MANAGEMENT MARKETING VALUE ENGINEERING AND FIRM PERFORMANCE

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Abstract

Value engineering is to design new products or services at a higher level of performance on the market from the start of the project, from the amount of customer value. Product/service is analyzed in terms of features/characteristics, which corresponds to a cost, the sum of all cost functions/features as the total production cost, which should be minimal and the economic effect of performance and strive for customer perceived maximum. In doing so, companies can prosper by increasing the volume of profit.

Key words: value function/feature main, critical cost, performance, profit

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MATERIAL AND METHOD

To conduct research and desk research we used exploratory research was aimed at identifying the state of knowledge, different approaches to defining the concept of value engineering.

RESULTS AND DISCUSSIONS

Value engineering is mainly aimed at improving the performance of a product / service, building customer value creation, passing through the filter performance / cost, performance (P) is defined by the ratio:

$$P = \frac{S}{C} \longrightarrow >1; \quad (1)$$

where: S - Obtain end product / service to a unit, C - total consumption of resources to get the appropriate effect.

The trend is that the effect obtained is greater than C, supraunitar ie, what the literature calls "the emergence of the human brain. "

Value analysis has been associated to early 1930 with analysis monocriterială by the german engineer F. Posch and consider necessary relationship between the amount of functions / features of a product / service / process and costs required to achieve them. The method developed in the period of the Second World War, when demand for products / services together with increased prices of purchasing, when many companies were seeking replacement solutions but with the same performance, but cheaper. They proposed the drafting of new solutions cloud constructive alternative products / services at a lower cost for the same product, based on analysis of each input into the components of the product / service end.

UK value analysis introduced in 1952, after S. U.A, Japan in 1966 and is in Romania value method was applied in 1979. Value analysis method is a creative, research and systematic design. The method presented in the literature under three names with the same methodology:

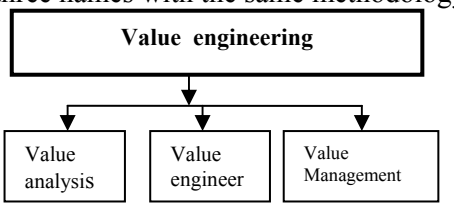

Figure 1**Aspects of value engineering**

Value analysis is applied to existing products to improve performance and apply value engineering to design new products / services. Value management includes all activities using the

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relationship between management for minimum value utility customer minimum cost profit.

Value analysis seeks performance for each function / feature and utility consumption using resources to achieve their human performance (P):

$$P \Rightarrow \max \frac{V_a}{Cr} \quad (2)$$

where: P, human performance, V_a - effect obtained (use value), C_r - consumption of resources to achieve the purpose (total costs).

From equation (2) results and the three options to maximize performance:

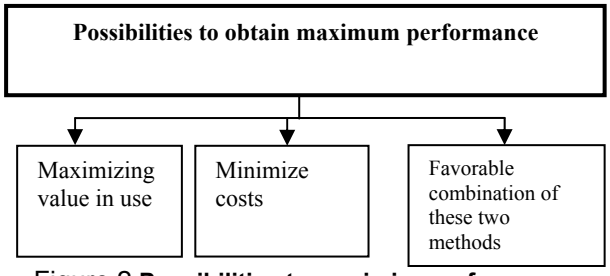
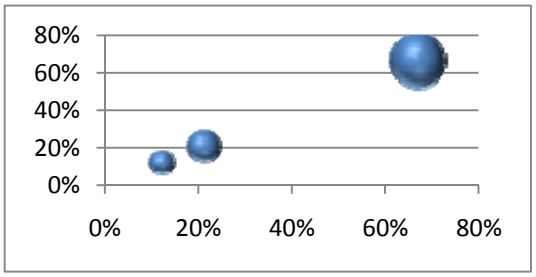


Figure 2 **Possibilities to maximize performance**

The study conducted on a sample of 150 food companies in Moldova, which apply value engineering, the result:



- 67% minimize use millet;
- 21% using maximization of the value in use;
- 12% using combined methods of the first two methods.

Then I use the term value engineering for both above. The purpose of this study was developed a new product, which has as objective: the elimination of functions / features that are not needed and their costs (such as using a higher mark, when the limit does not require the element projected Track the brand) and cost reduction increase performance, creating a partnership between producer and customer to customer satisfaction to the maximum limit of keeping the company's profitability, reduce costs, risk management and the marketing. Use value of a new product is a function of several parameters, as follows: $V_{î} = f(V_t;V_e;V_s;V_m;V_r;V_a)$ (3), where: V_t - technical value afforded by the technical performance of the product; V_e - apparent aesthetic value of the combined effects of psycho exerted on customers, on the combination of volume, shape, size, colors, etc.., V_s - exchange value, the option afforded by customers to change an old product with a new one and the price the customer is willing or persuaded to pay for this change, V_m - the moral value of the new product is the impact that this product will have on clients' moral values, V_r-determined value and the rarity of an invention, luxury goods, items intended for collections, etc., V_a - emotional value determined by the product's ability to create emotional value (feelings) to customers.

