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Research Article

Development of A Holistic Framework for the Key Packaging Elements of Agri-Food Products

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Abstract

In this paper, a holistic methodological framework is developed aimed at the design and production of effective packaging that satisfies the needs of the modern market.Marketing and logistics managers, food technologists and social responsibility executives acknowledge the importance of a holistic approach to marketing and strive to consolidate their perception of such an approach and what it entails for packaging. Food producers can take account of these efforts and utilize those elements which emerge as being appreciated by all of the constituents cited above. To this end, primary research data was collected using a questionnaire that was completed by managers in the relevant business units of companies operating in the prepackaged agri-foodstuffs market in Greece, a major and competitive market.

Keywords: Packaging, Holistic Marketing/Logistics approach, Food industry.

1. Introduction

Packaging is one of the most crucial operations in today's business arena because it stimulates impulsive buying behavior, increases market share and reduces promotional costs Deliya, Parmar and Bhavesh [1]. Many definitions have been offered for packaging. Olson and Jacoby [2] defined it "*as an extrinsic element of the product or an attribute that is related to the product but does not form part of the physical product itself*". Arens [3] uses a more technical definition by arguing that "*Packaging is the container for a product – encompassing the physical appearance of the container and including the design, color, shape, labeling and materials used*".

One of the most comprehensive definitions for packaging was proposed by Saghir [4] who defined packaging as a "*coordinated system of preparing goods for safe, secure, efficient and effective handling, transport, distribution, storage, retailing, consumption and recovery, reuse or disposal combined with maximizing consumer value, sales and hence profit*". Nevertheless, beyond the above functional role of the packaging there is a strong communication role simply because it becomes the voice and face of the image and producer identity. As Shimp [5] argues, "*Packaging can be described as the least expensive form of advertising, a silent sales man and a five-second commercial*".

It is obvious from the definitions above that packaging serves a dual purpose; "*to sell what it protects and protect what it sells*". This two-fold nature makes packaging an intricate and complicated operation involving two of the key functional areas of companies; Marketing and Logistics. This is true especially in the retail food sector, where the market is very competitive, manufacturers are forced to distinguish their products from those of their competitors andcustomers are time demanding and time pressured (purchase decision is usually made between 2 to 4 seconds once the package is in the hands of the consumer) to choose between thousands of products. Packaging in the food sector is a critical issue not only for attracting consumers to buy the product but also to ensure retailers that the product is of a good state. Hence, packaging aims to protect the product, not only from transit and physical damage, but also from microbial and bacterial deterioration, as well as, climatic hazards (heat, cold, moisture, frost etc.). Packaging must also identify, track and trace the product supporting traceability in the food supply chain.

Moreover, according to WorldPackagingOrganisation [6], there are many challenges in the retail and food sector regarding the packaging that need to be encountered in the business environment during the last decade: "*the aging of the world's population, the trend towards smaller households, the increasing requirement for convenience among consumers, rising health awareness among consumers, the trend towards 'on-the-go' lifestyles among increasingly time-poor consumers, growing requirements for brand enhancement/ differentiation in an increasingly competitive environment, new packaging material development, the move towards smaller pack sizes as the incidence of families eating together at the dinner table become less common, increasing awareness of environmental issues, and the adoption of new regulatory requirements on packaging recycling*". Azzi et al. [7] concluded that food packaging should focus on identifying methods and procedures for an integrated and systematic packaging design and take into account various variables which exert influence on packaging.

Therefore, it is clear that the food packaging needs to be holistically considered taking into account various aspects / disciplines. And in the literature, there are many research initiatives that proposed a packaging design and development framework including a number of factors. Paine [8] one of the

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pioneers in food packaging proposed the following factors: Product needs, Distribution needs and wants, Packaging materials, Machinery and production processes, Consumer needs and wants, Market needs and wants, and Environmental performance. Furthermore, Coles, McDowell and Kirwan [9] proposed a framework for a packaging strategy inluding the: "*1) Technical requirements of the product and its packaging to ensure pack functionality and product protection/preservation throughout the pack's shelf life during distribution and storage until its consumption, 2) Customer's valued packaging and product characteristics, for example, aesthetic, flavour, convenience, functional and environmental performance, 3) Marketing requirements for packaging and product innovation to establish a distinct (product/service) brand proposition; protect brand integrity and satisfy anticipated demand at an acceptable profit in accordance with marketing strategy, 4) Supply chain considerations such as compatibility with existing pack range and/or manufacturing system, 5) Legislation and its operational / financial impacts, for example, regulations regarding food hygiene, labelling, weights and measures, food contact materials, due diligence etc. and 6) Environmental requirements or pressures and their impacts, for example, light-weighting to reduce impact of taxes or levies on amount of packaging used*".

