-moulded polyester bottles and jars for carbonated beverages and water have emerged as rigid and semi-rigid packaging. Multilayer barrier plastic cans, microwave susceptors, dispensing closures, gas barrier bags for prime cuts of meat, modified atmosphere packaging, rotogravure printed fullpanel shrink film labels, and dual ovenable trays are examples of innovations for the convenience attributes that have propelled food and beverage packaging into the 21 st century. Moreover, some 21st century innovations are related to nanotechnology whose future may lie in improving barrier and structural/mechanical properties of packaging materials and development of sensing technologies. The principal drivers for most of these innovations have been consumer and food service needs and demands for global and fast transport of food. These packaging innovations are derived largely from industry research and development programs.

2.6 Role of Food Packaging

The principal roles of food packaging are to protect food products from outside influences and damage, to contain the food, and to provide consumers with ingredient and nutritional information (Coles, 2003). Traceability, convenience, and tamper indication are secondary functions of increasing importance. According to Marsh and Bugusu (as cited in Food Packaging—Roles, Materials, and Environmental Issues, 2007), the goal of food packaging is to contain food in a cost-effective way that satisfies industry requirements and consumer desires, maintains food safety, and minimizes environmental impact.

Food waste reduction and Containment

Any assessment of food packaging's impact on the environment must consider the positive benefits of reduced food waste throughout the supply chain. Significant food wastage has been reported in many countries, ranging from 25% for food grain to 50%

for fruits and vegetables (FAO, 1989). Inadequate preservation/protection, storage, and transportation have been cited as causes of food waste. Packaging reduces total waste by extending the shelf-life of foods, thereby prolonging their usability. Rathje et al (1985) found that the per capita waste generated in Mexico City contained less packaging, more food waste, and one-third more total waste than generated in comparable U.S. cities. In addition, Rathje et al (1985) observed that packaged foods result in 2.5% total waste—as compared to 50% for fresh foods—in part because agricultural by-products collected at the processing plant are used for other purposes while those generated at home are typically discarded. Therefore, packaging may contribute to the reduction of total solid waste.

Convenience

Convenience features such as ease of access, handling, and disposal; product visibility; resealability; and microwavability greatly influence package innovation. As a consequence, packaging plays a vital role in minimizing the effort necessary to prepare and serve foods. Oven-safe trays, boil-in bags, and microwavable packaging enable consumers to cook an entire meal with virtually no preparation. New closure designs supply ease of opening, resealability, and special dispensing features. For example, a cookie manufacturer recently introduced a flexible bag with a scored section that provides_access to the cookies. A membrane with a _____ peelable seal covers the opening before sale and al ows reclosure after opening. Advances in food packaging have facilitated the development of modern retail formats that offer consumers the convenience of one-stop shopping and the availability of food from around the world. These convenience features add value and

competitive advantages to products but may also influence the amount and type of packaging waste requiring disposal.

Information and Marketing

A package is the face of a product and often is the only product exposure consumers experience prior to purchase. Consequently, distinctive or innovative packaging can boost sales in a competitive environment. The package may be designed to enhance the product image and/or to differentiate the product from the competition. For example, larger labels may be used to accommodate recipes. Packaging also provides information to the consumer. For example, package labelling satisfies legal requirements for product identification, nutritional value, ingredient declaration, net weight, and manufacturer information. Additionally, the package conveys important information about the product such as cooking instructions, brand identification, and pricing. All of these enhancements may impact waste disposal.

Preservation/Protection

Food packaging can retard product deterioration, retain the beneficial effects of processing, extend shelf-life, and maintain or increase the quality and safety of food. In doing so, packaging provides protection from three major classes of external influences: chemical, biological, and physical.

Chemical protection minimizes compositional changes triggered by environmental influences such as exposure to gases (typically oxygen), moisture (gain or loss), or—light (visible, infrared, or ultraviolet). Many different packaging materials can provide a chemical barrier. Glass and metals provide a nearly absolute barrier to chemical and other environmental agents, but few packages are purely glass or metal since closure

devices are added to facilitate both filling and emptying. Closure devices may contain materials that állow minimal levels of permeability. For•example, plastic caps have some permeability to gases and vapours, as do the gasket materials used in caps to facilitate closure and in metal can lids to allow sealing after filling. Plastic packaging offers a large range of barrier properties but is generally more permeable than glass or metal.

Biological protection provides a barrier to microorganisms (pathogens and spoiling agents), insects, rodents, and other animals, thereby preventing disease and spoilage. In addition, biological barriers maintain conditions to control senescence (ripening and aging). Such barriers function via a multiplicity of mechanisms, including preventing acc•ess to the product, preventing odour transmission, and maintaining the internal environment of the package.

Physical protection shields food from mechanical damage and includes cushioning against the shock and vibration encountered during distribution. Typically developed from paperboard and corrugated materials, physical barriers resist impacts, abrasions, and crushing damage, so they are widely used as shipping containers and as packaging for delicate foods such as eggs and fresh fruits. Appropriate physical packaging also protects consumers from various hazards. For example, child-resistant closures hinder access to potentially dangerous products. In addition, the substitution of plastic packaging for products ranging from shampoo to soda bottles has reduced the danger from broken glass containers.

Tamper indication

—Wilful tampering-WïtfrTood and þharmaceutical products has resulted in special packaging features designed to reduce or eliminate the risk of tampering and adulteration. Although any package can be breeched, tamper-evident features cannot easily be replaced.

Tamper-evident features include banding, special membranes, breakaway closures, and special printing on bottle liners or composite cans such as graphics or text that irreversibly change upon opening. Special printing also includes holograms that cannot be easily duplicated. Tamper-evident packaging usually requires additional packaging materials, which exacerbates disposal issues, but the benefits generally outweigh any drawback. An example of a tamper-evident feature that requires no additional packaging materials is a heat seal used on medical packaging that is chemically formulated to change colour when opened.

Traceability

The Codex Alimentarius Commission defines traceability as, "the ability to follow the movement of a food through specified stage(s) of production, processing and distribution" (Codex Alimentarius Commission, 2004). Traceability has three objectives: to improve supply management, to facilitate trace-back for food safety and quality purposes, and to differentiate and market foods with subtle or undetectable quality attributes (Golan et al 2004).

Food manufacturing companies incorporate unique codes onto the package labels of their products; this allows them to track their products throughout the distribution process. Codes are available in various formats (for example, printed barcodes or electronic radio frequency identification [RFID]) and can be read manually and/or by machine.

2.7 Food Packaging Materials

Package design an construction play a significant role in determining the shelf life—of a food product. The right selection of packaging materials and technologies

maintains product quality and freshness during distribution and storage. Materials that have traditionally been used in food packaging include glass, metals (aluminium, foils, laminates, tinplate, and tin-free steel), paper and paperboards, and plastics. Moreover, a wider variety of plastics have been introduced in both rigid and flexible forms. Today's food packages often combine several materials to exploit each material's functional or aesthetic properties. As research to improve food packaging continues, advances in the field may affect the environmental impact of packaging.

Paper and paperboard

The use of paper and paperboards for food packaging dates back to the 17th century with accelerated usage in the later part ofthe 19th century (Kirwan, 2003). Paper and paperboard are sheet materials made from an interlaced network of cellulose fibres derived from wood by using sulfate and sulfite. The fibres are then pulped and/or bleached and treated with chemicals such as slimicides and strengthening agents to produce the paper product. Paper and paperboards are commonly used in corrugated boxes, milk cartons, folding cartons, bags and sacks, and wrapping paper. Tissue paper, paper plates, and cups are other examples of paper and paperboard products.

Paper

Plain paper is not used to protect foods for long periods of time because it has poor barrier properties and is not heat sealable. When used as primary packaging (that is, in contact with food), paper is almost always treated, coated, laminated, or impregnated with materials such as waxes, resins, or lacquers to improve functional and protective properties. The many different types of paper used in food packaging are as follows:

Kraft paper—Produced by a sulfate treatment process, kraft paper is available in several forms: •natural brown, unbleached, heavy duty, •and bleached white. The natural kraft is the strongest of all paper and is commonly used for bags and wrapping. It is also used to package flour, sugar, and dried fruits and vegetables.

Sulfite paper—Lighter and weaker than kraft paper, sulfite paper is glazed to improve its appearance and to increase its wet strength and oil resistance. It can be coated for higher print quality and is also used in laminates with plastic or foil. It is used to make small bags or wrappers for packaging biscuits and confectionary.

Greaseproof paper—Greaseproof paper is made through a process known as beating, in which the cellulose fibres undergo a longer than normal hydration period that causes the fibres to break up and become gelatinous. These fine fibres then pack densely to provide a surface that is resistant to oils but not wet agents. Greaseproof paper is used to wrap snack foods, cookies, candy bars, and other oily foods, a use that is being replaced by plastic films.

Glassine—Glassine is greaseproof paper taken to an extreme (further hydration) to produce a very dense sheet with a highly smooth and glossy finish. It is used as a liner for biscuits, cooking fats, fast foods, and baked goods.

Parchment paper—Parchment paper is made from acid-treated pulp (passed through a sulfuric acid bath). The acid modifies the cellulose to make it smoother and impervious to water and oil, which adds some wet strength. It does not provide a good barrier to air and moisture, is not heat sealable, and is used to package fats such as butter and lard.

Paperboard

Paperboard is thicker than paper with a higher weight per unit area and often made in multiple layers. It is commonly used to make containers for shipping—such as boxes, cartons, and trays—and seldom used for direct food contact. The various types of paperboard are as follows (Soroka, 1999):

White board—Made from several thin layers of bleached chemical pulp, white board is typically used as the inner layer of a carton. White board may be coated with wax or laminated with polyethylene for heat sealability, and it is the only form of paperboard recommended for direct food contact.

Solid board—Possessing strength and durability, solid board has multiple layers of bleached sulfate board. When laminated with polyethylene, it is used to create liquid cartons (known as milk board). Solid board is also used to package fruit juices and soft drinks.

Chipboard—Chipboard is made from recycled paper and often contains blemishes and impurities from the original paper, which makes it unsuitable for direct contact with food, printing, and folding. It is often lined with white board to improve both appearance and strength. The least expensive form of paperboard, chipboard is used to make the outer layers of cartons for foods•such as tea and cereals.

Fiberboard—Fiberboard can be solid or corrugated. The solid type has an inner white board layer and outer kraft layer and provides good protection against impact and compression. When laminated with plastics or aluminium, solid fibreboard can improve barrier properties and is used to package dry products such as coffee and milk powder. The corrugated type, also known as corrugated board, is made with 2 layers of kraft paper with a central corrugating (or fluting) material. Fibreboard's resistance to impact abrasion and

crushing Gage make It widely used for shipping bulk food and case packing of retail food products.

Paper laminates—Paper laminates are coated or uncoated papers based on kraft and sulfite pulp. They can be laminated with plastic or aluminium to improve various properties. For example, paper can be laminated with polyethylene to make it heat sealable and to improve gas and moisture barrier properties. However, lamination substantially increases the cost of paper. Laminated paper is used to package dried products such as soups, herbs, and spices.

Plastics

Plastics are made by condensation polymerization (polycondensation) or addition polymerization (polyaddition) of monomer units. In polycondensation, the polymer chain grows by condensation reactions between molecules and is accompanied by formation of low molecular weight by-products such as water and methanol. Polycondensation involves monomers with at least two functional groups such as alcohol, amine, or carboxylic groups. In polyaddition, polymer chains grow by addition reactions, in which two or more molecules combine to form a larger molecule without liberation of byproducts. Polyaddition involves unsaturated monomers; double or triple bonds are broken to link monomer chains. There are several advantages to using plastics for food packaging. Fluid and moldable, plastics can be made into sheets, shapes, and structures, offering considerable design flexibility. Because they are chemically resistant, plastics are inexpensive and lightweight with a Wide range of physical and optical properties. In fact, many plastics are heat sealable, easy to print, and can be integrated into production processes where the package is formed, filled, and sealed in the same production line. The

major disadvantage o plastics is their variable permeability to light, gases, vapours and low molecular weight molecules.

There are two major categories of plastics: thermosets and thermoplastics (EPA, 2006b). Thermosets are polymers that solidify or set irreversibly when heated and cannot be remolded. Because they are strong and durable, they tend to be used primarily in automobiles and construction applications such as adhesives and coatings, not in food packaging applications. On the other hand, thermoplastics are polymers that soften upon exposure to heat and return to their original condition at room temperature. Because thermoplastics can easily be shaped and molded into various products such as bottles, jugs, and plastic films, they are ideal for food packaging.

Moreover, virtually all thermoplastics are recyclable (melted and reused as raw materials for production of new products), although separation poses some practical limitations for certain products. The recycling process requires separation by resin type as identified by the American Plastics Council (Table 2.1).

Table 2.1: Resin identification codes for plastic recycling.

Resin	Code	Amount generated (thousand tons)	Amount recycled (thousand tons)
Polyethylene terephthalate	1	2860	540
High-density polyethylene	2	5890	520
Polyvinyl chloride	3	1640	
Low-density polyethylene	4	6450	1 90a
Polypropylene	5	4000	10
Polystyrene	6	2590	
Other resins	7	5480	390

Source: American Plastics Council (2006b) and EPA (2006a).
alncludes linear low-density polyethylene.

There have been some health' concerns regarding residual monomer and components in plastics, including stabilizers, plasticizers, and condensation components such as bisphenol A. Some of these concerns are based on studies using very high intake levels; others have no scientific basis. To ensure public safety, FDA carefully reviews and regulates substances used to make plastics and other packaging materials. Any substance that can reasonably be expected to migrate into food is classified as an indirect food additive subject to FDA regulations. Despite these safety concerns, the use of plastics in food packaging has continued to increase due to the low cost of materials and functional advantages (such as thermosealability, microwavability, optical properties, and unlimited sizes and shapes) over traditional materials such as glass and tinplate (LopezRubio et al, 2004).

Multiple types of plastics are being used as materials for packaging food, including polyolefin, polyester, polyvinyl chloride, polyvinylidene chloride, polystyrene, polyamide, and ethylene vinyl alcohol. Although more than thirty types of plastics have been used as packaging materials (Lau & Wong, 2000), polyolefins and polyesters are the most common.

Polyolefins—Polyolefin is a collective term for polyethylene and polypropylene, the two most widely used plastics in food packaging, and other less popular olefin polymers. Polyethylene and polypropyléne both possess a successful combination of properties, including flexibility, strength, lightness, stability, moisture and chemical resistance, and easy processability, and are well suited for recycling and reuse.

The simplest and most inexpensive plastic made by addition polymerization of ethylene is polyethylene. There are two basic categories of polyethylene: high density and low density. High-density polyethylene is stiff, strong, tough, resistant to chemicals and moisture, permeable to gas, easy to process, and easy to form. It is used to make bottles for-milk, juice, and water; cereal box liners; margarine tubs; and grocery, trash, and retail bags. Low-density polyethylene is flexible, strong, tough, easy to seal, and resistant to moisture. Because low-density polyethylene is relatively transparent, it is predominately used in film applications and in applications where heat sealing is necessary. Bread and frozen food bags, flexible lids, and squeezable food bottles are examples of low-density polyethylene. Polyethylene bags are sometimes reused (both for grocery and non-grocery retail). Of the two categories of polyethylene, high-density polyethylene containers, especially milk bottles, are the most recycled among plastic packages.

