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Establishment Of The Target Cost In The Development Of New Products

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ABSTRACT

The management of the costs in all of the elements of the productive cycle from the project, going by the production until the after-sale activities, became an important differentiation tool in the competition among the companies. Specifically, the estimate of the cost of the new product in the beginning of the development of new products (DNP) is of vital importance so that the decision taken of continuation or not of the DNP, because the decisions taken in the phase of conceptual project are responsible for most of the costs of the new product. The objective of this article is to present a methodology of establishment of the Target Cost in the development of new products. It will be presented and discussed the analysis of a case in a company producer of biodegradable plastic as ecological and economical alternative of substitution of the derived plastic of the petroleum.

Keywords - Biodegradable plastic, development of new product, reduction of cost, target cost.

I. INTRODUCTION

The development of a new product presents characteristics of nature multidisciplinary and interdisciplinary. In that way it should happen an integrated effort of several sections of the companies involved in these activities for this process to be effective. The tasks that it composes this procedure can be executed in several interaction manners through the characteristics of the changes of information among the development phases.

With the increase of the competition among the companies provoked by the phenomenon of the Globalization, the dispute for improvements in the acting in productivity, quality, speed, flexibility and innovation in the Development of New Products (DNP) it is essential for companies that look for growth and the market establishment. To focus in which customer or product is more lucrative in relation to the fundamental elements of time, cost and quality is of great importance for improvements in the process of DNP [1].

The acting in that area depends on the capacity of the companies manage the development process and of improvement of the products and of they interact with the market and with the sources of technological innovation.

The effective release of new products and the improvement of the quality of the existent products are two subjects of great relevance for the competitive capacity of the companies. Both activities compose what usually calls of DNP. In the countries in "development", the Development of Product largely concentrates on the adaptations and improvements of existent products, in other words, the technological activity tends to be almost exclusively increase instead of the radical type. The conditions economical, technological and social of those countries, in most of the cases, inhibit the radical innovations and they turn the changes increase of fundamental importance for the competitiveness of several industrial segments. The new products tend to be developed at the central countries (where they are usually located the development centers) and they are spread us other countries through international transfer of technology. It is observed that the improvement incremental of the existent products is as important as the technological ruptures and the release of new products [2].

The involvement of suppliers and buyers in the release of new products are of vital importance and it should be taken into account so that the new product can obtain success in a competitive market [3]. Like this, the integration of tools of costs with project tools can come to constitute an only platform of a system of estimate of costs of products during the process of development of products. Of this integration, the companies can develop a differentiated product, with appropriate costs, capable to reach high quality patterns [4].

An economical analysis during the different stages of the life cycle of the product should be accompanied of an analysis of the competitiveness

and of the quality. This economical analysis consists of the evaluation of research and development costs (P&D), it manufactures, assembly, packing, distribution, sales, operation, maintenance, retreat and market discard.

In the process of development of new products the phase of the definition of the conceptual project detach as the most important among the other phases of project informal, preliminary and detailed. It recognizes that up to 80% of relative total costs to the product life cycle is in the phase of conceptual project [5]. As consequence, activities "upstream" of product development offer potential larger to influence the main strategic decisions than activities "downstream" of production and sales. These decisions happen of the most appropriate selection for a functional and alternative structure of product design in relation to a certain target cost. The Target Cost - of the product is the value of cost of the life cycle, given by the sum of the project costs, production, operation, maintenance, retreat and discard. The analysis of the cost of the product requests estimate. The process of estimate of costs possesses two different stages: preparation of the information and estimate of costs. The preparation of the information of costs, in the conceptual project, happens when they are lifted up the needs of the customers and established the requirements and the design specifications. Like this, the estimate of costs of the product should happen when of the selection of the functional structure and of the conception alternative.

Being the cost an important parameter in the taken of decision of the process, then the knowledge of the cost of the conceptual project produces a great effect in the definition of the pursuit or not of the project. For a process of satisfactory development, a development team should be had knowledge of as will be the product in terms of costs, as well as she should know about the technical aspects in the beginning of the process. Because, in case doesn't know the development costs can produce something unviable of commercialization. Like this, this article will describe the methodology of establishment of Target Cost in the development of new products [6]; soon afterwards it will present a case study in a company producing of biodegradable plastic as ecological and economical alternative as substitution of the derived plastic of the petroleum [7].

II. METHODOLOGY AND MATERIALS

For the accomplishment of this article information were used contained in the monograph of Brondi that now works in the company [8]. This author accomplished the case study in monograph of course conclusion in Administration, being fundamental for the present article as data source, information and explanation of doubts.