Although, the many-fold nature of packaging is clearly evident, most studies in the literature focus either on its impact on specific aspect(s) e.g. on the consumer behavior, on the efficiency of logistics systems throughout the supply chain, etc., or they try to identify the corresponding packaging elements - but considered them as of equal significance and appreciation by the various managers. This study tries to fill the gap or to make the first step. By identifying the significance that marketing, logistics, food scientist and environmental managers perceive against the various elements of the package in the food suppy chain.

From the analysis of the literature, we note that there is a lack of research about the main factors / components of packaging - which we call elements formarketing managers- from a holistic point of view that encompassesmarketing, logistics, food technologists and corporate social responsibility (CSR) environmental issues. Therefore, there is a lack of strategies, approaches and tools for product designers, marketers and promoters, food technologists and process / service managers as well as engineers.

This research effort aims to fill this gap or, at least, make the first important step. By recognizing the importance, marketing managers, logisticians, food technologists and corporate social responsibility (CSR) andenvironmental executives ascribeto it, and how they perceive it both in terms of packaging materials and retail packaging, producers can take into account those elements that are highly appreciated by all of the above components. In order to achieve the above goal, the primary data for this research will be gathered through a questionnaire to be completed by consumers as well as by the managers of the respective - business operations considered in the packaged food products market, which is a very important and competitive market in Greece. The survey is focused only in primary pack because all the examined disciplines are applied in practice.

Different views on the significance of packaging elements are provided by business executives in the food supply chain and businesses / chain members. The main research question of this research is: "*Which are the elements of packaging that are recognized by all business executives in the food supply chain as critical?*".

The paper is organized as follows: The next section identifies and categorizes the key elements of the packaging (related to marketing, logistics, food technology and environmental needs), which are derived from the literature survey. These elements help the planning of the research methodology, as well as, the development of the questionnaire, which are presented in the third section. The fourth section presents and discussses the findings. Finally, conclusions and recommendations for future research are provided.

2. Which are the packaging elements for the food products?

In this paper, a theoretical framework for identifying the critical elements of food products' packaging is proposed. It is based on the concept that the "the food supply chain food packaging needs to be holistically considered taking into account the logistics systems of the members of the supply chain, as well as, the marketing, food technology, and environmental factors". The above factors have been developed by synthesizing the literature review focused in every system / discipline and presented in the next section.

The following figure presents the proposed by the paper theoretical framework:

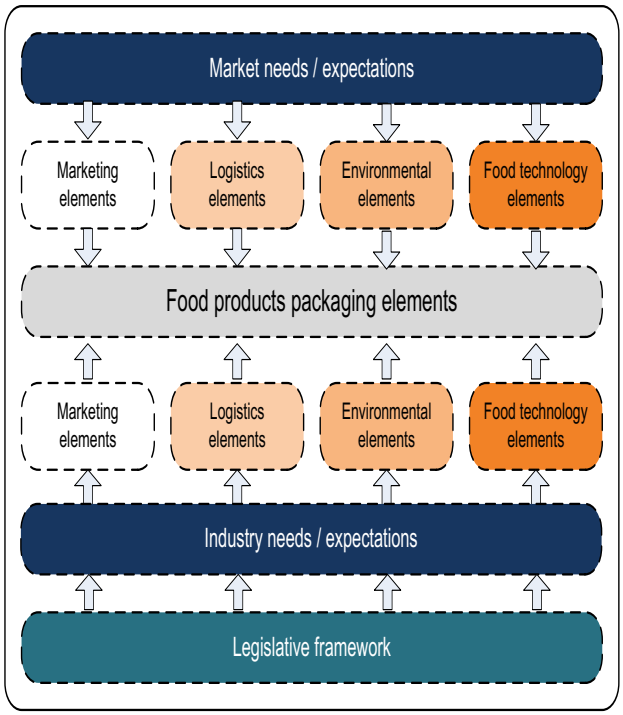

Fig. 1. Theoretical framework of food packaging elements

The current legislative framework, which applies to all countries of the European Union (EU) includes: 1) General rules on food labeling (horizontal legislation), and 2) Rules for specific categories of food eg. olive oil, chocolate (vertical legislation). In particular, the general rules on the labeling of foodstuffs concern the new EU legislation on the provision of food information to consumers (European Commission [10]). It is mandatory from 13 December 2014 and consolidates two Directives (2000/13 / EC and 90/496 / EEC) into legislation, Regulation (EU) No 1169 / 2011 laying down the general principles, requirements and obligations regarding food information, and in particular general and nutritional labeling. Under the above legal framework, the main elements of the label of food products are:

Table 1. Mandatory elements of food product labels

Element	Details
Sales name.	
List of ingredients.	
List of Allergens.	
Quantitative ingredient declaration (QUID)	Required when there is a characteristic ingredient that determines the identity of the product as shown by its name or description.
Net quantity.	
Minimum durability date and final consumption date.	
Special maintenance conditions	Any special storage conditions and / or conditions of use.
Data of the responsible person for the product.	Producer, packer or intra-EU dealer.
Place of production or origin.	
Instructions for use	If their failure would hinder proper use of the food.
The indication of the alcoholic strength	By volume obtained for beverages containing more than 1,2% by volume of ethyl alcohol.
Nutrition declaration.	
Batch identification / lot number indication.	All units of sale of a foodstuff, produced, prepared or packaged under substantially identical conditions'. The batch is determined by the producer, manufacturer, or first vendor established in the community. The batch indication is optional when the minimum durability date is indicated, indicating at least a day and a month.

For the purposes of this research we shall consider all the aforementioned elements to be mandatory, we don't incorporate them in our survey and so we examine the elements of the other four disciplines (marketing, logistics management, environmental and food technology elements; next sections). Furthermore, -even if it's of great interest- in this paper we won't examine the market's / customers' requirements of packaging, which will be the main topic of our future research. It is well known that consumers of the food products want innovation and value novelty; therefore, they food industry must listen to customers' needs.

2.1 Packaging for marketing

There are many researches that aim to identify the elements of the package that have a strong impact on consumer's purchase decision (Fotiadis [11]; Vyas [12]; Simms and Trott [13]; Butkeviciene et al. [13]; Wells et al [15]; Raghubir and Krishna, [16]; Bloch [17]). Silayoi and Speece [18] argue that a good package attracts consumer's attention and thus works as a tool for differentiation. It can also work, as an effective marketing channel for communication (Wells et al [15]; Underwood et al. [19]; Nancarrow et al [20]; Underwood and Ozanne [21]).

Madden et al. [22], studied the images and colors meanings and preferences. Rettie and Brewer [23] examined the verbal and visual components of package design options. Silayoi and Speece [24] identify the marketing elements and categorise them in visual (including graphics and size / shape of packaging) and informational elements (including product information and information about the technologies used on the package). The following table presents an indicative list of latest research initiatives that examines the marketing elements that that have positive relationship to consumer behaviour in buying food products (Table 2).

Table 2. Marketing elements that have positive relationship to consumer behaviour

Authors	Marketing elements that have positive relationship to consumer behaviour
Wyrwa and Barska [25]	Comfort of use and durability
Sener et al. [26]	Background image and form
Mohebbi [27]	Graphics and color
Bix et al. [28]	Color contrast
Russell [29]	Color and size

2.2 Packaging for logistics

Packaging is a critical success factor of logistics and supply chain management. In the literature a researcher can identify many papers that discuss how the packaging supports the logistics activities in the food supply chain (Johnson [30]; Bjärnemoet al [31]) and support the traceability of the food products (Ahmed et al. [32]; Rundh [33]).

Lambert et al [34], proposed a number of trade-offs of packaging with the following main logistics functions: i) transportation, by increasing package information, package protection and standardization, ii) inventory management, by increasing product protection, iii) Warehousing by increasing package information, product protection and standardization, and iv) Communications - promotion, by increasing package information.