Harder, denser, and more transparent than polyethylene; polypropylene has good resistance to chemicals and is effective at barring water vapour. Its high melting point (1600C) makes it suitable for applications where thermal resistance is required, such as hot-filled and microwavable packaging. Popular uses include yogurt containers and margarine tubs. When used in combination with an oxygen barrier such as ethylene vinyl alcohol or polyvinylidene chloride, polypropylene provides the strength and moisture barrier for ketchup and salad dressing bottles.

Polyesters—Polyethylene terephthalate (PET or PETE), polycarbonate, and polyethylene naphthalate (PEN) are polyesters, which are condensation polymers formed from ester monomers that result from the reaction between carboxylic acid and alcohol. The most commonly used polyester in food packaging is PETE.

Polyethylene terephthalate — Formed when terephthalic acid reacts with ethylene glycol, PETE provides a good barrier to gases (oxygen and carbon dioxide) and moisture. It also has good resistance to heat, mineral oils, solvents, and acids, but not to bases. Consequently,'ETE is becoming the packaging material of choice for many food products, particularly beverages and mineral waters.

The use of PETE to make plastic bottles for carbonated drinks is increasing steadily (van Willige et al, 2002). The main reasons for its popularity are its glass-like transparency, adequate gas barrier for retention of carbonation, light weight, and shatter resistance. The three major packaging applications of PETE are containers (bottles, jars, and tubs), semirigid sheets for thermoforming (trays and blisters), and thin-oriented films (bags and snack food wrappers). PETE exists both as an amorphous (transparent) and a semicrystalline (opaque and white) thermoplastic material. Amorphous PETE has better ductility but less stiffness and hardness than semicrystalline PETE, which has good strength, ductility, stiffness, and hardness. Recycled PETE from soda bottles is used as fibres, insulation, and other non-food packaging applications.

Polycarbonate — Polycarbonate is formed by polymerization of a sodium salt of bisphenol acid with carbonyl dichloride (phosgene). Clear, heat resistant, and durable, it is mainly used as a replacement for glass in items such as large returnable/refillable water bottles and sterilizable baby bottles. Care must be taken when cleaning polycarbonate because using harsh detergents such as sodium hypochlorite is not recommended because they catalyze the release of bisphenol A, a potential health hazard. An extensive literature analysis by vom Saal & Hughes (2005), suggests the need for a new risk assessment for the low-dose effects of this compound.

Polyethylene naphthalate — PEN is a condensation polymer of dimethyl naphthalene dicarboxylate and ethylene glycol. It is a relatively new member of the polyester family with excellent performance because of its high glass transition temperature. PEN's barrierY2Dgrnes-for carbon dioxide, oxygen, and water vapour are superior to those of PETE, and PEN provides better performance at high temperatures, allowing hot refills, rewashing, and reuse. However, PEN costs three to four times more than PETE. PEN provides protection against transfer of flavours and odours; it is well suited for manufacturing bottles for beverages such as beer.

Polyvinyl chloride—Polyvinyl chloride (PVC), an addition polymer of vinyl chloride, is heavy, stiff, ductile, and a strong medium, amorphous, transparent material. It has excellent resistance to chemicals (acids and bases), grease, and oil; good flow characteristics; and stable electrical properties. Although PVC is primarily used in medical and other non-food applications, its food uses include bottles and packaging films. Being eásily thermoformed, PVC sheets are widely used for blister packs such as those for meat products and unit dose pharmaceutical packaging.

PVC can be transformed into materials with a wide range of flexibility with the addition of plasticizers such as phthalates, adipates, citrates, and phosphates. Phthalates are mainly used in non-food packaging applications such as cosmetics, toys, and medical devices. Safety concerns have emerged over the use of phthalates in certain products, such as toys (FDA 2002; Shea 2003; European Union 2005).

Due to these safety concerns, phthalates are not used in food packaging materials in the United States (HHS, 2005); instead, alternative nonphthalate plasticizers such as adipates are used. For example, di-(2-ethylhexyl) adipate (DEHA) is used in the manufacture of plastic cling wraps. These alternative plasticizers also have the potential to leach into food but at lower levels than phthalates.

Low levels of DEHA have shown no toxicity in animals. Finally, PVC is difficult to recycle because it is used for such a wide variety of products, which makes it difficult to identify and separate. In addition, incineration of PVC presents environmental problems because of its chlonne content.

Polyvinylidene chloride—Polyvinylidene chloride (PVdC) is an addition polymer of vinylidene chloride. It is heat sealable and serves as an excellent barrier to water vapour, gases, and fatty and oily products. It is used in flexible packaging as a monolayer film, a coating, or part of a co-extruded product. Major applications include

packaging of ptoultry, cured meats, cheese, snack foods, tea, coffee, and confectionary. It is also used in hot filling, retorting, low-temperature storage, and modified atmosphere packaging. PVdC contains twice the amount of chlorine as PVC and therefore also presents problems with incineration.

Polystyrene—Polystyrene, an addition polymer of styrene, is clear, hard, and brittle with a relatively low melting point. It can be mono-extruded, co-extruded with other plastics, injection molded, or foamed to produce a range of products. Foaming produces an opaque, rigid, lightweight material with impact protection and thermal insulation properties. Typical applications include protective packaging such as egg cartons, containers, disposable plastic silverware, lids, cups, plates, bottles, and food trays. In expanded form, polystyrene is used for non-food packaging and cushioning, and it can be recycled or incinerated.

Polyamide—Commonly known as nylon (a brand name for a range of products produced by DuPont), polyamides were originally used in textiles. Formed by a condensation reaction between diamine and diacid, polyamides are polymers in which the repeating units are held together by amide links. Different types of polyamides are characterized by a number that relates to the number of carbons in the originating monomer. For example, nylon-6 has six carbons and is typically used in packaging. It has mechanical and thermal properties similar to PETE, so it has similar usefulness, such as boil-in bag packaging. Nylogso-offers good chemical resistance, toughness, and low gas permeability.

Ethylene vinyl alcohol—Ethylene vinyl alcohol (EVOH) is a copolymer of ethylene and vinyl alcohol. It is an excellent barrier to oil, fat, and oxygen. However, EVOH is

moisture sensitive and is thus mostly used in multilayered co-extruded films in situation where it is not in direct contact with liquids.

Laminates and co-extrusions—Plastic materials can be manufactured either as a single film or as a combination of more than one plastic. There are two ways of combining plastics: lamination and co-ektrusion. Lamination involves bonding together two or more plastics or bonding plastic to another material such as paper or aluminium (as discussed in the section on metal). Bonding is commonly achieved by use of water-, solvent-, or solids-based adhesives.

After the adhesives are applied to one film, two films are passed between rollers to pressure bond them together. Lamination using laser rather than adhesives has also been used for thermoplastics (Kirwan & Strawbridge, 2003). Lamination enables reverse printing, in which the printing is buried between layers and thus not subject to abrasion, and can add or enhance heat sealability.

In co-extrusion, two or more layers of molten plastics are combined during the film manufacture. This process is more rapid (requires one step in comparison to multiple steps with lamination) but requires materials that have thermal characteristics that allow co-extrusion. Because co-extrusion and laminations combine multiple materials, recycling is complicated. However, combining materials results in the additive advantage of properties from each individual material and often reduces the total amount of packaging material required. d. Therefore, co-extrusion and lamination can be sources of packaging reduction.

Glass

Glass has an extremely long history in food packaging; the first glass objects for holding food are believed to have appeared around 3000 BC (Sacharow & Griffin, 1980).

The production of glass containers involves heating a mixture of silica (the glass former), sodium carbonate (the melting agent), and limestone/calcium carbonate and alumina (stabilizers) to high temperatures until the materials melt into a thick liquid mass that is then poured into molds. Recycled broken glass (cullet) is also used in glass manufacture and may account for as much as 60% of all raw materials. Glass containers used in food packaging are often surface-coated to provide lubrication in the production line and eliminate scratching or surface abrasion and line jams. Glass coatings also increase and preserve the strength of the bottle to reduce breakage. Improved break resistance allows manufacturers to use thinner glass, which reduces weight and is better for disposal and transportation (McKown, 2000).

On the basis of it being odourless and chemically inert with virtually all food products, glass has several advantages for food-packaging applications: It is impermeable to gases and vapours, so it maintains product freshness for a long period of time without impairing taste or flavour.

The ability to withstand high processing temperatures makes glass useful for heat sterilization of both low- acid and high-acid foods.

Glass is rigid, provides good insulation, and can be produced in numerous different shapes. The transparency of glass allows consumers to see the product, yet variations in glass colour can protect light-sensitive contents. Finally, glass packaging benefits the environment because it is reusable and recyclable. Like any material, glass has some disadvantages. Despite efforts to use thinner glass, its heavy weight adds to transportation costs. Another concern is its brittleness and susceptibility to breakage from internal pressure, impact, or thermal shock.

Metal

Metal is the most versatile of all packaging forms. It offers a combination of excellent physical protection and barrier properties, formability and decorative potential,

recyclability, and consumer acceptance. The two metals most predominantly used in packaging are aluminium and steel.

Aluminum—Commonly used to make cans, foil, and laminated paper or plastic packaging, aluminium is a lightweight, silvery white metal derived from bauxite ore, where it exists in combination with oxygen as alumina. Magnesium and manganese are often added to aluminium to improve its strength properties (Page et al, 2003). Unlike many metals, aluminium is highly resistant to most forms of corrosion; its natural coating of aluminium oxide provides a highly effective barrier to the effects of air, temperature, moisture, and chemical attack.

Besides providing an excellent barrier to moisture, air, odours, light, and microorganisms, aluminium has good flexibility and surface resilience, excellent malleability and formability, and outstanding embossing potential. It is also an ideal material for recycling because it is easy to reclaim and process into new products. Pure aluminium is used for light packaging of primarily soft-drink cans, pet food, seafood, and pre-threaded closures. The main disadvantages of aluminium are its high cost compared to other metals (for example, steel) and its inability to be welded, which renders it useful only for making seamless containers.

Aluminium foil—Aluminium foil is made by rolling pure aluminium metal into very thin sheets, followed by annealing to achieve dead-folding properties (a crease or fold made in the film will stay in place), which allows it to be folded tightly. Moreover, aluminium foil is available in a wide range of thicknesses, with thinner foils used to wrap food and thicker foils used for trays. Like all aluminium packaging, foil provides an excellent barrier to moisture, air, odours, light, and microorganisms. It is inert to acidic foods and does not require lacquer or other protection. Although aluminium is easily recyclable, foils cannot be made from recycled aluminium without pinhole formation in the thin sheets.

Laminates and metallized films—Lamination of packaging involves the binding of aluminium foil to paper or plastic film to improve barrier properties. Thin gauges facilitate application. Although lamination to plastic enables heat sealability, the seal does not completely bar moisture and air. Because laminated aluminium is relatively expensive, it is typically used to package high value foods such as dried soups, herbs, and spices. A less expensive alternative to laminated packaging is metallized film. Metallized films are plastics containing a thin layer of aluminium metal (Fellows & Axtell, 2002). These films have improved barrier properties to moisture, oils, air, and odours, and the highly reflective surface of the aluminium is attractive to consumers. More flexible than laminated films, metallized films are mainly used to package snacks. Although the individual components of laminates and metallized films are technically recyclable, the difficulty in sorting and separating the material precludes economically feasible recycling.

Tinplate—produced from low-carbon steel (that is, blackplate), tinplate is the result of coating both sides o>kplatewith thin layers of tin. The coating is achieved by dipping sheets of steel in molten tin (hot-dipped tinplate) or by the electro-deposition of tin on the steel sheet (electrolytic tinplate). Although tin provides steel with some corrosion resistance, tinplate containers are often lacquered to provide an inert barrier between the metal and the food product. Commonly used lacquers are materials in the epoxy phenolic and oleoresinous groups and vinyl resins.

In addition to its excellent barrier properties to gases, water vapour, light, and odours, tinplate can be heat-treated and sealed hermetically, making it suitable for sterile products. Tin plate has good ductility and formability, and can therefore be used for containers of many different shapes. Thus, tinplate is widely used to form cans for drinks, processed foods, and aerosols; containers for powdered foods and sugar- or flour-based confections; and as package closures. Tinplate is an excellent substrate for modern metal

coating and litho printing technology, enabling outstanding graphical decoration. Its relatively low weight and high mechanical strength make it easy to ship and store. Finally, tinplate is easily recycled many times without loss of quality and is significantly lower in cost than aluminium.

Tin-free steel—Also known as electrolytic chromium or chrome oxide coated steel, tin-free steel requires a coating of organic material to provide complete corrosion resistance. Even though the chrome/chrome oxide makes tin-free steel unsuitable for welding, this property makes it excellent for adhesion of coatings such as paints, lacquers, and inks. Like tinplate, tin-free steel has good formability and strength, but it is marginally less expensive than tinplate. Food cans, can ends, trays, bottle caps, and closures can all be made from tin-free steel. In addition, it can also be used to make large containers (such as drums) for—sale-and bulk storage of ingredients or finished goods

(Fellows & Axtell, 2002).

2.8 Considerations for Use of Different Packaging Materials

The key to successful packaging is to select the package material and design what best satisfy competing needs with regard to product characteristics, marketing considerations (including distribution needs and consumer needs), environmental and waste management issues, and cost. Not only is balancing so many factors difficult, but also it requires a different analysis for each product, considering factors such as the properties of the packaging material, the type of food to be packaged, possible food/package interactions, the intended market for the product, desired product shelf-life, environmental conditions during storage and distribution, product end use, eventual package disposal, and costs related to the package throughout the production and distribution process. Some of these factors are interrelated: for example, the type of food and the properties of the packaging material

determine the nature of food — package interactions during storage. Other times, the factors are at odds with each other: for example, single-serving packaging meets consumer needs, but bulk packaging is better for environmental reasons.

2.9 Food Labelling

Food labelling is the primary means of communication between the producer and seller of food on one hand, and the purchaser and consumer of the other (Codex Alimentarius, undated). A label is an information tag, wrapper, seal, or imprinted message that is attached to a product or its package. Labelling plays a major role in product planning strategy. The information on labels helps customers decide if the product is right for them (Faresse, Kimbrell & Woloszyk, 2003).

The mam function of-a-TãFéTÄš—to inform customers about a product's contents and give directions for use. Labels also protect businesses from legal liability for mishaps involving their products. Fear of litigation, consumer pressure, government regulation, and concern for consumer safety are all factors that have led manufacturers to place more detailed information on labels (Faresse, Kimbrell & Woloszyk, 2003).

2.10 Food Labelling Laws and Regulations

Packaging is being recognised as a major industry in all developing countries. This is not surprising as all the products manufactured or processed are packed in some way or the other, so as to safeguard the interests of the consumer and the society. The laws and regulations that apply to these products are very critical. These laws act as a measure of protection and self satisfaction for the customers in terms of quality and quantity.

The link between food packaging and consumer protection is of high significance. A package is a vehicle of safety and achieves the objective of delivering safe, wholesome, nutritious food to the consumer. To safeguard the interests of the consumer and the society

at large, packaging laws and regulations have been introduced by various bodies, organisations and governments.

In the past, the public has criticised product labelling for failing to offer complete and truthful information. Public complaints about the lack of uniformity in labelling on packages encouraged governments to establish labelling laws. Many package labels must now meet local and international standards. These standards prevent manufacturers from misleading consumers with deceptive or incomplete packaging labels (Faresse, Kimbrell & Woloszyk, 2003).