In sites of several companies they were collected data that it allowed us the description of important information world market of biodegradable plastic. The main areas of use of the plastic, to world production, the main producers and the per capita consumption of materials plastics are some of the information collected in sites, as for instance, of the company BASF (www.basf.com).

With the intention of maintaining the company producing of biodegradable plastic in the anonymity, the name of the company won't be mentioned. For the same reason, they won't be described information of the company to allow recognition in an indirect way.

III. LITERATURE REVIEW

Target Cost appeared in Japan (1970) and later in the United States, Germany and other countries. Initially, it was adopted as standard practice in industries assemblers and later it was applied in the process industries and of production of software for computers. The measure that the consumers constantly looked for new and "better" the life cycles of the developed products became shorter, increasing the importance of the administration of costs in the pre-production apprenticeships and of drawing [8].

Like this, Target Cost was it used for the reduction of the total costs, but maintaining the high quality of the products. The effectiveness of the Target Cost as tool of cost control. Another objective is use in the formulation of the strategic plans of profit integrating the information of the production engineering with the marketing areas [9,10].

The automobile Japanese company Nissan, establishes the prices of their products taking into account the expectations of the conditions of the market when throwing the new product, in other words, it determines the white selling price of a new model considering several internal and external factors [11]. The internal factors include the position of the model in the product head office and objectives of profitability of administration for that model. The external factors include the image of the corporation and level of loyalty of the customer in the niche of the model, the quality level and functionality, market share expectation and the expected prices of competitive models.

The stages for the determination of the Target Cost of a product are described in the following way [6]:

Stage 1) Planning of the life cycle for a new specific product - it consists of the definition of the development plans of the product, of production in total scale and of model change. Also, it involves the estimate of related costs the project team, in the

prototype development, to the production setup, to equipments and the raw material, among others. When concluded this activity, a profit plan should be developed based on the model of life of the product.

Stage 2) Planning of profit of medium and long periods and general plan of new products. It involves the determination of plans of profit of medium and/or long period, besides plans of financing for the whole company. At this time, should be determined the objectives of based profits in the life models for each production line, as well as in the perspective of the profit plannings and of financing. They should also be defined the plans of sales, of initial investments, of personnel, of obtaining of fund, among others.

Stage 3) Merchandising. It involves the accomplishment of market researches and evaluation of the results, under the focuses of the: a) understanding of the user's needs; b) analysis of the tendency between market competitors and c) identification of subjects related with the based quality in the feedback of the market. These information aid in the determination of goals for the next product models.

Stage 4) Concept of the product and development proposal. Considering the result of the previous analyses, the management of the company looks for to define the concept of the product. They are certain information on the purposes of the product, the market potential, the image of style, the main functions, among others.

Stage 5) Determination of the selling price. It includes the determination of the white selling price of the product. The team of planning of the product, should study the prices of real sales of similar products, of competitors in the market, as well as, the functions of this product.

Stage 6) Establishment of the Target Cost for the product. It corresponds at the cost that the new product should reach so that the company can reach the Target Profit, established for the period of life of the product. The Target Cost of the product can be certain in the following way: Price of Target Sales - Target Profit = Target Cost.

3.1 Biodegradable Plastic

Biodegradable plastic is considered that, during the use, it presents the same functions of the normal plastic products, however degraded, after the use, in carbon dioxide and water, through apparels or for contact with microorganisms in embankments. The great characteristic consists of the" no accumulation" in the nature [12].

The biodegradable plastic is composed basically by carbon, oxygen and hydrogen and he is called polibidroxibutirato (PHB) and of him it can derive a copolymer polihidroxibutirato-valerato (PHB-HV) being the two belonging to the family of the polihidroxialcanoatos. The two are described as polyesters of natural origin, similar in application terms and physiochemical properties, to the polyethylene and the polipropileno. The properties in this healthy plastic: production with raw material renewable, as the cane of sugar; it completes biodegradable (no pollutant) and his capacity to produce by processes that use clean technology. This plastic is a product biocompatível and ecologically correct. His production is made through the fermentation of the cane sugar that initially is inverted by an enzymatic process becoming a syrup and for the microorganisms of the species Alcaligenes eutrophus s.p. The pulp of the cane of sugar is used for the electric energy production and of necessary steam for the process. In the extraction phase, a superior alcohol is used as solvent of the biopolymer. The residues basically treated water and organic matter of the bacterium that it is thrown in the farming of cane of sugar by as organic fertilizer.

His biodegradable feels through the exhibition to a middle active bacteriological. In a period between six and eighteen months the material if decompositision entirely, depending on the dimensions of the material and of the bacteriological conditions. The biodegradable plastic becomes water and carbon gas that for his time it is rescued by the cane of sugar, for his vegetative growth, closing like this the life cycle.