Based on the above, the following are initially identified as key elements: package information, package protection, standardization and product protection. Moreover, Saghir [35] studied several case studies identified the following elements in the grocery retail supply chain for its key players: 1) Packaging producer: Strength tests and vibrations, cost analysis, 2) Manufacturer: Pallet pattern, packaging size, strength analysis, stacking and storage tests, visualization, usability, attitude, size, weight and complaints, 3) Carrier: Truck load efficiency, distribution cost, environmental impact, and 4) Retail: handling, protection, ergonomics, storage.

2.4 Packaging for food technology

According to Opara and Mditshwa [36] the main functions of packaging are to protect and stabilise food until its consumption. As authors argue "*once these central functions are addressed, all the others (marketing, communication, distribution, etc.) should be equally considered*". Hence, the primary functions of packaging in regards to food technology are, to:

- Ensure food safety and integrity, by avoiding physical damage by external mechanical force or pressure, environmental elements such as heat and light energy, dust, chemical and microbial contamination, gas transfer from outside to inside and vice-versa, etc. This is critical because since according to World Packaging Organisation [6], about 10% of fruit and vegetables shipped to european union are discarded due to unacceptable quality and spoilage.
- Preserve the quality and freshness of the food by maintaining its sensory characteristics, such as texture, colour and flavour, as well as, the nutritional value high mineral and vitamin level, low chemical preservative content.
- Inform the customer, by addressing of recipient, describing the product and perhaps describe how to handle the package and use the product (Sorrentinoet al [37]; Appendini and Hotchkiss [38]; Quested [39]; Paine [8]).

2.3 Packaging for the enviromental friendly practices

According to the Environmental Protection Agency (2006) [40], packaging materials account for about 31% of total solid urban waste. The above percentage is important for the contribution of food packaging materials, as food is the only product consumed at least 3 times a day (Hunt et al [41]). Moreover, food packaging is approximately 50% (by weight) of total packaging sales (Marsh and Bugusu [42]). Therefore, immediately after use, the packaging should be removed in an environmentally responsible manner. Good practices for the management of solid urban waste include various processes related to recycling (such as plastic and glass recycling, composting, etc.). In general, the main objective is to reduce packaging's impact on the environment or to be produced by reusable, recyclable and renewable resources. In recent years, one of the most important factors in this direction in the food industry is the use of environmental (or green) labels. Of course, efforts to record the environmental footprint of food are not new, as from time to time various initiatives and programs have been designed and implemented, such as eco-friendly product labels, organic products and energy efficiency labels (Lewis et al , 2008 [43]). Moreover, the science and the practice of using labels to drive changes in consumer behavior is complex (Tzilivakis et al [44]).

2.5 Packaging means for all disciplines

Today more than ever, companies have realized that packaging can surely affect consumers' decision but also improve the performance of companies in terms of warehousing and transportation, by standardizing the corresponding logistics activities and minimizing their operational costs (Folinas and Fotiadis [45]). Food packaging is one of the principal safety factors in the transportation chain from "farm to fork". Moreover, it constitutes one of the most effective sales and marketing tools for products, as it is the packaging which first wins the consumer over (relevant research has shown that roughly 70% of consumers' purchasing decisions are made "in front of the shelf").

Additionally, latest developments in changes to consumers' dietary habits and the increase of their environment-friendly conscience render a holistic approach to packaging necessary, an approach that will determine the packaging elements by taking account of factors such as those relating to (Jönson [46]):

1. Marketing: design and test food products package systems for appealing to consumer point of purchase, proposing elements such as: form and graphics, legislative requirements and marketing, customers' requirements / serving end-consumers, as well as distribution.
2. Logistics Management: in order to optmize material flow and handling, warehousing functions, facilitating transportation and distribution, ass well as, the protection of both products and the environment and to provide information regarding the conditions and the placement of the product.
3. Food technology: relating to information on the food/product, such as, for example, its nutrients, the existence of allergens, preparation/cooking instructions, information relating to production, production and best-by dates and whether the product is organic or certified, and
4. Environmental information: principally aimed to reduce the environmental impact, reduce energy consumption, inform on the option to reuse or recycle the packaging, etc.