Careful consideration must be taken when planning package labelling for foreign markets. Care must be taken to meet local labelling laws as well. Some countries require that -labelling is bilingual. Other countries require that every ingredient in a product is listed on the label. Labelling has become a highly regulated and complex part of product planning. Marketers face the challenge of planning product packaging and labelling that conforms to regulations. The Codex Alimentarius Commission implements the Joint FAO/WHO Food Standards Programme, the purpose of which is to protect the health of consumers and to ensure fair practices in the food trade.

2.11 Sustainable Packaging

Sustainability in the packaging domain is receiving increasing attention; however, internationally there is no clear understanding about what constitutes 'sustainable packaging' (Sonneveld, James, Fitzpatrick, & Lewis, 2005). The Sustainable Packaging Alliance (SPA) was formed in Melbourne (Australia) between Victoria University, RMIT University and Birubi Innovation Pty. Ltd. in 2002. If step changes and continuous improvement in packaging sustainability issues were to become a reality, the founding SPA partners recognised the need to develop an integrated, supply chain focused, multidimensional approach to research, education and training (James et al, 2005). One of

the first initiatives of SPA was to establish a research project, led by Helen Lewis at RMIT University, to create and promote a vision of sustainable packaging.

As a first step towards defining sustainable packaging, a stakeholder survey was undertaken with the aim to explore the current connotation of sustainability for companies in the packaging supply chain and some of its key external stakeholders. The stakeholder survey results — which were presented at the International Association of Packaging Research Institutes (IAPRI) 2004 Conference in Stockholm (Lewis & Sonneveld, 2004)£- highlighted that defining terms such as 'sustainability' in relation to

'packaging' is difficult to comprehend by most stakeholders.

Most respondents raised systemic issues such as meeting higher environmental standards in conjunction with the need to meet the requirements of the economic system for transport, distribution and protection of products throughout the supply chain. The

role of the consumer was also identified as a critical one. Packaging sustainability will need to reconcile the often conflicting consumer expectations — with regard to increasing needs for convenience, safety and shelf life as being provided by packaging - with the higher aspirations that many of the same citizens have for a greater environmental sustainability of packaging (Lewis & Sonneveld, 2004). The full survey results are available on SPA's web site (www.sustainablepack.org).

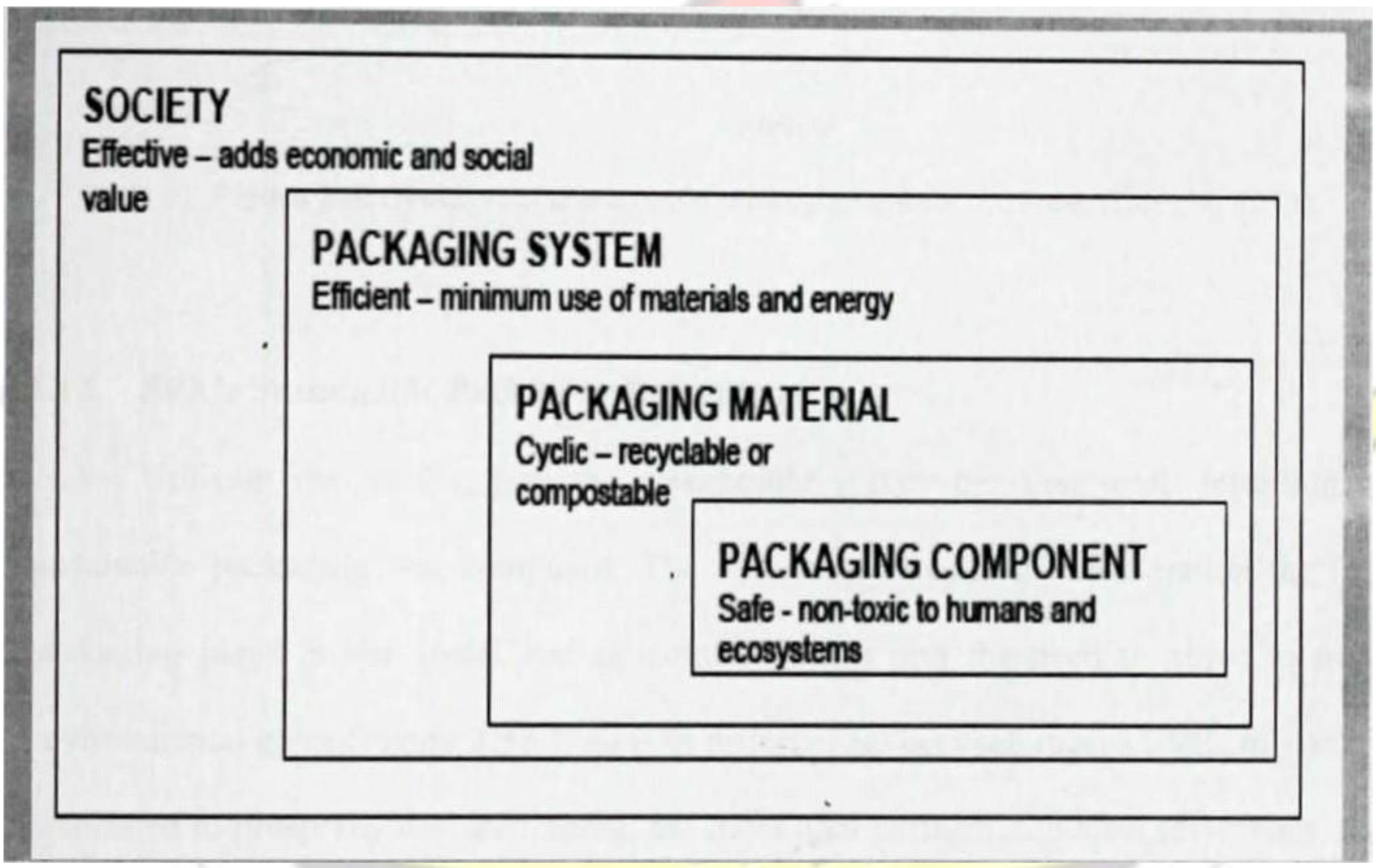
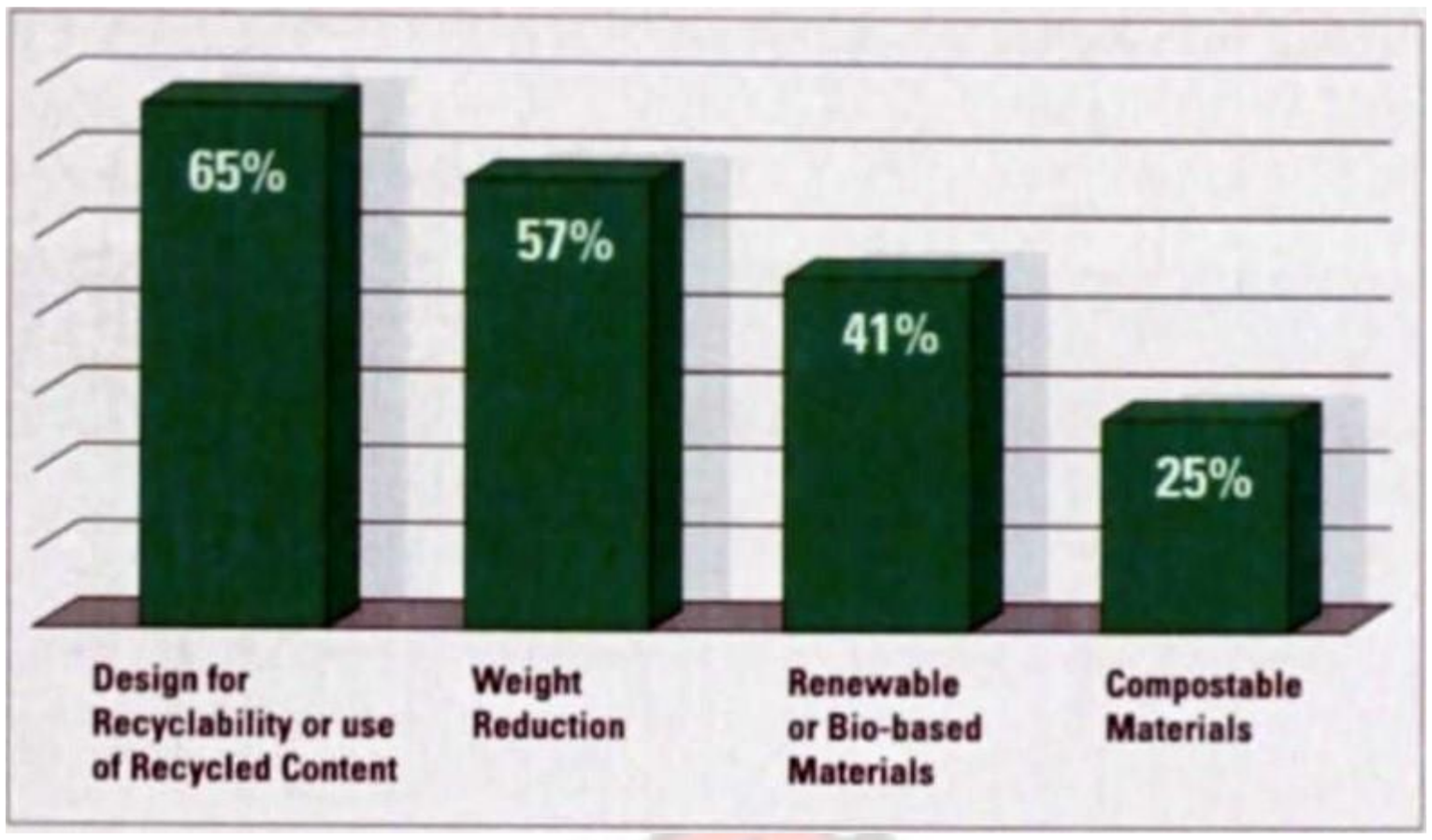


Figure 2.3: Four levels and principles of SPA's sustainable packaging definition.
Source: (James et al, 2005).



Percentage

Activity

Figure 2.4: Direction of sustainable packaging efforts. Source: (DuPont, 2011).

2.12 SPA's Sustainable Packaging Definition

Utilising the results from the stakeholder survey the first draft definition of sustainable packaging was composed. The definition takes into consideration the role packaging plays in our social and economic systems and the need to strive to meet environmental goals (Figure 2.3). It aims to differentiate between macro levels of society associated to prosperity and well-being, the functional performance level (efficiency and effectiveness) of the product/packaging system, the environmental performance level of materials (impact and waste prevention) to the micro level of human and eco toxicological soundness ofthepackegmgcomponents (James et al, 2005).

—-Table 2.2, summarizes this first, preliminary definition, and is being disseminated to encourage further debate. The goal is sustainable development with consideration of the role of the producúpackaging systems and the entire life cycle. The economic, social and environmental functions of packaging are considered in the context of sustainability and are differentiated between different levels of concerns (James et al, 2005).

Table 2.2: SPA's sustainable packaging definition

Principle	Meaning	Levels at which the principle is applied
Effective	It adds real value to society by effectively containing and protecting products as they move through the supply chain and by supporting informed and responsible consumption.	Society
Efficient	Packaging systems are designed to use materials and energy as efficiently as possible throughout the product life cycle. This should include material and energy efficiency in interactions with associated support systems such as storage, transport and handling.	Packaging system
Cyclic	Packaging materials are cycled continuously through natural or (industrial) technical systems, minimizing material degradation and/or the use of upgrading additives.	Packaging material
Safe	Packaging components do not pose any risks to human health or ecosystems. When in doubt the precautionary principle applies.	Packaging component

Source: (James et al, 2005)

2.13 Evaluat@g Packaging—ainability

In parallel to the drive towards sustainable packaging development and a widely accepted definition for sustainable packaging, there is an immediate need for tangible indicators to facilitate continuous improvement in packaging environmental performance. Packaging supply chain stakeholders, and brand owners in particular, demonstrate a fast increasing interest to be able to credibly evaluate the environmental performance of product packaging systems (SPA, 2005).

The development process of product packaging systems involves many professional disciplines such as, for example, designers, engineers, technologists, marketers, and environmental managers. It requires a multi-disciplinary, collaborative and holistic approach, but there is an ad-hoc expectation for packaging technologists in industry to provide comprehensive and credible information to others within and external to the organization. This information ranges from packaging material characteristics, to packaging functionality in distribution and use, to process-ability in manufacturing and filling, and to environmental impact. A significant degree of understanding and skills is needed to appropriately collect and analyse such information and to be able to present the findings to internal company decision makers. This is often even more emphasised by the need to meet targets imposed through voluntary or regulatory measures such as, in Australia, the anticipated strengthened National Packaging Covenant (NPC) framework featuring a comprehensive series of performance indicators (SPA, 2005).

Hence, company packaging technologists would benefit from the availability of a widely accepted tool that enables them to rapidly assess, generate and report credibleenvironmental information based on a multi-criteria evaluation. With such a tool various packaging designs could be compared and it would provide the ability to evaluate variations in packaging aging components and to develop company standards (benchmarks). To be valuable in decision making, such a multi-criteria evaluation will need interaction with company packaging strategic directions and linking in with packaging functionality related to product performance, life cycle impact data, material consumption, distribution and

transport •scenarios, production capabilities and efficiencies, and post-use waste management options and scenarios (SPA, 2005).

The Sustainable Packaging Coalition@ (SPC), a project of GreenBlue@, envisions a world where all packaging is sourced responsibly, designed to be effective and safe throughout its life cycle, meets market criteria for performance and cost, is made entirely using renewable energy, and once used, is recycled efficiently to provide a valuable resource for subsequent generations. The mission of the Sustainable Packaging Coalition is to use thorough research and science-based approaches to help advance and communicate a positive, robust environmental vision for packaging and to support innovative, functional packaging materials and systems that promote economic and environmental 'health (Sustainable Packaging Coalition, 2011).

2.14 ISO (International Organization for Standardization)

ISO (International Organization for Standardization) is the world's largest developer of voluntary International Standards. International Standards give state of the art specifications for products, services and good practice, helping to make industry more efficient and effective. Developed through global consensus, they help to break down barriers to international trade. ISO develops International Standards and was founded in 1947, and since then have published more than 19,000 International Standards covering almost all aspects of techno ogy and business. From food safety to computers, and agriculture to healthcare, ISO International Standards impact all our lives.

A standard is a document that provides requirements, specifications, guidelines or characteristics that can be used consistently to ensure that materials, products, processes and services are fit for their purpose (ISO, 2012). The International Organization for Standardization (French: Organisation internationale de normalisation) widely known as ISO, is an international standard-setting body composed of representatives from various national standards organizations (ISO, 2011). Founded on February 23, 1947, the organization promulgates worldwide proprietary, industrial, and commercial standards. It has its headquarters in Geneva, Switzerland (ISO, 2011).

Figure 2.5: The ISO logo.

The three official languages of the ISO are English, French, and Russian (ISO catalogue, undated). The organization's logos in two of its official languages, English and French, include the word ISO, and it is usually referred to by this short-form name. The organization saysthat ISO is not-an-acronym or initialism for the organization's full name in either official language; rather, recognizing that its initials would be different in different languages, it adopted ISO, based on the Greek word isos (meaning equal), as the universal short form of its name (Kuert, 1997).

