AHP MODEL FOR SELECTING PACKAGING SYSTEMS IN FOOD INDUSTRY

ABSTRACT

This paper addresses the problem regarding packaging systems in the food industry, specifically the lack of characterization for food packaging systems in Chile and the lack of a guiding method to decide the implementation of the most adequate system in a food production plant. The purpose of this research stems from the technical requirements associated with carrying food products from their processing to the final consumer. Considering marketing perspective, packaging must be attractive in every way; hence, appropriate technology for each proposed package is required. This study proposes to consider also, qualitative aspects in the analysis. The multi-criteria methodology and the use of the Analytic Hierarchy Process (AHP), provides an approach that integrates technical and qualitative aspects identifying conflicting criteria. It starts from the examination of food industry current situation, in support of the development of characterization of packaging system. The results of this research offer a method based on empirical data to address the complex objectives and the link associated with the selection problem of packaging systems of the food industry in Chile.

Keywords: packaging systems, AHP, food industry.

1. Introduction

Nowadays, there is a great concern worldwide related to the food industry, every day the population grows. In Chile, today the population is about seven millions inhabitants, and the expectations are that by 2050 the population will reach more than twenty millions. With this growth projected the need for food grows in the same way, clearly marking a steady increase in demand for food products. It is of interest to investigate the technical requirements associated with carrying food products from processing to the final consumer. It is how each country regulates this condition, where a properly packaged product is required in order to keep intact the product from development to final consumption and comply with current regulations. From the perspective of marketing, the package must be attractive in every way for this technology appropriate for each proposal package is required. Since there are different factors that influence the selection process, from an economic perspective, legal, commercial, etc. Criteria arise in conflict with each other. This study addressed through a multi-criteria approach to achieve this consensus among complex objectives. The overall objective is to develop a model to work for those involved in the implementation process of packaging systems in the food industry to define and assess an appropriate system to assist in the marketing of food products. The

result of this work allows us to deliver robust tools to industry professionals to implement food packaging systems.

2. Research Design/Methodology

The purpose of this paper is to provide a methodological tool to work for those involved in the implementation process of packaging systems in the food industry to define and assess an appropriate system to assist in the marketing of food products. Through AHP, a model to distinguish between different alternatives of packaging systems for food products is designed. The model incorporates quantifiable aspects and those intangibles to be evaluated. Figure 1 depicts an initial structure considering six main criteria and sub criteria. These criteria are obtained from experts in the food industry. The bottom level includes the feasible alternatives.
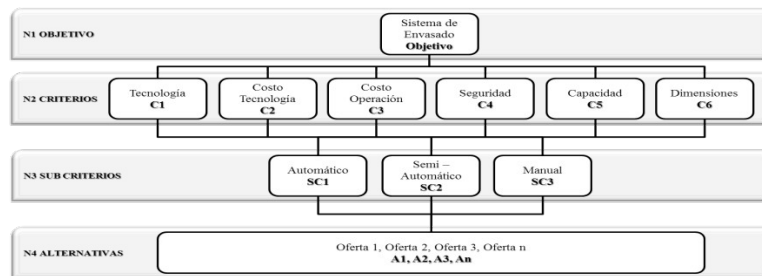

Figure 1.Proposed hierarchy structure

3. Data/Model Analysis

In order to test the proposed method, the model is applied to a real case study . A food Company requires solving a problem of selecting a packaging system for dips. Juan Bas Alimentos S.A. is a holding company belonging to the ICB, is one of its production plants and is dedicated to the production of specific food products in sauces, dressings and pickles, is located in Quilicura in Santiago de Chile. Criteria to evaluate are six and five participants at this stage, and then the matrix of pairwise comparisons is:

	C1	C2	C3	C4	C5	C6
C1	1	1 1/3	1/3	1 1/3	2 1/6	3 2/7
C2	3/4	1	1/5	3/4	1 3/8	1 3/7
C3	3/4	5/6	1	1 1/3	3 3/4	4
C4	3/4	1 1/3	3/4	1	4 2/3	6
C5	1/2	5/7	1/4	2/9	1	5 4/5
C6			1/4	1/6	1/6	1
	4,01	5,92	4,77	4,82	13,11	21,53

Where

C_1 refers to technology, obtained a 22%

C_2 refers to technology cost, obtained a 16 %

C_3 operational cost, was assigned a 21 %

C_4 security, 23 %

C_5 Capacity, obtained a 11% and

C_6 Dimensions achieved only a 6% priority

With these results, it was possible to evaluate the different packing systems available as shown at the following matrixes:

	SC1-C1 Automático-Tecnología (0,2081)	SC2-C2 / Semiautomático-Costo Tecnología (0,1494	SC1-C3 / Automático-Costo Operación (0,2432)	SC1-C4 / Automático-Seguridad (0,2244)	SC1-C5 / Automático-Capacidad (0,1081)	SC3-C6 / Automático-Dimensiones (0,0669)
Alternativa 1 – A1 Rovema	0,4849	0,0579	0,6497	0,6384	0,6757	0,0722
Alternativa 2 – A2 Tecmar	0,3486	0,0666	0,2345	0,2442	0,1955	0,0722
Alternativa 3 – A3 Altair	0,1156	0,5694	0,0696	0,0700	0,0828	0,4635
Alternativa 4 – A4 Propia JBA	0,0509	0,3060	0,0462	0,0475	0,0461	0,3921

	SC1-C1 Automático-Tecnología (0,2081)	SC2-C2 / Semiautomático-Costo Tecnología (0,1494	SC1-C3 / Automático-Costo Operación (0,2432)	SC1-C4 / Automático-Seguridad (0,2244)	SC1-C5 / Automático-Capacidad (0,1081)	SC3-C6 / Automático-Dimensiones (0,0669)	Σ Prioridades Globales
Alternativa 1 – A1 Rovema	0,1009	0,0121	0,1352	0,1328	0,1406	0,0150	**0,5366**
Alternativa 2 – A2 Tecmar	0,0725	0,0139	0,0488	0,0508	0,0407	0,0150	0,2417
Alternativa 3 – A3 Altair	0,0241	0,1185	0,0145	0,0146	0,0172	0,0965	0,2853
Alternativa 4 – A4 Propia JBA	0,0106	0,0637	0,0096	0,0099	0,0096	0,0816	0,1850

4. Results and Conclusions

The application and analysis through AHP resulted constructive since permitted to take into consideration new factors and their impact related to choosing a provider and a specific type of technology system.

The results of this study may be considered in packaging food companies since it is possible to recognize the focuses for future investment at the production plants.

The proposed methodology and subsequent testing in a real case in Juan Bas Alimentos S.A., may be a reference or guide for evaluators who are in the food industry and presents a methodological compendium which no history recorded in Chile.

5. Key References

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