3.1 Market of biodegradable plastic

The Market of biodegradable plastic now is of difficult mensuration, mainly for treating of a new segment inside of the market of plastics, the only found data sources were academics' that it is accomplishing studies on this market researches. However these studies reveal only the size of the market for the optics of the producer.

Leaving of the presupposition of the production of biodegradable plastic is gotten to measure a market of approximately 150 thousand tons a year, what represents only 0,08% of the world production of plastic.

The market segmentation especially feels for the process of to project or to characterize a product or service that it will exercise an attraction strong for some special point of the market [13]. The biodegradable plastic is a new material that can come to solve the problems of treatment of residues and of the global environment carted by the plastic no biodegradable, being like this a product that is positioned as an alternative ecologically correct to the derived plastic of petroleum.

In this segmentation we should observe with special attention the market of Germany, one of the great world potencies that presents a very strong plastic industry with countless companies and research institutes if dedicating to the

development of biodegradable plastics, besides, we have the political and social factors that they influence at this market, such as, the law that foresees the compulsory nature of use of biodegradable plastics of here some decades and the great understanding of the population for the preservation of the environment. It is a market especially attraction due to the factors mentioned mainly by his size, since Germany consumes about 11 million tons of plastic a year, importing 6 million tons approximately year.

The World Market of Plastic is presenting a great growth in the last decades, being shown as one of the great forces of the modern industry mainly due to the great technological development that today allows to the use of the plastic in practically all industrial fields. Plastics are used in almost all sections of the economy due to the cost-acting advantages on top of other competitive materials as the steel, iron etc.

The Market of packings comes as the largest market of plastics, following for construction, later the industry of pieces of furniture, motors, electric. Plastics used in electronic devices and automobiles are markets substantially smaller, however of great importance. Other markets include toys and medical products and every product type home.

IV. ANALYSIS OF THE CONTESTANTS

In the analysis of the contestants two factors were considered:

- Only the companies producing of plastics degraded / biodegradable and no the producers in general of plastic, exactly for we consider that these markets are still different, with different consumers that they look for a characteristic of the product that is not found in the usual plastics didn't degrade.
- Among the countless ones possible producing of plastics degraded / biodegradable in the world, they were considered only those that it is producing with certainty and developing their plastics, those that possess presence now in the market, in other words, companies that are selling and/or testing their products. This because, companies that possess patents of development of plastics with these characteristics, companies that are striped in countless studies exist, however they don't present market development, in which it is known that the product is not being marketed nor developed.

Being like this, they were considered as main competitive, active direct in the market of plastics biodegradable six companies, that developing products with the characteristics similar to the biodegradable plastic, some with products degraded (original of raw material didn't renew), however that reach the same market segment and other with products also biodegradable.

V. RESULTS

The biodegradable plastic possesses a market positioning with the following aspects:

- High price: The price of the biodegradable plastic as well as of the other biodegradable plastics he is in larger level than the one of the conventional polymers, owed mainly the economy of scale lack and of the high investments with to the innovation.
- Change of Market: The market of polymers in general is suffering countless changes, coming of the fast advanced technologies. In spite of the advanced technology, the biodegradable plastic possesses a less turbulent market, with slower changes owed mainly to the high investment requested for entrance in this market niche.

The target people for the biodegradable plastic are politically the industries that they present market vision, understanding the viability of a plastic correct, that use "Green Market" as strategy, in other words, that they bet in the final consumers' understanding. Being like this the main market will be Europe, USA, Japan and areas where the population presents higher sociocultural levels of the remaining of the planet, demanding preservation solutions to the environment as in the case of the biodegradable plastic. These markets act about 45% of the world production of plastic, besides they be the largest per capita consumers with 105 kg/capita – North American, 92 kg/capita - Europe and 86 kg/capita-Japan [7].

The price of the biodegradable plastic it will be made superior to the of the conventional plastics, with that the company will establish his price with an Estrategy Premium, in other words, a high price harnessed to a high product quality (this high quality feels besides his intrinsic characteristic, the biodegradable, but also for his great applicability).

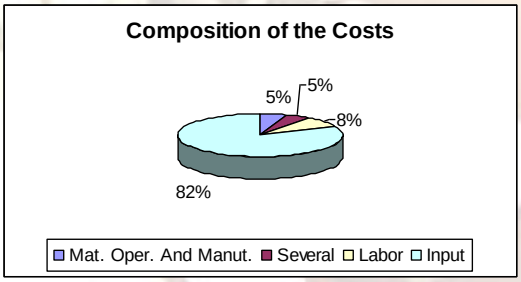
However, we have that this high price is due exclusively for the economy of scale lack and for the countless investments regarding the development of the product tends to look for the establishment of the price of the biodegradable plastic through a" Strategy of High Value" (high quality versus average price) conquering starting from this moment whole wanted market, since this accepts to pay the more for a final product since the product doesn't harm the environment.