The ten good things ISO standards can do for small SMEs (ISO, 2011) includes:

1. Standards help you compete on a level playing field with bigger enterprises (Doug Smith, Canada),

2. Standards open up export markets for your products and services (Per Frode, Sweden),

3. Standards help you discover best business practices (Franco Nava, Italy),

4. Standards drive efficiency in your business operations (Martin Denison, Austria),

5. Standards add credibility and confidence for your customers (P. Sivanesan, Singapore),

6. Standards open new business opportunities and sales (Moses Maina, Kenya),

7. Standards give you the competitive edge (Mike Chilman, Britain),

8. Standards make your brand name internationally recognized (Julio Gómez, Spain),

9. Standards help your company grow (Eng. Krisdany Vinícius, Brazil) and,

10. Standards enable a common "language" to be used across an industry sector (Rolf Huber, New Zeal'ndSL——

The ISO has a network of national standards bodies. These national standards bodies make up the ISO membership and they represent ISO in their respective countries. The Ghana Standards Authority is an ISO member.

2.15 Codex Alimentarius (Food Code/Food Laws)

Evidence from the earliest historical writings indicates that governing authorities were already then concerned with codifying rules to protect consumers from dishonest practices in the sale of food. Assyrian tablets described the method to be used in determining the correct weights and measures for food grains, and Egyptian scrolls prescribed the labelling to be applied to certain foods. In ancient Athens, beer and wines were inspected for purity and soundness, and the Romans had a well-organized state food control system to protect consumers from fraud or bad produce. In Europe during the Middle Ages, individual countries passed laws concerning the quality and safety of eggs, sausages, cheese, beer, wine and bread. Some of these ancient statutes still exist today.

The second half of the nineteenth century saw the first general food laws adopted and basic food control systems put in place to monitor compliance. During the same period, food chemistry came to be recognized as a reputable discipline and the determination of the "purity" of a food was primarily based on the chemical parameters of simple food composition. When harmful industrial chemicals were used to disguise the true colour or nature of food, the concept of "adulteration" was extended to include the use of hazardous chemicals in food. Science had begun providing tools with which to disclose dishonest practices in the sale of food and to distinguish between safe and unsafe edible products.

C O E X A L I M E N T A R I U S

Figure 2.6: Codex logo.

The Codex Alimentarius, or the food code, has become the seminal global reference point for consumers, food producers and processors, national food control agencies and the international food trade. The code has had an enormous impact on the thinking of food producers and processors as well as on the awareness of the end users the consumers. Its influence extends to every continent, and its contribution to the protection of public health and fair practices in the food trade is immeasurable. The Codex Alimentarius system presents a unique opportunity for all countries to join the international community in formulating and harmonizing food standards and ensuring their global implementation. It also allows them a role in the development of codes governing hygienic processing practices and recommendations relating to compliance with those standards.

The significance of the food code for consumer health protection was underscored in 1985 by the United Nations Resolution 39/248, whereby guidelines were adopted for use in the elaboration and reinforcement of consumer protection policies. The guidelines advise that 'Governments should take into account the need of all consumers for food security and should support and, as far as possible, adopt standards from the ... Codex Alimentarius" of FAO and the World Health Organization.

The officials and experts who laid the foundations and determined the direction taken by activities of the Joint FAO/WÀO Food Standards Programme and the Codex

Alimentarius Commission were-first-an&fðremost concerned with protecting the health of consumers and ensuring fair practices in the food trade. They felt that, if all countries harmonized their food laws and adopted internationally agreed standards, such issues would be dealt with naturally. Through harmonization, they envisaged fewer barriers to trade and a freer movement of goods and products among countries, which would be to

the benefit of farmers and their families and would also help to reduce hunger and poverty. The founders concluded that the Codex Alimentarius would be a panacea to some of the difficulties that were impeding freedom of trade, a view that is reflected in the General Principles under Purpose of the Codex Alimentarius. The volume of world food trade is enormous and is valued at between US$300 billion and $400 billion. A principal concern of national governments is that food imported from other countries should be safe and not jeopardize the health of consumers or pose a threat to the health and safety of their animal and plant populations. Consequently, governments of importing countries have introduced mandatory laws and regulations to eliminate or minimize such threats. In the area of food, animal and plant control, these measures could be conducive to the creation of barriers to inter-country food trade.

2.16 The Hazard Analysis Critical Control Point or (HACCP)

HACCP, or the Hazard Analysis Critical Control Point system, is a process control system that identifies where food safety hazards may occur in a food production process and puts into place stringent controls to prevent the hazards from occurring. By strictly monitoring and controlling each step of thè process, there is less chance for hazards to occur and in this way a food business is able to assure the safety of the food products they produce.

HACCP IS used intern Ionally and has been adopted by the joint FAO/WHO FoodStandards Programme as the best approach to take to control food borne disease. The Codex Alimentarius Commission was then created under this programme to develop food standards, guidelines and related texts, one of which is the Codex Basic Food Hygiene Texts. HACCP can be applied to all businesses throughout the food chain and 47

forms the basis of a proactive food safety management system. When effectively implemented, HACCP will control biological, physical, chemical and allergen hazards within a food operation.

Implementing a HACCP plan helps assure regulatory authorities and customers that the food business is taking every reasonable precaution to assure food safety. As a proactive approach to managing food safety, it also helps reduce contamination-related food losses and associated costs, and will protect and enhance brands and private labels.

There is no internationally recognized auditing standard for HACCP and while all seven HACCP principles are included in the ISO 22000 standard, HACCP can be implemented as a separate risk management system, or as part of a certification to ISO 9000. HACCP is a systematic approach to the identification, evaluation, and control of food safety hazards based on the following seven principles:

Principle 1: Conduct a hazard analysis.

Principle 2: Determine the critical control points (CCPs).

Principle 3: Establish critical limits.

Principle 4: Establish monitoring procedures.

Principle 5: Establish corrective actions.

Principle 6: Establish verification procedures.

Principle 7:-Eéiablish record-keepin and documentation procedures.

The benefits of HACCP include:

- Improved food safety
- Increased business awareness-of food risks.
- Greater product and raw ingredient traceability
- Increased buyer and consumer confidence . Consistency in inspection criteria

- Promotion of internal review of processes
- Supports business leadership through the direction of resources to safety critical elements of the process . Compliance with food law
- Reduction in complaints
- Reduced risk of negative publicity
- Improved responsiveness to problems through devised corrective action

Figure 2.7: HACCP certification symbol.

2.17 The Ghana Standards Authority (GSA)

The Ghana-Standards AuthŒíiýCGSA) was established by the Standards Decree, 1973 (NRCD 173) as Ghana Standards Board, changing it from its previous name, National Standards Board as it was when first established in August, 1967. The GSA is the National Statutory Body responsible for Metrology, Standards, Testing, Inspection and Certification. In 2011, its name was changed from Ghana Standards Board (GSB) to its current name, the Ghana Standards Authority (GSA). GSA's vision is to become a model of excellence in standardization in Africa.

Its mission is to promote standardization for the improvement of the quality of goods, services and sound management practices in industries and public institutions in

Ghana. In Ghana the basic labelling law has been documented into the L.I. 1541 which spells out the general rules for labelling.

2.18 Food and Drugs Authority (FDA)

The Food and Drugs Authority is the national regulatory body under the Ministry of Health with the responsibility of implementing Food and Drugs Law of 1992, (PNDCL 305B) to regulate the manufacture, importation, exportation, distribution, use and advertisements of food, drugs, cosmetics, medical devices and household chemicals with respect to ensuring their safety, quality and efficacy. In exercising this mandate, the Food and Drugs Authority ensures the safety and wholesomeness of foods we eat. The FDA also ensures that human and veterinary drugs, household chemicals substances, cosmetics and medical devices are safe and effective.

2.19 Benchmarking

It is often stated that those who benchmark do not have to reinvent the wheel (ParkerJT996). By fotlúÍÑïðGers, one can make improvements and not focus_omstale ideas. Benchmarking at first glance may be mistaken for a copycat form of developing strategic plans and for making improvements within an organization. Benchmarking is a process that allows organizations to improve upon existing ideas. In order to eliminate myths and misconceptions about benchmarking, it is important to know exactly what benchmarking is, the different types of benchmarking, the criticisms of benchmarking, and the ethical practices concerning benchmarking (Lankford, undated).

"Benchmarking is simply the process of measuring the performance of one's company against the best in the same or another industry" (Stevenson, 1996).

Benchmarking is not a complex concept but it should not be taken too lightly. Benchmarking is basically learning from others. It is using the knowledge and the experience of others to improve the organization. It is analyzing the performance and noting the strengths and weaknesses of the organization and assessing what must be done to improve.

The knowledge that is available for comparing operations and processes are vast (Boxwell, 1994). "An organization's ability to evaluate its practices against specific business strategies and objectives is critical to leveraging its knowledge capital" (Harper, 1996). Information is there for organizations and it should be evaluated, used, and shared. This is one of the primary goals of benchmarking. It is the process of using all of the knowledge and experience of others to develop new and fresh ideas. This is basic teamwork, which is the way progressive organizations are migrating. Many organizations are realizing how much more can be achieved if there is more collaboration between leaders in an industry,

There are three reasons that benchmarking is becoming more commonly used in industry (Boxwell, 1994). They are:

- Benchmarking is a more efficient way to make improvements. Managers can eliminate trial and error process improvements. Practising benchmarking focuses on tailoring existing processes to fit within the organization.

- Benchmarking speeds up organization's ability to make improvements. Benchmarking has the ability to bring corporate America's performance up as a whole significantly. If every organization has excellent production and

total quality management skills then every company will have world class standards.

Benchmarking is not just making changes and improvements for the sake of making a change. Benchmarking is about adding value. No organization should make changes to their products, processes, or their organization if the changes do not bring benefits. When using benchmarking techniques, an organization must look at how processes in the value chain are performed (Stevenson, 1996):

1. Identifying a critical process that needs improvement.

2. Identify an organization that excels in the process, preferably the best.

3. Contact the organization that you are benchmarking; visit them, and study the process or activity.

4. Analyze the data.

5. Improve the critical procÕãýðGrown organization.

-All of these things lead to successful benchmarking a product, process, or area within an organization. As stated by Bill Krenek, the International Benchmarking Clearinghouse technology coordinator, "Benchmarking provides the quantum leaps needed to keep on top" (Harper, 1996).

Types of Benchmarking

There are three primary types of benchmarking that are in use today. These are process benchmarking, performance benchmarking, and strategic benchmarking (Bogan, 1994).

Figure 2.8: The Benchmarking process.

The Process of Benchmarking

Organizations that benchmark, adapt the process to best fit their own needs and culture. Although number of steps in the process may vary from organization to organization, the following six steps contain the core techniques:

Process benchmarking _____ focuses on the day-to-day operations of the organization. It is the task of improving the way processes performed every day. Some examples of work processes that could utilize process benchmarking are the customer complaint process, the billing process, the order fulfilment process, and the recruitment process (Bogan,

1994). All of these processes are in the lower levels of the organization. By making improvements at this level, performance improvements are quickly realized. This type of benchmarking results in quick improvements to the organization.

Performance benchmarking focuses on assessing competitive positions through comparing the products and services of other competitors. When dealing with performance benchmarking, organizations want to look at where their product or services are in relation to competitors on the basis of things such as reliability, quality, speed, and other product or service characteristics.

Strategic benchmarking deals with top management. It deals with long term results. Strategic benchmarking focuses on how companies compete. This form of benchmarking looks at what strategies the organizations are using to make them successful. This is the type of benchmarking technique that most Japanese firms use (Bogan, 1994). This is due to the fact that.the Japanese focus on long term results.

Other types of benchmarking are competitive benchmarking, cooperative benchmarking, collaborative and internal (Boxwell, 1994). Competitive benchmarking is the most difficult type of benchmarking to practice. For obvious reasons, organizations are not interested in helping a competitor by sharing information. This form of benchmarking is measuring the performance, products, and services of an organization against its direct or indirect competitors in its own industry.

Competitive benchmarking starts a basic reverse engineering and then expands into benchmarking. Reverse engineering is a competitive tool used in benchmarking. It looks at all aspects of the competition's strategy. This does not just include the disassembly and examination of the product but it analyzes the entire customers' path of the organization's competitor. This IS a difficult thing to do because this information is

not easily obtained. Therefore, it requires extensive research. It is also important to remember when using competitive benchmarking that the goal is to focus on your direct competitors and not the industry as a whole.

"Cooperative and collaborative benchmarking are the most widely used types of benchmarking because they are relatively easy to practice" (Boxwell, 1994). These forms of benchmarking are a more accommodating way of getting information. In cooperative benchmarking, organizations invite best in class organizations to meet with their benchmarking team to share knowledge. This is usually done without much controversy because these organizations are not direct competitors, During this process information flows one way. From the "best in class" organization to the benchmarking team organizations.

Collaborative benchmarking does the opposite, information flows many ways. With collaborative benchmarking, information is shared between groups of firms. It is a brainstorming session among organizations. It is important to realize that not all collaborative efforts are considered benchmarking. It is sometimes called "data sharing." Data sharing results do not focus on the process but only the end result, while benchmarking focuses on the processes of the organizations (Boxwell, 1994). Internal benchmarking is used to identify the best in house practices in the organization and to disseminate these practices throughout the organization. Internal benchmarking allows managers in the organization to-be—more-knowledgeable about the organization as a whole.

Criticisms of Benchmarking

As with any new concept there are those who are in favour of the idea and those who oppose or criticize it. Benchmarking should not be used as a way to set goals. Those who are responsible for meeting specific goals must understand all of the processes that are required to make the goal a reality. One of the criticisms of benchmarking is that it can be considered as spying on the competition (Boxwell, 1994). Benchmarking is not spying on the competition but keeping up with what they and the rest of the industry are doing. In Japan, benchmarking is a part of their manager's job descriptions (Boxwell, 1994).

Benchmarking can be as complex as re-engineering or as simple as thumbing through the quarterly reports of organizations and making comparisons. Although organizations must use benchmarking with some caution, it can be informative and foster a spirit of openness and cooperation from indirect competitors (Graham, 1997). It is not enough to benchmark the costs of activities and identify best practices. When an organization looks at benchmarking they must look at all aspects of the business, its products, and its processes. It is crucial for organizations to focus on anything that will impact its performance and quality.

The Ghanaian Packaging Industry

In recent times, the idea of producing professional as well as standard packaging has been a major concern among experts, policy makers and stakeholders in the Ghanaian food packaging industry.

In 2011, the Quality Assurance Manager of Unilever Ghana, Kofi Essuman, urged small and medium scale enterprise owners to employ packaging as a tool to enter the global market. Reacting to a statement made by the then Trade Minister Hannah Tetteh in

July 2011 that Ghanaian businesses are unable to compete favourably on both the local and international markets due to poor packaging, Mr. Essuman said "we can make it if we will be able to improve our packaging. It is time we start looking at things globally. Companies abroad are successful with exports primarily because they spend time and money researching into the right kind of packaging to use".

"Good package has become a technical barrier and without a clear understanding of these barriers, we cannot break ground. Packaging has become a last minute venture for manufacturers" he said. He recommended that manufacturers think global, show respect to customers by delivering well packaged quality products, and bear in mind that their product can be shipped from one location to the other. He said entrepreneurs need packaging awareness.

In an article published in the Daily Graphic, on March 8, 2014, Page 44, the Director of Centre for Plant Medicine Research (CPMR), Professor Dominic Edoh, asked local herbal medicine manufacturers to invest more in the packaging of their products. That, he said, would not only pave way for products from the country to meet international standards but also offer local manufacturers the chance to compete effectively in the global markets. According to Professor Edoh, most local herbal medicine fail to meet international standards because of poor packaging and lack of scientific data on the products."Although most of the orthodox medicines are of quality standards, the lack of effective packaging continues to affect local companies. We must repackage our products If the country-is-fëälly serious about development," he said.