Many researchers have tried to identify the key elements of the package that either affect consumer purchasing decisions or they are the main reasons that operations managers and logistics managers use them so as to choose the right package (Prendergast and Marr [47]; Rettie and Brewer [23]; Keller [48]; Underwood [49]; Silayoi and Speece [19]; Estiri et al. [50]; Chaudhary [51]). Moreover, companies in food industries use green labels to prove the implementation of environmental friendly practices. Based on the above studies, as well as, the elements that are extracted from the previous sections these key elements can be classified into the following categories (We use this categorization since it we are expected to have one element applied to more than discipline):

- *Visual elements*, meaning that it has: vivid (strong) colors, only one color (monochrome), only white color (background), many blank parts and product photography / images / graphics.
- *Information elements*, meaning that it provides: information about the company, information about the product (ingredients), nutrition information, production or remaking techniques, quality standards marks, compliance with environmental practices, data that support traceability, lot number, product identification coding schemes such as barcode, QR-code, etc., marks for flammable / hazardous materials, proposed ways of consumption, storage conditions and brand elements (logo, slogan, symbol, etc.).
- *Physical elements*, such as: size (marginally bigger than product size), volume (marginally bigger than product volume), shape (following the common / typical shapes e.g. such as: square, rectangle, triangle, circle), material / components (e.g. be made of durable materials, materials that add prestige to the product, materials that are environmentally friendly, materials that can be reused and materials that allows elongation), waterproof, withstand mechanical stress, withstand

corrosion and wear, cheap (low price of production or recycling) and light / low weight.

- *Operational elements*, such as: protection of the product from theft, from moisture, ease of placing/mounting the product on the shelf, do not expose the product to light, allow visual contact with part of the product, ease of transportation and handling, while also permitting packaging in larger packages / logistics units (carton, pallet, etc.).

All the above elements are critical for both producers and consumers. *But, what about marketing and sales managers?Also, about the operations / logistics managers, food scientists and the managers who are responsible for the environment? Do they have the same perception?Which elements are most critical to both groups? Which are common? How can packaging manufacturers work to fill the gap among the views / of the two disciplines?*The output of this review is used for delineating the perception of the managers in the food supply chain in Greece that is the main topic of the next section.

3. Packaging elements of food products: Findings from an empirical research study

3.1 Research approach

In this paper different views on the significance of packaging elements are provided by business executives in the food supply chain and businesses / chain members. The main research question of this research is: "*Which are the elements of packaging that recognize business executives in the food supply chain as critical?*".

The research was focused on the food sector and the sample included companies (manufacturers, wholesalers and mainly retailers) in the packaged food market in Greece. Primary data were collected through a questionnaire. It was divided into three sections; the first section asks for information about the company, the second tried to sketch the profile of the manager (logistics manager or marketing manager; there was a filter question was employed to screen out the four groups of the sample: marketing, logistics, food tecnology and environmrntal aspects) and the third aimed to assess the significance of the packaging elements using a five point Likert scale (from “1: Not significant” to “5: Very significant”).

Before the questionnaire was administered it was pilot tested using the method of content validity and the questionnaire sample was confirmed by 5 managers so as to check the appropriateness of the elements and the clear understanding of the questions. Also, in order to assess the reliability of questionnaire, Cronbach's alpha was estimated. For this purpose, a prototype of 40 questionnaires of pretest was taken. The results (Cronbach alpha = 0.848) show that the questionnaire used in this study has had a good reliability for achieving its main objectives.

A total of 500 questionnaires were distributed among companies in the targeted sector and finally the numbers of 194 questionnaires were used in this study; 58 were answer by marketing or sales managers, 46 logistics or operations managers, 44 food scientists working in the production, and 44 managers assigned the environmental practices. According to the analysis of survey data, 76% of the respondents are working in SME’s and only 24% in big companies. Most of the respondents have many years of experience (12.5+/-7.5 years) and high education degree (75%). The data collected were analyzed using SPSS version 23.0. The analysis included descriptive and inferential analysis. The information obtained was then used to interpret and discuss results.

3.2 Findings

The results of the research are presented in this section. First, the Table 3 presents the means and standard deviations for all the disciplines / business aspect. Those with mean higher than 4 is highlighted).