As well as the other objectives, so much in communication, product and force of sales the objective of the price will be to reach the wanted level of participation in the market (8%) within two years with that the goal of the Plan of Price will be the Maximization of the Use of the Market - entering in the market with a maximum price that the consumers will be willing to pay for the acquired benefit of the biodegradable plastic, and later (through the learning curve and economy of

scale) the company will tend to reduce the price immediately to conquer the consumer inferior.

The Market of biodegradable plastics, as a whole, is in the beginning of his cycle, with that becomes impossible to the mensuration of demand curves through market researches or even statistical analysis of data. The demand is foreseen through an analysis of the consumers' needs that they come in several niches of markets returned for the environmental subjects and "intend" practical solutions for such problems.

As the composition of costs and expenses have that the great majority of the costs feels for the variable portion. In a superficial analysis of the composition of the costs we could conclude that becomes very small the earnings with the economy of scale. However we have that in the reality the production in industrial scale of the biodegradable plastic (according to forecast - 10.000 ton/ano) it will bring earnings in the negotiations with the suppliers (larger volume x better price), it will bring earnings the commercialization expenses and earnings with the experience of accumulated production. It can be observed in the Graphic 1 that most absolute of the costs they refer to the inputs involved in the production process (82%), being exactly this the great competitive advantage. The operating expenses with sales, being included the taxes regarding the exports, they represent a decrease of about seven percentage in the liquid income.



Graphic 1: Composition of the Production costs of the Biodegradable Plastic

Being like this now the prices practiced by the companies in the few marketed amounts, they are in the same strip. The biodegradable plastic presents a selling price, that can vary for his line of products of US$ 4,00 the US$ 6,00 for kilo. For example: Ecoflex (Basf) it presents a price of commercialization of US$ 4,00/quilo and PCL produced by Solvay a price of commercialization of US$ 6,00/quilo. We can notice a balance of practiced price, exactly for the development apprenticeship that such market is. With the development of the products and economy earnings in the production, the prices of all biodegradable polymers will tend to decrease significantly, therefore the company should be attentive to the distribution costs, because these unfortunately will represent the key subject in the competitiveness of the company with respect to price.

With the insert in the market of the product, and a larger certainty of the demand for period the company can be opting for the price through Target Cost method that increases the data on levels of sales, showing the price that assures the return tax wanted on the accomplished investment. The company should frequently accompany the levels of prices practiced by the contestants, through market research or for the simple acquisition of the competitive products.

As for the Market of polymeric Biodegradable, the calls EDP's (Environmentally Degradable Polymers), we have that this presents the characteristic of being quite heterogeneous due to the several applications that each biodegradable polymer now in study it possesses. With that a larger strip exists for variations of prices and for possible answers to the competitors' changes.

VI. CONCLUSION

In the context of the Brazilian, several industrial reality they are the justifications to rethink in the logics of costs adopted by the companies. Among them, it can stand out: the increase of the competition in the country due to globalization that implicates in the need of the national companies promote improvement continues in their products and processes; the decrease of the life cycle of the products, turning the development of new products as competition factor and permanence in the competitive market.

Of that it sorts out the use of the Target Cost has as main focus the improvement continues in the organizations, seeking to support the process of reduction of costs in the phase of DNP, while other management systems total of costs seek to support the process of reduction of costs inside of the context of the current productive system and of the current manufactured products.

In a simplified way the logic of the Target Cost, as it can be observed, it follows two stages. The first is the process of planning of a product so that he satisfies the consumer's desires, taking into account the definition of the profit puts and of selling price it puts of the new product. The second stage is the process of obtaining of the Target Cost for the intensive use of the engineering of value and of other techniques of production engineering returned to the continuous improvements seeking to the approach of the actual costs with the costs goals established.

The bio-polymers market is in the middle of the expansion, due to the countless attributes regarding the service of the needs and the consumers' desires, through the ecological conscience and environmental protection. The

concept in the biodegradable plastic product, by itself, carries this ecological conscience.

However these values and attributes, they should be worked so that the result of the exhibition of this mark in the world market swallows the expected results.

Like this, the purpose of the present article will demonstrate the steps of implantation of the Target Cost for continuous improvements in DNP as administration of companies and to present a case study in DNP (Biodegradable plastic) through the analysis of the market of biodegradable plastic, of the contestants and of the establishment of prices and costs.

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