—Similarly, the Ghana Rice Inter-professional Body, GRIB is stepping up efforts to introduce new standards for the production of local-rice. This entails instituting

qualitycontrol mechanisms to ensure local-rice is produced to meet the international standards. It would see GRIB become the certifying-body for locally produced rice.

The President, Imoro Amoro tells Joy Business, the initiative is part of measures to turn around the fortunes of the local rice industry. "Is just like that of the imported rice which are branded as Thai-rice Association and the American Rice Association etc. GRIB as the umbrella body for the local rice industry and would therefore want to standardize locally-produced rice" he noted.

According to him, packaging is a major factor to be considered to ensure local rice competes favourably with imported ones on the market. "Packaging is one of our biggest problems because the local packaging cannot be compared to that of the imported rice. So if we want to address this, we at least guarantee the quality of the rice that can equally be appealing as that of the imported ones" he concluded.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter outlines the various research instruments and methods that have been used to collect data for the study. Mention is made of the Research Design, the Population for the Study, Sample Population, Sample Design, Data Collection, and Research Tools.

3.2 Research Design

Survey was employed for this research. This method is best suited for studies that have individual people as the unit of analysis.

3.3 Population for the Study

The local food packaging industries (SMEs), packaging/packaging design experts, consumers and packaging institutions within Accra and Kumasi constituted the population for this study. The population in terms Of numbers is represented as 530 people. Some of the industries visited include Qualiplast, Grafitec, Crown Cans Ghana Limited, Packaging Logistics, Polykrafi, •Poly Products, Ghana Standards Authority and Food and Drugs Authority. The—industries included Cocoa Processing Company, Cadbury, Reob Complex, PZ Cussons, Neha Manufacturing & Food Processing, and Malina Food Choices. The rest include Samsarp Produce, Native's Best, Naa Yaa's Brand, Debless Farms, F. A. Fally Ghana, HHB Foods, Tasty Gilato, Home Foods and Cannery, Praise Exports, Selassie Farms & Groceries, Hammidamens Enterprise, King Solomon Trading, Fountainlife Foods, and Pees Farm Produce.

3.4 Sample Population

By the nature of this research, it was impossible to include all available population for study, therefore only the sample population was studied. The sample population includes consumers, SMEs and packaging experts in Accra and Kumasi. Tables A to D below show the distribution of the number of people studied at the selected sites and institutions.

Table 3.1 A: Consumers.

PLACE OF STUDY	RESPONDENTS
Accra	250
Kumasi	250
Total	500

Table 3.1 B: SMEs (Food Packaging Industry).

PLACE OF STUDY	RESPONDENTS
Accra	10
Kumasi	10
TotaL	20

Table 3.1 C: Regulatory Bodies/Packaging Experts.

PLACE OF STUDY	RESPONDENTS
Accra/Kumasi	5
Total	5

Table 31 D: Packaging Industries.

Place of Study	Respondents
Accra	5
Total	5

3.5 Sampling Design

The sample population comprised 150 public/private workers and 150 students, 20 CEOs of SMEs from Accra and Kumasi respectively due to the fact that this category of people can read and make informed choices. The rest included two CEOs of regulatory bodies, three packaging authorities, and five CEOs of packaging converters in Accra. The total population sample was 530. The Purposive Sampling method was used for the study.

3.6 Data Collection

Data were collected froríía7ríÂary and secondary sources. Primary data relevancto-the study were collected from the field by the help of research tools. The research tools used for the study were: questionnaires, observations and interviews.

Secondary data were collected from monographs, encyclopaedias and unpublished theses, catalogues, periodicals, newsletters, brochures, journals, magazines, publications, charts, and books.

3.7 Research Tools

3.7.1 Questionnaire

At prior notice, the researcher travelled to each place of study and administered questionnaires. The questionnaire combined both open and close-ended questions.

Respondents were given one to two weeks to finish answering the three-paged wellstructured questionnaires. Frantic efforts were made by the researcher to retrieve all questionnaires administered. The table below shows the number of questionnaires which were collected per stratum.

Table 3.2: Questionnaire distributions per stratum.

Strata	Number of Questionnaires administered	Number of Questionnaires received
Stratum 1 (Consumers)	500	500
Stratum 2 (SMEs)	20	20
Stratum 3 (Regulatory Bodies Packaging Experts)	5	5
Stratum 4 —Oackaging Producing	5	5 Industries)
Total =	530	530

Out of the 530 questionnaire copies administered to the sample population, all were retrieved and this represents 100% of the total number of questionnaires administered. The data collected were then assembled, synthesized, critically evaluated, translated and conclusions drawn from them.

3.7.2 Observation

For a study of this nature, the observational approach was indispensable. The logical fact is that, the denominators: "standards", "benchmarks", and "best practices" are

best exhibited through observation than any other medium. Best (1981) explains that certain types •of information can best be obtained through direct observation. The researcher therefore adopted the participant observant method which enabled him to undertake on-the-spot observation of product packaging during product manufacturing.

3.7.3 Interview

Interview, which is more or less an oral questionnaire, was employed by the researcher to extract pertinent information from a large number of the general public who could neither read nor write.

3.8 Library Research

To make room for comparison and scholarly presentation of ideas, the researcher conducted library research to colÐecondary data for the study. The following facilities were visited for relevant literature: IOPG Library, Main library, KNUST, Kumasi, College of Art library, KNUST, Kumasi, personal library, and other relevant packaging design websites. At these facilities, data were collected from newsletters, unpublished theses, the internet, books, journals, magazines, periodicals, encyclopaedias, brochures, and catalogues. The various data collected were evaluated and used as substantive literature for the research.

3.9 Summary of Discussion

The various data collection methods and tools were carefully manipulated to acquire and interpret data. Much effort was therefore made by the researcher to collate data necessary for the study. The next chapter discusses the analyses, evaluation and

interpretation of the data that have been collected using the research methods and tools discussed earlier in this chapter.

CHAPTER FOUR

ANALYSIS AND DISCUSSION OF DATA

4.1 Introduction

The information gathered from the administration of the instruments are presented and analyzed in this chapter. Interviews and questionnaires were used as tools by the researcher to collect data from the sample population. A critical analysis of data collected using the two tools of research have been presented as follows:

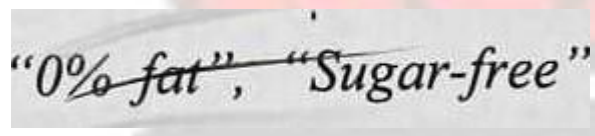
4.2 Analysis of results for Questionnaires and Interviews

The results for the questionnaire sent out were assembled and discussed below.

Questions were focused on the three objectives of this research.

Objective One: Evaluate extent of development and state of the Ghanaian food packaging industry.

Questionnaire for Consumers

Objective one was to evaluate extent of development and state of the Ghanaian food packaging industry. To accomplish this objective, 500 consumers sampled from Accra (250) and Kumasi (250) were asked three fundamental questions. On the consumer's questionnaire, question 4—When you see inscriptions like "Natural", "No additives "100%-pure",  etc on local labels, do you trust them?, question 6—0n a scale of 1 to 10, how will you grade Ghanaian packaged products in relation to foreign products? and question 11—Can Ghanaian packaged products compete with those on the international market?, were to assist in having an

overview of the current state of the Ghanaian packaging industry. The results were as follows:

Question 4: When you see inscriptions like "Natural", "No additives , 100% pure", "0% fat", "Sugar-free" etc on local labels, do you trust them?

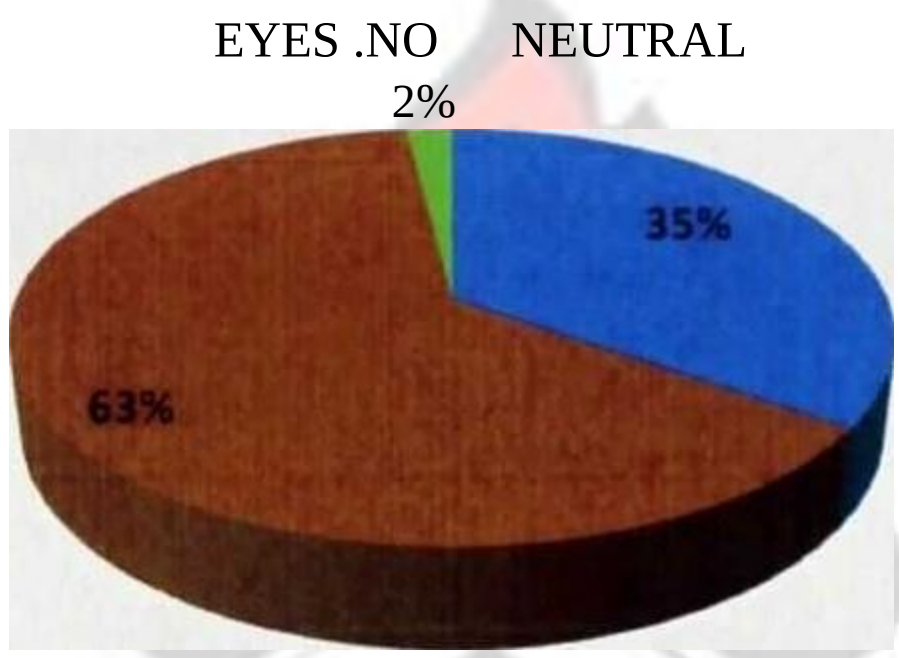
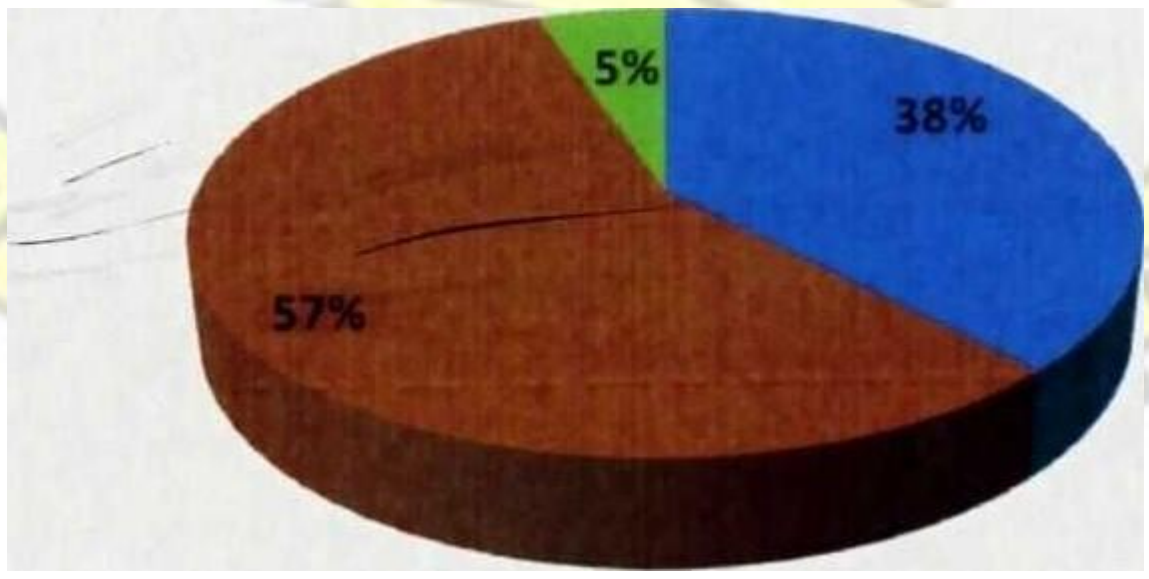


Figure 4.0: Consumers trust in health information presented on product labels in Accra.

Question 4: When you see inscriptions like "Natural", "No additives", "100% pure", "0% fat", "Sugar-free" etc on local labels, do you trust them?



4.1: Consumers

Figure trust in health information presented on product labels in Kumasi.

Question 4: When you see inscriptions like "Natural", "No additives , 100% pure",

"0% fat", "Sugar-free" etc on local labels, do you trust them?

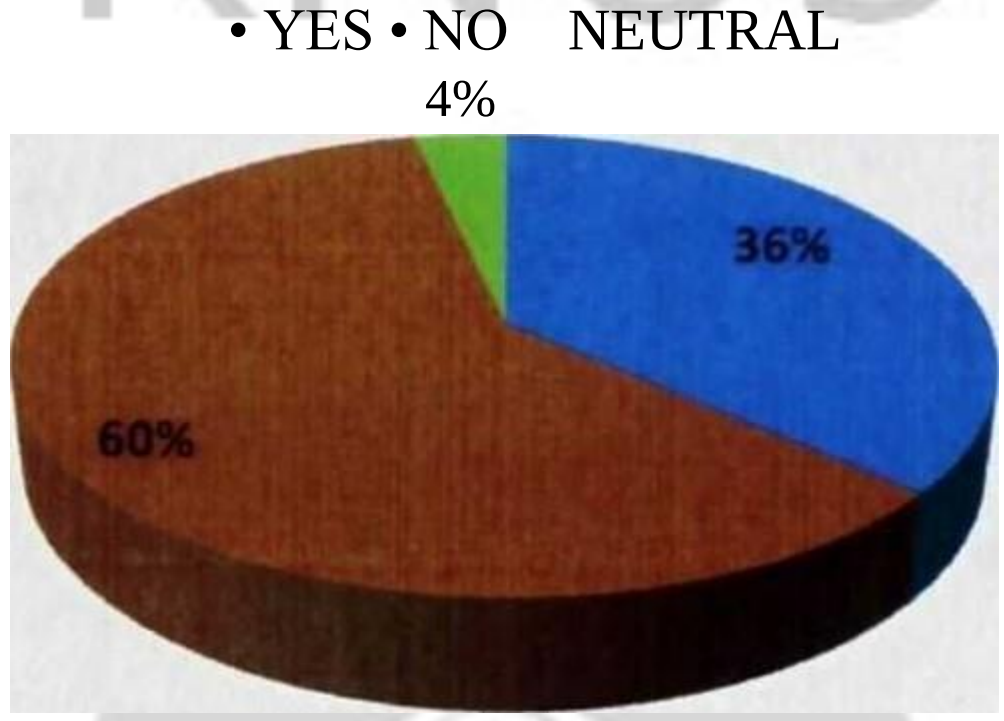


Figure 4.2: Consumers trust in health information presented on product labels (Accra and Kumasi).

Question 9: On a scale of 1 to 10, how will you grade Ghanaian packaged products in relation to foreign products?

Figure perception about the grade of Ghanaian packaged products in Accra.

Question 9: On a scale of 1 to 10, how will you grade Ghanaian packaged products in relation to foreign products?