Table 3. Sinificance of packaging elements from all business aspects

Packaging element	Mean (Std. deviation)
Has vivid / strong colors	3.21 (1.08)
Has only one color (monochrome)	2.11 (0.92)
Has only white color	2.30 (0.70)
Has many blank parts (or has only white color as a background)	2.39 (0.95)
Have a picture	2.75 (1.05)
Provides nutrition information	4.02 (1.04)
Reports production or reproduction techniques	2.94 (1.06)
Includes quality standards marks	4.35 (0.91)
Includes marks that show the compliance to environmental practices	3.70 (1.05)
Includes data that support traceability	4.03 (1.06)
Includes product identification coding schemes such as barcode, QR-code, etc.	4.26 (1.05)
Includes marks for flammable / hazardous materials, storage conditions and brand elements	3.89 (1.11)
Provides proposed ways of consumption	3.27 (1.15)
Has size marginally bigger than product's size	3.37 (1.08)
Has volume marginally bigger than product's volume	3.23 (1.10)
Follows the common / typical shapes (e.g. such as: square, rectangle, triangle, circle)	3.22 (1.20)
Is made of durable materials	3.81 (0.82)
Is waterproof	3.86 (1.02)
Withstands mechanical stress	3.88 (0.94)
Withstands corrosion and wear	4.12 (0.93)
Protects the product from theft	2.96 (1.22)
Protects the product from moisture	3.86 (1.04)
Can easily be mounted on the shelf	3.73 (1.14)
Do not expose the product to light	3.59 (1.06)

Allow visual contact with part of the product	3.65 (1.14)
Is light / has low weight	3.33 (0.95)
Produced by material / components (e.g. be made of durable materials, that add prestige to product)	3.94 (0.99)
Produced by materials that are environmentally friendly	3.78 (1.07)
Produced by materials that can be reused and materials that allows elongation)	3.49 (1.02)
Can easily be transported and handled	4.16 (0.80)
Allows packaging in larger packages / logistics units (carton, pallet, etc.)	4.31 (0.80)
Is cheap (low price of production or recycling)	3.99 (0.93)
Suggest recipes for this product	3.73 (1.01)
Be ready to cook	3.24 (1.01)
Indicate country of origin and secondary materials	3.79 (1.20)
Shows at any time the product temperature	3.54 (0.97)
Increase product life	3.40 (1.01)
Smart label	3.80 (1.10)
Protected originname	3.55 (1.01)
The shape of the package describes the product content	3.72 (1.14)
Do not expose light to solar radiation	3.73 (0.92)
Do not allow the odor to leak	3.55 (1.07)
Be made of recycled materials	3.44 (0.96)

The non-parametric test of Kruskal-Wallis reveals a statistically significant differences for the following elements of packaging that recognize business executives in the food supply chain as critical (Table 4).

Table 4. Significant differences for the elements of packaging that recognize business executives in the food supply chain as critical

Elements	p.	Dominate functional area(s)
Has vivid / strong colors	0,000	Marketing
Includes product identification coding schemes such as barcode, QR-code, etc.	0,000	Food technology and Logistics
Provides proposed ways of consumption	0,047	Food technology
Follows the common / typical shapes (e.g. such as: square, rectangle, triangle, circle	0,011	Logistics
Is waterproof	0,005	Food technology
Protects the product from theft	0,008	Logistics
Do not expose the product to light	0,006	Logistics
Allow visual contact with part of the product	0,048	Marketing
Is light / has low weight	0,023	Food technology
Produced by material / components (e.g. be made of durable materials, add prestige)	0,000	Food technology
Produced by materials that are environmentally friendly	0,021	Environmental
Produced by materials that can be reused and materials that allows elongation)	0,004	Food technology
Allows packaging in larger packages / logistics units (carton, pallet, etc.).	0,033	Logistics
Be ready to cook	0,043	Food technology and Marketing
Shows at any time the product temperature	0,014	Logistics
Increase product life	0,013	Food technology and Logistics
Smart label	0,032	Food technology
Do not expose light to solar radiation	0,027	Environmental
Do not allow the odor to leak	0,006	Environmental and Logistics

Finally, the following table presents the five more significant, as well as, the five less significant elements for every discipline / functional area:

Table 5. Significance of packaging elements from every business aspect

Marketing	
Most significant	1. Includes quality standards marks. 2. Produced by material / components (e.g. be made of durable materials, materials that add prestige to the product). 3. Is cheap (low price of production or recycling). 4. Allow visual contact with part of the product. 5. Have a picture. ...
Less significant	... 39. Is light / has low weight. 40. Has size marginally bigger than product's size. 41. Has volume marginally bigger than product's volume. 42. Reports production or reproduction techniques. 43. Follows the common / typical shapes (e.g. such as: square, rectangle, triangle, circle).
Logistics	
Most significant	1. Allows packaging in larger packages / logistics units (carton, pallet, etc.). 2. Includes product identification coding schemes such as barcode, QR-code, etc. 3. Includes quality standards marks. 4. Can easily be transported and handled. 5. Includes data that support traceability. ...
Less significant	... 39. Reports production or reproduction techniques.

	40. Have a picture. 41. Has only white color. 42. Has many blank parts (or has only white color as a background). 43. Has only one color (monochrome).
Food technology	
Most significant	1. Includes product identification coding schemes such as barcode, QR-code, etc. 2. Includes quality standards marks. 3. Provides nutrition information. 4. Produced by material / components (e.g. be made of durable materials, materials that add prestige to the product). 5. Is waterproof. ...
Less significant	... 39. Reports production or reproduction techniques. 40. Have a picture. 41. Has only white color. 42. Has many blank parts (or has only white color as a background). 43. Has only one color (monochrome).
Environmental	
Most significant	1. Includes marks that show the compliance to environmental practices. 2. Includes product identification coding schemes such as barcode, QR-code, etc. 3. Includes data that support traceability. 4. Includes marks for flammable / hazardous materials, storage conditions and brand elements (logo, slogan, symbol, etc.). 5. Includes quality standards marks. ...
Less significant	... 39. Protects the product from theft. 40. Have a picture. 41. Has only white color. 42. Has many blank parts (or has only white color as a background) 43. Has only one color (monochrome).

4. Conclusions

Packaging is a core business function. Marketers believe that it is the fifth "P" of marketing and logisticians plan the warehousing and transportation systems according to its main parameters / dimensions. Enviromental specialists see the packaging as an excellent area to apply all the green practices and technologies and food scientists argue that it plays a critical role in the habits and culture of consumers.

This research starts with the belief of the authors that the design of food products' packaging includes factors such as: promotion, safety, environmental impact and waste management of the packaging material throughout all over the food life cycle, etc.,as Coles, McDowell and Kirwan [9] proposed. Authors agree with Marsh and Bugusu [52]who pointed out that 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*". In this study, primary data are collected through a questionnaire in order to identify the significance that all managers perceive against the various elements of the package of food products. by identifying the significance that marketing, logistics, food scientist and environmental managers perceive against the various elements of the package in the food suppy chain packaging can be designed and developed in a more effetcive and efficient manner.

The findings reveal that different packaging elements had different functional implications on the above managers' mind. In particular, according to the above results managers' responses reveal that the differences of the marks are concentrated to the following elements for every business function:

- Marketing: Has vivid / strong colors, Allow visual contact with part of the product.
- Logistics: Follows the common / typical shapes (e.g. such as: square, rectangle, triangle, circle), Protects the product from theft, Do not expose the product to light, Allows packaging in larger packages / logistics units (carton, pallet, etc.), Shows at any time the product temperature.
- Food technology: Provides proposed ways of consumption, Is waterproof, Is light / has low weight, Produced by material / components (e.g. be made of durable materials, add prestige), Produced by materials that can be reused and materials that allows elongation), Smart label.
- Environmental: Produced by materials that are environmentally friendly, Do not expose light to solar radiation.

Nevertheless, there are some common packaging elements that more than one managers can be surely be benefitted, such as: Includes quality standards marks, Includes product identification coding schemes such as barcode, QR-code, etc., Produced by material / components (e.g. be made of durable materials, materials that add prestige to the product), Increase product and Includes data that support traceability.

Generally, these findings of this paper disclose: that the gap among various managers' perception regarding packaging can be bridged by adopting practices and approaches in an integrated manner.

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