4.1: Consumers

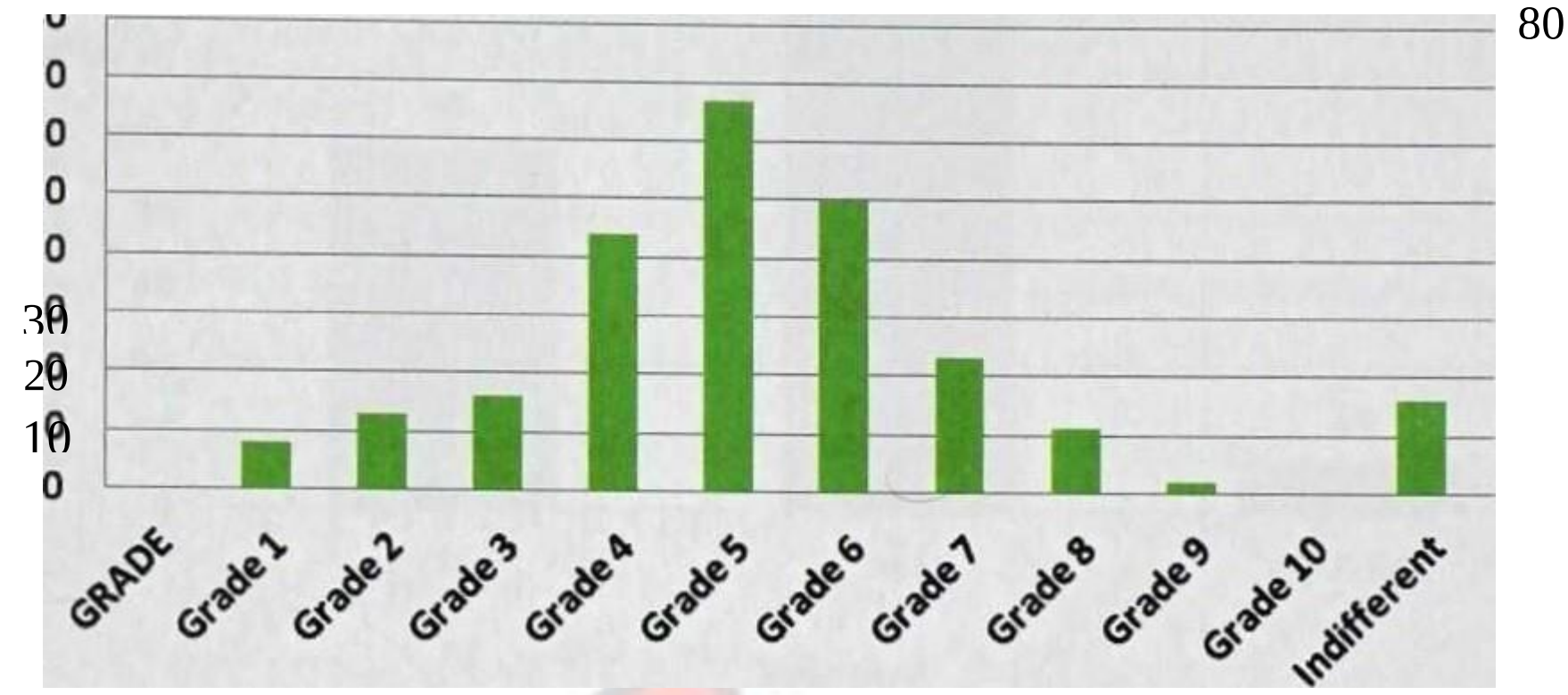


Figure 4.4: Consumer perception about the grade of Ghanaian packaged products in Kumasi.

Question 9: On a scale of 1 to 10, how will you grade Ghanaian packaged products in relation to foreign products?

4.1: Consumers

Figure 4.1: Consumers perception about the grade of Ghanaian packaged products in Accra and Kumasi.

Question 11: Can Ghanaian packaged products compete with those on the international market?

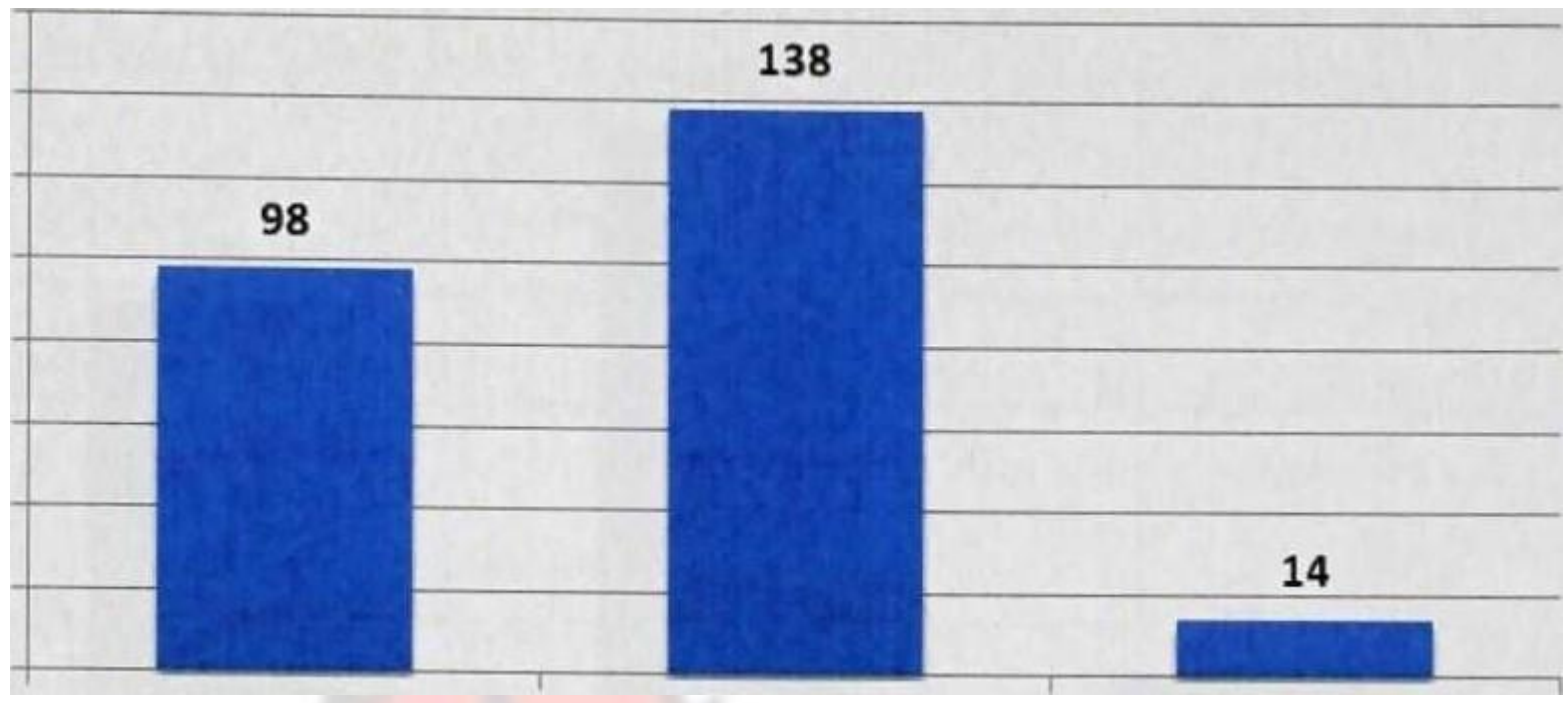
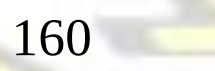


Figure 4.6: Consumer perception about the competitiveness of packaged Ghanaian products on the international market in Accra.

Question 11: Can Ghanaian packaged products compete with those on the international market?



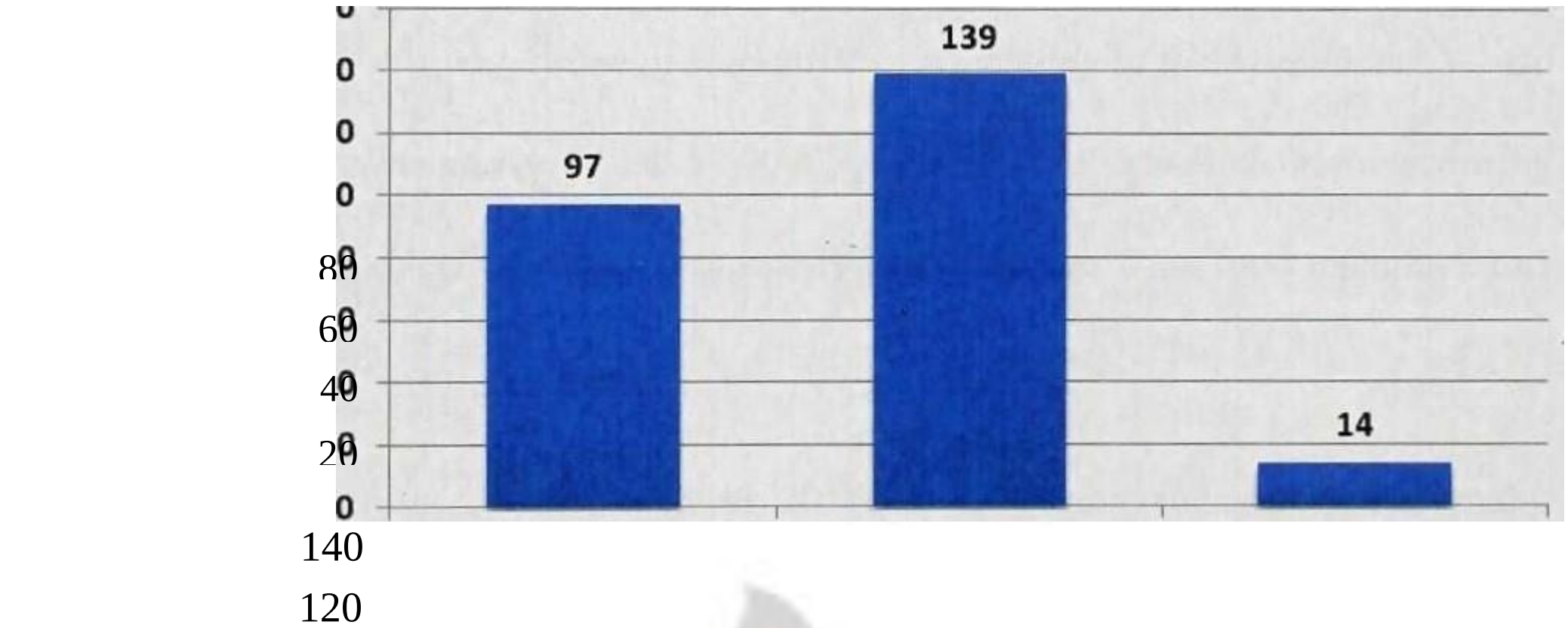
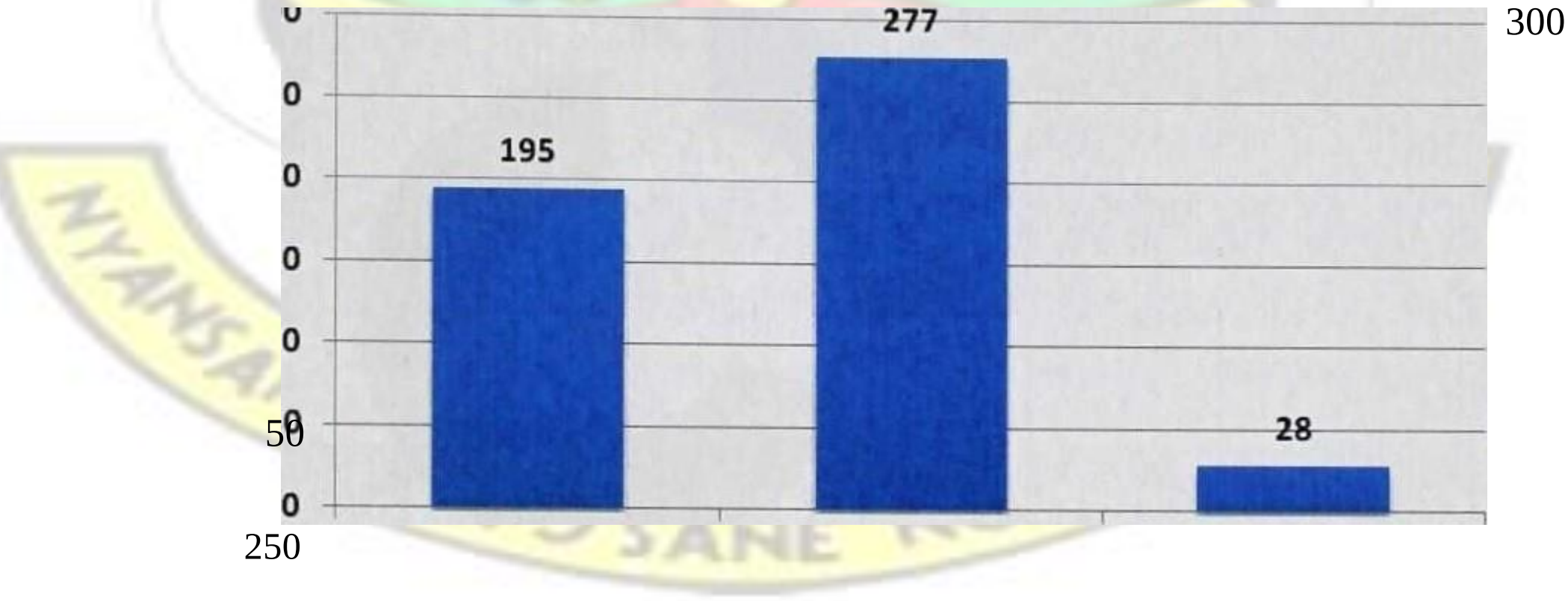


Figure 4.7: Consumer perception about the competitiveness of packaged Ghanaian products on the International market in Kumasi.

Question 11: Can Ghanaian packaged products compete with those on the international market?



YES NO NEUTRAL

Response

Figure 4.8: Consumer perception about the competitiveness of packaged Ghanaian products on the international market in Accra and Kumasi.

Objective Two: Ascertain the awareness of manufacturers on existing standards in food packaging.

Questions I—Are you aware ofstandards in packaging offood products? 3—Do you know of codex alimentarius? and 5—Are you guided by standards manual during packaging offoodproducts? were used to satisfy objective two from food manufacturers and SMEs.

Questionnaires were distributed to 20 food packaging industries. The major industries visited include Cocoa Processing Company, Cadbury, PZ Cuzzons, Reob

Complex, Malina Food Choices, Neha Foods and Manufacturing Processing and other SMEs In the food packaging bracket. To meet the requirements of the second objective, the three questions above were posed to the food packing industries to test their knowledge of standards in food packaging. The results have been outlined as follows:

Question 1: Are you aware of standards in packaging of food products?

EYES .NO —NEUTRAL

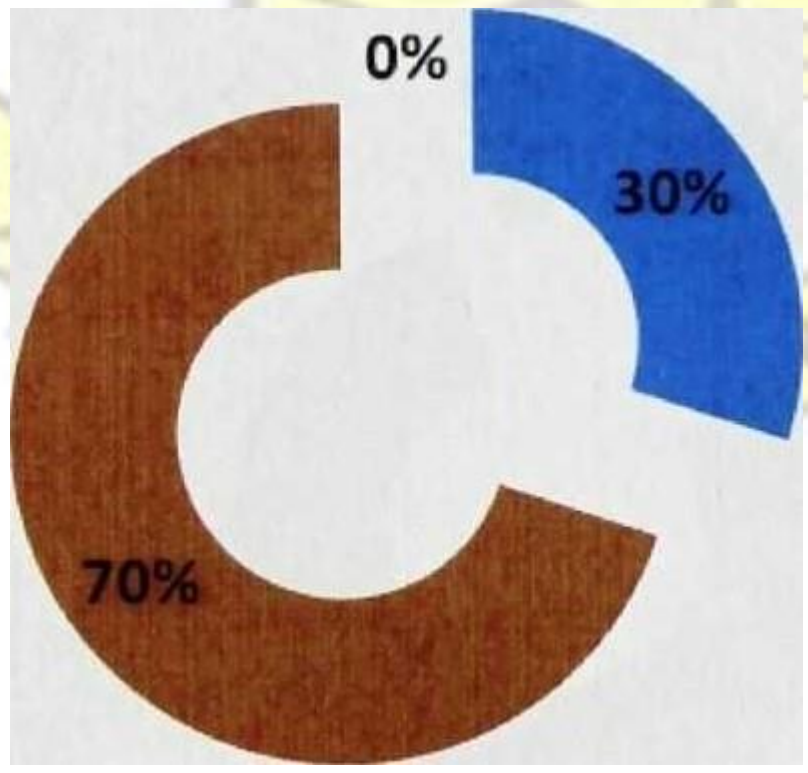


Figure 4.9: Degree of awareness of manufacturers of food packaging on standards in Accra.

Question 3: Do you know of codex alimentarius?

•YES •NO NEUTRAL

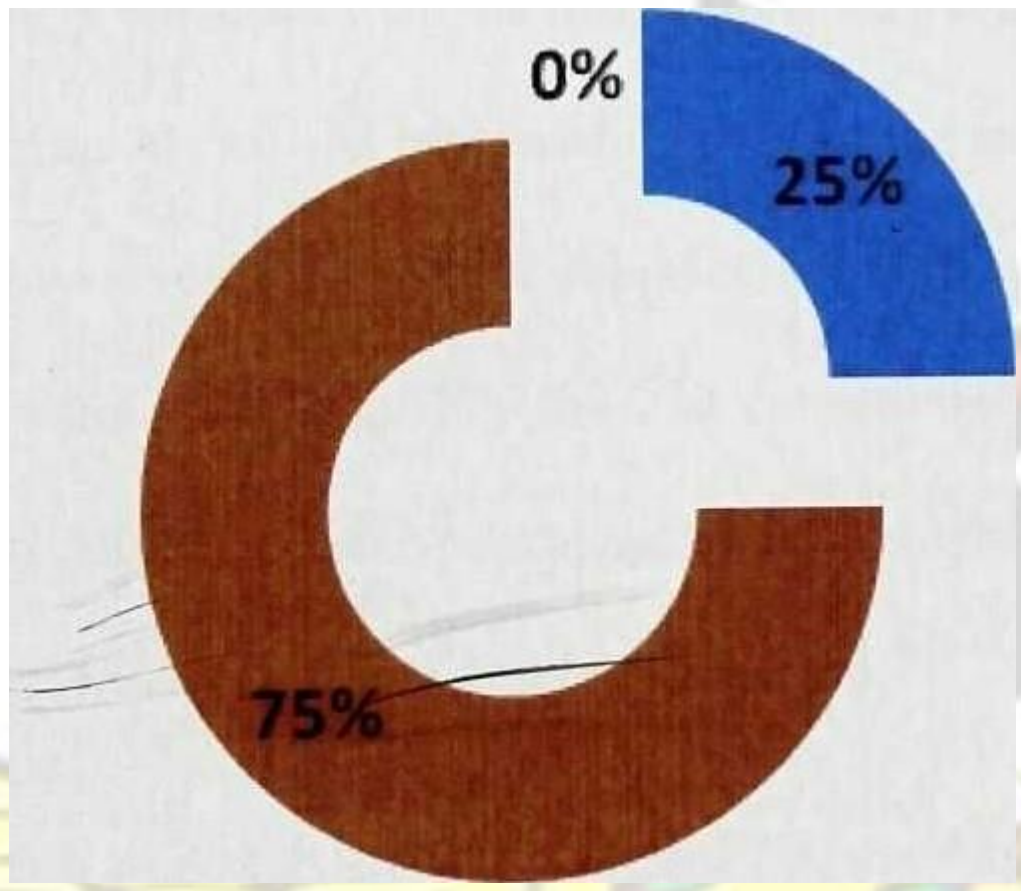


Figure 4.10: Knowledge of manufacturers of food packaging on Codex Alimentarius in Accra.

Question 5: Are you guided by standards manual during packaging of food products?

.YES .NO "NEUTRAL

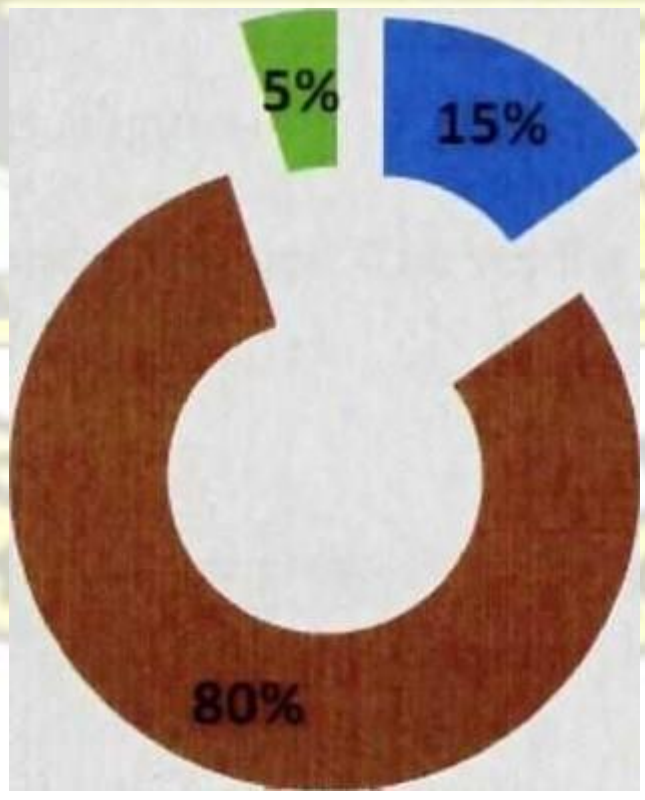


Figure 4.11: Guidance of manufacturers of food packaging by standards manual in Accra.

4.3 Interpretation of Results (Consumers)

Figure 4.0 was used to analyze questionnaire results of question 4 for consumers in Accra who made up stratum 1. Question 4 was focused on knowing the level of trust or credibility consumers associate with the inscriptions they see on pre-packed labels. Out of 250 respondents from Accra, 158 representing 63% of the sample population did not trust such claims. Eighty-seven respondents representing 35% did trust them and 5 people representing 2% were indifferent. For the 250 consumers in Kumasi, 142 representing 58% did not trust claims on local packages, 95 respondents representing 38% did trust and 13 representing-5-% remainedjndifferent(Figure 4.1).

The-collation of results from the overall 500 consumers sampled from Accra and Kumasi (Figure 4.2) produced the following results. Out of the 500 consumer respondents, 300 representing 60% do not believe the claims they see on the packages.

One hundred and eighty two, reflecting 36% do believe the claims on labels and 18 standing for 4% remained indifferent.

Question 9 was to decipher from consumers, their perception of Ghanaian packages with regards to grades (Figures 4.3 — 4.5). On a scale of 1 to 10, consumers were asked to grade the Ghanaian packages. The results have been presented in a table below:

Table 4.0: Consumer perception about the grade of Ghanaian packages in relation to foreign products in Accra. Source: Field Survey, 2013.

GRADE	No. of Respondents, Accra (250
1	7
2	15
3	24

4	41
5	73
6	44
7	16
8	13
9	1
10	0
Indifferent	16

Table 4.1: Consumer perception about the grade of Ghanaian packages in relation to foreign products in Kumasi. Source: Field Survey, 2013.

GRÅDE	o. o Respon ents, Kumasl (250)
1	8
2	13
3	16
4	44
5	67
6	50
7	23
8	11
9	2
10	
Indifferent	16

Question 11 was to elicit responses from Ghanaian consumers as to whether our packages could compete with those on the international market. The 138 of the 250 respondents from Accra representing 55% believe we are out of competition. Ninetyeight

representing 39% hope we can compete and 14 respondents relating to 6% are indifferent (Figure-4.6), The results were not too different for Kumasi consumers. 139 representing 56% answered no. 97 respondents representing 39% were hopeful our packages could compete and 14 representing 5% were indifferent (Figure 4.7). Figure 4.8 was a combination of 500 responses from both Accra and Kumasi consumers. 277 of the 500 respondents reflecting 55% are-of the opinion our packages cannot compete on the international market. 195 making up 39% of respondents think our packages can compete and 28 respondents making up 6% were neutral.

Table 4.2: Consumer perception about the grade of Ghanaian packages in relation to foreign products in Accra and Kumasi. Source: Field Survey, 2013

GRADE	No. o Respon ents, Accra & Kumasi (500)
1	15
2	28
3	40
4	85
5	140
6	94
7	39
8	24
9	3
10	
Indifferent	32

The average Ghanaian consumer does not believe the claims he reads on labels from packages. On the issue of competing with other packages on the international market, majorityyere not hopeÿJ-The-Ghanaian package was placed averagely on grade five out

of ten by consumers. From the above interpretations and analysis, one can easily deduce the overview of the Ghanaian food packaging industry from the minds of the average consumer. The perception of consumers about our own food packages leaves much to be desired.

4.4 Interpretation of Results (SMEs)

Stratum two was made up of companies and SMEs in the food packaging industry. The questionnaire for the food packaging industries was to address objective two, which was to ascertain whether manufacturers were aware of existing standards in food packaging. To accomplish this objective, three direct questions were raised. Questions I—Are you aware of standards in packaging offood products? 3—Do you know of codex alimentarius? and 5—Are you guided by standards manual during packaging offood products? The discussions of the results are as follows: 20 food packaging industries were visited. For question one, 6 companies were aware of standards in packaging and this represented 30% of the sample population. Fourteen SMEs representing 70% were not aware of any standards at all (Figure 4.9). For the returns for question two, 15 food packaging industries knew next to nothing about Codex Alimentarius and represented about 75% of the population. Out of the 20 industries, only 5 making up to 25% had knowledge of what Codex was all about (Figure 4.10). The use of standards manual during product packaging was another issue. Of the 20 companies, 80% do not make use of a standards manual. 15% did use and 5% remained indifferent (Figure 4.11).

It can be inferred from the gathered results that most Ghanaian food packaging industries, especially the SMEs, had no knowledge of food packaging standards. From the researcher's x)bservation, food packaging industries with international affiliations

(multinationals) did better with the understanding and the significance of standards than the local SMEs. Coca Cola, Nestle, Cadbury, and Cocoa Processing Company, were among the significantly small number of food packaging companies. who ensure compliance to standards.

4.5 Interpretation of Results (Regulatory Bodies)

The two major regulatory bodies in Ghana, Ghana Standards Authority and Food and Drugs Authority were interviewed to solicit their views for objective three. To gather data to help achieve results for objective three, the two regulatory bodies were asked the following questions: (I) Are local manufacturers complying with standards in labelling and packaging of food? and (2) Are the compliance mechanisms effective?

In an interview with a standards expert at the Ghana Standards Authority (GSA), packaging design standards are available and have been documented. Specific standards are available for the export of fresh vegetables such as yarn, tomato, fish etc. A standards catalogue has been posted and made available on their website for the general public. The basic labelling regulation in Ghana is that of the L.I. 1541, which spells out the general labelling rules for food, drugs and general goods in Ghana. The L.I. 1541 is composed of three parts: part I covers (food and drugs), part 2 (Goods other than food and drugs) and part 3 (general goods). On the issue of compliance, few manufacturers are complying with a large number not complying. The outcome of the interview with Food and Drugs Authority (FDA) was not different from that of Standards Authority. A similar trend was running through both authorities. It was intriguing as well as interesting for the researcher to have discovered that the use of standards was not mandatory. The onuses of responsibility falls on the manufacturer, who must endeavour to buy and apply specific standards to enablehim survive or-breaktfrfðugh international trade barriers. According to

the two regulatory bodies, when it comes to issues of standards, consumers play a significant role in determining the fate of products which make use of standards or are devoid of them.

Strata three also comprised of • packaging experts. According to experts in packaging, standards and its practical application is a major problem in the Ghanaian food packaging industry. Their concerns remain that the regulatory bodies and the law enforcement agencies should team up and to embark on regular checks to flush out noncompliant producers.

4.6 Interpretation of Results (Packaging Converters)

Strata four covered the main packaging producing industries. Questionnaires were administered to 5 of them. Qualiplast, Polyproducts, Polykraft, Crown Cans, and Packaging Logistics were all visited. From the research all five made use of relevant standards including package testing and evaluation after production. According to the packaging producers, some challenges they encounter include the maintenance of quality policies and company procedures, and safety requirements. Maintenance of standard weights and consistency in colours were also an issue for them. These challenges could affect standards and specifications of food packaging materials.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary

The objectives of this research was to evaluate extent of development and state of the Ghanaian food packaging industry,' ascertain the awareness of manufacturers of existing standards in food packaging and to access the level of compliance with food packaging standards.

To satisfy these objectives, a sample population was developed and categorised into four major strata. General consumers made up stratum 1, SMEs for stratum 2, regulatory bodies and packaging experts for stratum 3 and packaging producing industries for stratum 4.

Questionnaires were developed and administered based on the objectives of the study. Subsequently, interviews were conducted, observations were made and data were provided. The major findings reflected the poor perception consumers have about Ghanaian food packages and the packaging industry at large, the inadequate knowledge of packaging standards on behalf of SMEs and local food packaging producers. The low level of compliance with labelling and packaging standards (L.I. 1541) was also evident.

The remedies proposed b>gng experts/professionals to the above lapses are not farfetched. They could be easily adopted and used to help minimise if not curtail the problem of standards in the Ghanaian food packaging industry. However, reasons for non-compliance have been attributed mostly to ignorance/inadequate education on standards, rigidity of some standards, cost involved in complying and bureaucratic tendencies on the part of regulatory bodies and institutions tasked to ensure compliance.

Much advocacy work and education of the buying public by relevant stakeholders such as the Institute of Packaging, the Ghana (IOPG) & Ghana Export Trade Information Centre (GETIC) is very much desired. Also, there must be regular sensitization programs on packaging issues, especially standards, which could lead to easy adoption of desired standards by the buying public.

5.2 Conclusion

The problem of lack of application of standards in product packaging could first be apportioned to consumers. If consumers will demand and insist on quality, producers will give them just that. As the saying goes, "the customer is always right." Secondly, SMEs, manufacturers and producers could also be blamed. In-house maintenance of quality policies, procedures and requirements were lacking and thus contributed largely to the standards problem. The discovery that use of available standards were the responsibility of the manufacturer, explains the curios situation where few producers ensure compliance when they desire to export to foreign markets. Thirdly, the regulatory bodies indicate that although there is a plethora of specific standards available, consumers play a key role in ensuring that manufacturers comply with standards through purchasing choices.

All the—key players in the industry—consumers, regulatory bodies, law enforcement agencies, food producers, packaging experts/professionals should team up and help provide a panacea to this standards problem plaguing the industry.

5.3 Recommendations

To ensure that the food packaging industry and the nation at large benefit from the study, the recommendations based on the main findings must be seriously considered.

Based on the findings from this study the researcher therefore recommends the following:

- The remedy for standards lies in the hands of the consumer. It all centres on consumer education. The Consumer Associations should educate consumers to demand quality at all levels. Consumers must be educated on what to look out for when buying products. The absence of these features on products will mean that they will be rejected by consumers.

- A Packaging Designers Association should be formed to oversee the affairs of packaging design and packaging designers. This responsibility lies in the hands of the Department of Communication Design, KNUST, since it has the requisite resources. It is a truism that average graphic designers execute most packaging design projects with no background in packaging at all.

- Basic standards documents such as the L.I. 1541 should be made handy and accessible to key players in the industry. It should be made available in both soft and hard copies and distributed to SMEs, food packaging producers, packaging designers, consumers, etc.

- Seminús, traiying and _____ workshops should be• organized by the Institute of Packaging Ghana (IOPG o educate stakeholders in the packaging industry about standards. Especially global food standards such as Codex Alimentarius, ISO, EU Regulations and the significance of knowing them.
- Engage duty bearers to formulate a national policy for the packaging sector and implement the existing standards through voluntary certification systems spearheaded by the IOPG in close collaboration with the Ghana Standard Authority and Ministry of Trade.

- Ghana Standards Authority, Food and Drugs Authority, and the law enforcement agencies together with the government should embark on a 3600 awareness campaign on standards. The campaign will highlight the need, the benefits and the results of using standards.

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Appendix for

APPENDIXES

1: Research Questionnaire Consumers

I. What do you look outfor when buying a pre- packed product?

A. Quality of the product B. Price C. Packaging D. Other.....

2. How often do you read the label on a pre-packed product?

A. Not at all B. Sometimes C. Critically D. Other.....

3. How important is the nutrition information on a pre-packed product to you?

A. Very important B. Sometimes C. Critically D. Other.....

4. When you see inscriptions like "Natural", "No additives", "1000% pure", "0% Fat" "Sugar-free" etc on local labels, do you trust such claims? Yes a No ☐

5. Give reasonš for your answer

---

8. Are you conscious of health issues when buying pre-packed products?

Yes Cl No Cl

9. Whatfeature(s) on a pre-packed product would you associate with credibility?

---

10. What is your impression about Ghanaian packaged products?

---

11. On a scale of 1 to 10, how will you grade Ghanaian packaged products in relation to foreign products?

.....

12. Justify your grade with reason(s)

.....

13. Can Ghanaian packaged products compete with those on the international markets?

YesCl No C)

14. Explain your answer

Appendix 2: Research Questionnaire for Food Packaging Industries/SMEs

1. Are you aware of standards in product packaging? Yes NO

2. Do you know of Codex Alimentarius? Yes NO

3. Are you guided by a standards manual during packaging of food products?

Yes C] No Cl

4. Have you certified your products with the Ghana Standards Authority? Yes No

5. Have you certified your products with the Food and Drugs Authority? Yes NO

6. What is your opinion about the certification process?

Simple Normal Frustrating Cumbersome

7. Do you think application of standards in packaging could help break international trade barriers? Yes NO C]

8. Are the current mechanisms of compliance to standards effective? Yes C] NO ☐

9. As an institution, enumerate some challenges you encounter as you try to comply or adhere to standards in the food packaging industry.

3: Regulatory Bodies

1. Are there packaging design standards for the local food packaging industry?

YeS C] No Cl

2. Have these standards been documented in a standards manual?

Yes [2 No ☐

3. Have the standards manual been made available to local manufacturers and SMEs?

Appendix Research Questionnaire for

Yes No

4. Are local manufacturers complying with standards in labelling and packaging of food?

Yes No Cl

5. What mechanisms have you put in place to ensure compliance with these standards?

6. Are the compliance mechanisms effective?

Yes No [2

7. What is the role of your institution in ensuring that ONLY standard packaged products get to the market?

.....

.....

8. Is your institution aware that several SUB-STANDARD packaged products have invaded the market?

Yes NO •

9. What measures are you taking to eliminate such products from the market?

.....

.....

10. What sanctions have you put in place for non-compliance?

4: Experts

I. As an expert in packaging, do you see the issue of standards and its practical application as a problem in the Ghanaian packaging industry? Yes NO

2. What are your concerns about this issue?

_____

_____

3. What solution(s) would you propose to help solve this problem as an expert in packaging?

.....

_____

_____

4. The issue with local manufacturers has to do with compliance or adherence to standards. What in your view could be done to ensure that they comply with these standards?

_____

_____

5. If you have any more concerns to address to the industry as an expert they are welcome

_____

_____

Appendix Research Questionnaire for Packaging

5: Producing Industries

I. Are there standards that you follow when producing packages? Yes No [2

2. If yes, can you cite one specific example?

.....

.....

3. Do you test your packages after production? Yes [2 NO ☐

4. Which of these testing methods do you subject your packages to after production?

☐Comparative testing C)Assessment testing a Investigational testing a None

5. Which of the following evaluation methods do you apply after producing packages?

Monitoring the pack's performance in the distribution system Laboratory tests ☐ Field trials D None

6. The following are specific lab tests conducted on packages after production.

Which of these tests do you employ?

Compression testing Stack testing Dlmpact/drop /shock testing a Vibration testing C] Torque testing Environmental testing/conditioning

Leak testing

7. Do you conduct material testing such as printability, resistance to fading, impact rigidity, freedom from taint, odour, and toxicity? ink migration and other strength properties on packages? Yes NO C]

8. As an institution, are there challenges you encounter as you try to comply with standards in the packaging industry? Yes NO

9. Enumerate some few challe»esi.f-yes—

.....

.....

6: Designers

1. Where did you acquire your education in packaging design?

_____

2. Have you worked on a brand before? Yes C]NO ☐

3. Ifyes, what brand(s)?

_____

4. What is a brand guide?

Appendix Research Questionnaire for Packaging

5. Have you wÓrked with a brand guide before? Yes NO

6. Do you know about Codex Alimentarius? Yes NO [2
7. If yes, what do you know about it?

8. Are you aware of *labelling laws and regulations* in packaging design? Yes ☐ No ☐

9. If yes, list some of them.

10. Identify five mandatory elements that must appear on a package design.

11. What do you know about design brief?

12. Enumerate four basic packaging design elements you employ in your design projects.

13. As a designer, do you follow up on your designs through to the printing and finishing stage? Yes ☐ No ☐

14. Explain your-anSWer

Appendix 7: The L.I. 1541

GHANA STANDARDS AUTHORITY (FOOD, DRUGS AND OTHER GOODS)
GENERAL LABELLING RULES, 1992

IN exercise of the powers conferred on the Ghana Standards Authority by subsection (1). Of: section 9 of the Standard 3 Decree, 1973 (N.R.C.D. 173) these rules are made this 29th day of April, 1992.

PART I-FOOD AND DRUGS

1. (1) No person shall offer for sale, sell distribute. Import or otherwise dispose of prepackaged food or drug, unless the food or drug is marked or labelled with

(a) The name of the food or drug

(b) A list of ingredients in the food or in respect of drugs, active ingredients, showing the amount of each present in the drug

(c) An indication of the minimum durability in the form of

(i) Date of manufacture and expiry date or best before date or use-by-date in respect to food or

(ii) Date ofmanufacture and expiry date in respect of drugs.

(d) Any special storage conditions and handling precautions that may be necessary.

(e) Instructions or directions for use or warnings and precautions that may be necessary imrespect of a drug

(f) Instructions for use in respect of food, if it would be difficult to make ——appropriate use of the food in the absence of such instructions

(g) An indication of the net contents in the form of net mass or volume or number of doses in respect of drugs

(h) Code marks or numbers indicating the batches of production or packaging to which the food or drug belongs

(i) Country of origin of the food or drug and

(j) The name and address of the producer, manufacturer, importer, packer, distributor or of the seller of the food or drug

2. (1) A name that is required to be used for food under Rule 1 shall be the name prescribed by law for the food if so prescribed.

(2) Where no name is prescribed by law for food, a customary name, that is to say a name, which is customary for that food in the area where the food is sold, may be used for the food.

(3) Where there is no name prescribed by the law for a food and there is no customary name or where customary name is not used, the name used for the food shall sufficiently precise to inform a purchaser of the nature and substances of the food and to enable the food to be distinguished from products with which it could be confused.

(4) The name of a food may consist of a name or description or of name and description;

(5) A trademark brand name or fåncy name shall not be substituted for the name of a food.

(6) The name of a drug as required by Rule I(a) should wherever possible include the international or national non proprietary name of the drug if it is available.

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Appendix 8: Regulations for food Importers

FOOD AND DRUGS AUTHORITY, GHANA

Requirements for Importation of Food

I. Only corporate bodies duly registered by the Registrar — Generals department shall be permitted to import Food into Ghana.

2. All food products to be imported into the country must be registered with the Food and Drugs Board under Section 18 and 25 of the Food and Drugs Law, 1992 (PNDCL 305B) and Section 4 (b) of the Food and Drugs (Amendment) Act, 1996; Act 523.

3. An Import permit must be obtained prior to confirmation of an order for the importation of any Food product. .

4. Permits shall be valid for one calendar year from the date of issue.

5. A fee shall be charged for the processing of each permit submitted for importation. The fee shall be determined by the Board from time to time.

6. All import permits shall bear the full name and address of the exporter and importer, name/description of product, quantity, and registration number of the product, manufacturer/country of origin, total CIF value and country of shipment, port of entry and customs harmonized code.

7. Certification from the Health Authorities, Regulatory Body or the appropriate agency of the country of origin, authenticated and attesting to the status of the manufacturer.

8. Food products are inspected by officials of the Food and Drugs Board at the port of entry- before they are released to the importer.

LABELLING REQUIREMENTS

1. The products brand name or common name must appear on the principal display panel.

2. A list of ingredients by their common names in descending order of quantity added.

3. Additional nutrition information/facts is optional.

4. An indication of the minimum durability in the form of "expiry date", "best before date" or "use-by-date".

5. Any special storage conditions and handling precautions that may be necessary.

6. Instructions or directions for use.

7. An indication of the net content in the form of net mass or volume in the metric system.

For food packed in a liquid medium, the Board requires a declaration in metric system of the drained weight of the food (liquid medium means water, aqueous solutions of sugar and salt, sauces, fruit and vegetable juices in canned fruits and vegetables only, or vinegar, either singly or in combination). Examples: mackerel in tomato sauce, sardines in vegetable oil, etc.

8. The batch number or lot of the product.

9. The name and complete address of the producer, manufacturers, importer, local agent, packer or distributor. In addition, local manufacturers must indicate complete location address of factory.

10. Country of origin must be provided on the product label.

11. Labelling should be in English—English translation in addition with other languages is permitted. .

12. Marks and labels for food must be in indelible ink and be legible.

Appendix 9: Labelling of Prepackaged Foods (CODEX STAN 1-1985)

GENERAL STANDARD FOR THE LABELLING OF PREPACKAGED FOODS

CODEX STAN 1-1985

MANDATORY LABELLING OF PREPACKAGED FOODS

The following information shall appear on the label of prepackaged foods as applicable to the food being labelled, except to the extent otherwise expressly provided in an individual Codex standard:

1. The name of the food

The name shall indicate the true nature of the food and normally be specific and not generic:

(a) Where a name or names have been established for a food in a Codex standard, at least one of these names shall be used.

(b) In other cases, the name prescribed by national legislation shall be used.

(c) In the absence of any such name, either a common or usual name existing by common usage as an appropriate descriptive term which was not misleading or confusing to the consumer shall be used.

(d) A "coined", "fanciful", "brand" name, or "trade mark" may be used provided it accompanies one of the names provided in Subsections (a) to (c).

(e) There shall appear on the label either in conjunction with, or in close proximity to, the name of the food, such additional words or phrases as necessary to avoid misleading or confusing the consumer in regard to the true nature and physical condition of the food including but not limited to the type of packing medium, style, and the condition or type of treatment it has undergone; for example: dried, concentrated, reconstituted, smoked.

2. List of ingredients

(a) Except for single ingredient foods, a list of ingredients shall be declared on the label.

(b) The list of ingredients shall be headed or preceded by an appropriate title which consists of or includes the term 'ingredient'.

(c) All ingredients shall be listed in descending order of ingoing weight (m/m) at the time of the manufacture of the food.

(d) Where an ingredient is itself the product of two or more ingredients, such a compound ingredient may be declared, as such, in the list of ingredients, provided that it is immediately accompanied by a list, in brackets, of its ingredients in descending order of proportion (m/m). Where a compound ingredient (for which a name has been established in a Codex standard or in national legislation) constitutes less than 5% of the food, the ingredients, other than food additives which serve a technological function in the finished product, need not be declared.

3. Net contents and drained weight

(a) The net contents shall be declared in the metric System ("Système International" units).

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(b) The net contents shall be declared in the following manner:

(i) for liquid foods, by volume;

(ii) for solid foods, by weight;
(iii) for semi-solid or viscous foods, either by weight or volume.

(c) In addition to the declaration of net contents, a food packed in a liquid medium shall carry a declaration in the metric system of the drained weight of the food. For the purposes

of this requirement, liquid medium means water, aqueous solutions of sugar and salt, fruit and vegetable juices in canned fruits and vegetables only, or vinegar, either singly or in combination.

4. Name and address

The name and address of the manufacturer, packer, distributor, importer, exporter or vendor of the food shall be declared.

5. Country of origin

(a) The country of origin of the food shall be declared if its omission would mislead or deceive the consumer.

(b) When a food undergoes processing in a second country which changes its nature, the country in which the processing is performed shall be considered to be the country of origin for the purposes of labelling.

6. Lot identification

Each container shall be embossed or otherwise permanently marked in code or in clear to identify the producing factory-arr&tTW1ðt.

77Date marking and storage instructions

(a) If not otherwise determined in an individual Codex standard, the following date marking shall apply:

(i) The "date of minimum durability" shall be declared.

(ii) This shall consist at least of:

- The day and the month for products with a minimum durability of not more than three months;

- The month and the year for products with a minimum durability of more than three months. If the month is December, it is sufficient to indicate the year.

(iii) The date shall be declared by the words:

- "Best before ..." where the day is indicated;

- "Best before end ..." in other cases.

(iv) The words referred to in paragraph (iii) shall be accompanied by:

- Either the date itself; or

- A reference to where the date is given.

(v) The day, month and year shall be declared in uncoded numerical sequence except that the month may be indicated by letters in those Countries where such use will not confuse the consumer.

(vi) Notwithstanding 4.7.1 (i) an indication of the date of minimum durability shall not be required for:

- Fresh fruits and vegetables, including potatoes which have not been peeled, cut or similarly treated;

- wines, liqueur wines, sparkling wines, aromatized wines, fruit wines and sparkling fruit wines;

- Beverages containing 10% or more by volume of alcohol;

• Bakers' or pastry-cooks' wares which, given the nature of their content, are normally consumed within 24 hours of their manufacture;

• vinegar;

• food grade salt;

• solid sugars;

• confectionery products consisting of flavoured and/or coloured sugars;

• chewing gum.

(b) In addition to the date of minimum durability, any special conditions for the storage of the food shall be declared on the label if the validity of the date depends thereon.

8. Instructions for use

Instructions for use, including reconstitution, where applicable, shall be included on the label, as necessary, to ensure correct utilization of the food.

9. General

(a) Labels in prepackaged foods shall be applied in such a manner that they will not bëCome separated from the container.

(b) Statements required to appear on the label by virtue of this standard or any other Codex standards shall be clear, prominent, indelible and readily legible by the consumer under normal conditions of purchase and use.

(c) Where the container is covered by a wrapper, the wrapper shall carry the necessary information or. the label on the container shall be readily legible through the outer wrapper or not obscured by it.

(d) The name and net contents of the food shall appear in a prominent position and in the same field of vision.

10. Language

(a) If the language on the original label is not acceptable, to the consumer for whom it is intended, a supplementary label containing the mandatory information in the required language may be used instead of relabeling.

(b) In the case of either relabeling or a supplementary label, the mandatory information provided shall be fully and accurately reflect that in the original label.