In the literature there are several definitions for functions, each author the argument - and its own definition, but most believe it is realistic that which defines the function as a response to the needs and satisfying customer expectations.

As shown in equation (3), each object is a plurality of functions (C_f), each function has a value of V_{ij} use and the amount of use values of all functions is the size of the new product value in use, after the relationship:

$$V_{î} = \sum_{J=1}^{m} V_{ij} \quad (4)$$

At the same time each function C_f has a cost C_j and size give us the sum of the costs depending on the cost of achieving the object studied Os, where the relationship:

$$O_s = \sum_{J=1}^{m} C_j \quad (5)$$

This function corresponds to a part of the new product / service studied trait that determines the amount of usage. Applying value engineering is an essential component for performance, because it encompasses a whole: producer + clients + management + marketing → market → profit social value → firm. It eliminates the uncertainties, risks diminish, reduce marketing expenses.

The study showed a poor knowledge of value engineering the product and company managers. Managers often resort to the services of external specialists to solve specific problems, however large and succesful companies on the market, the method is normally applied. As important, the functions of a product is classified as (*fig. 3*):

Main functions - correspond to the main purpose for which the product was created and contribute directly to give value in use, *feature-filled secondary* principal function contributed indirectly to the use value of the product, *necessary functions*, contributes to the use of the product value, *unnecessary functions* - do not

contribute in any way to use value of the product, resulting from mistakes in product design, product specific functions individually to other existing products that are created through innovation characteristic.

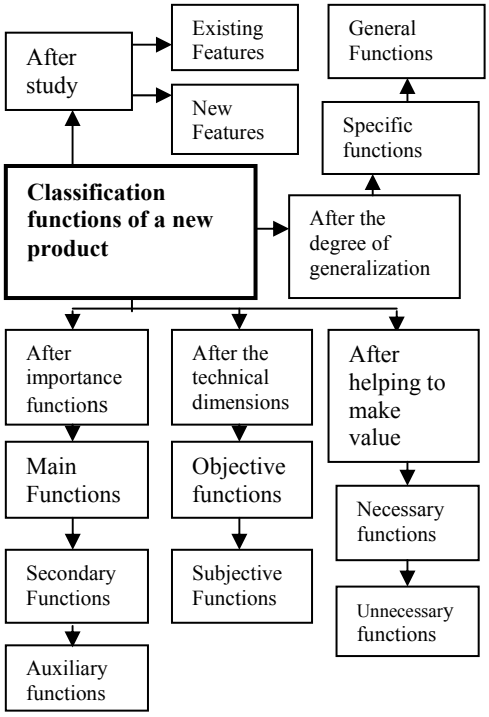


Figure 3 **Classification of the functions of a product/service**

All natural products have technical dimensions towards which requires Products costs, costs in terms of clients must take minimum values.

Choosing the size of a product must be correlated with the amount of usage, so that they can increase or decrease in direct proportion, according to the following figures, where: Z_i - the unnecessary physical size, Z_s-saturation zone that corresponds to sizes too large, V_i-use value (utility) of the product, V_i-min minimum utility value, V_i max - the maximum utility value, D_t min - minimum size below which cannot be solved; D_t - optimal size of the product;

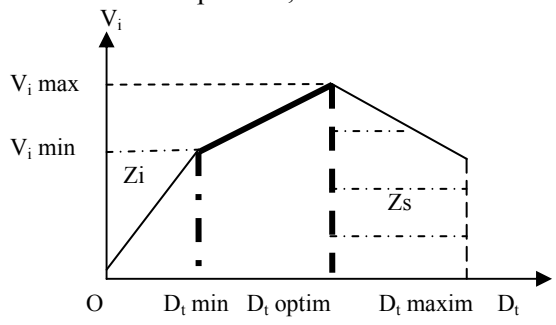


Figure 4 **The relationship between the technical dimensions product and its value in use**

If:

$Dt \leq 1.Dt$ optimal product usability and customer tends to a minimum product does not support;

D_t min $\leq$ Dt $\leq D_t$ optimal, we have a good space in which the product can fit the utility to meet customer expectations;

$Dt \geq 3.Dt$ optimal maximum size for the product chosen lead to unnecessary oversizing and high costs that customers are not willing to accept them, no gain more utility than the optimal.

The main objective should be closely followed by managers to invest in the product at minimal cost to obtain maximum performance. This constraint leads to an almost exclusive economic choice when we want to market a product / service, establishing the exact cost of each function / feature / attribute and its share in total product cost by eliminating unnecessary positions and expenses properly substantiated.

Determining the level of importance and the weight functions of a product / service, use value, using value engineering

Levels of importance of the functions, characteristics of a product requires precise determination of its components and performance levels for which it was designed, because each function/feature/attribute distinguishing participate in product improvement and therefore they must be ranked in relation to use value of the product / service studied. To resolve this problem, needs to know the following: *optimal composition of the product, the conditions under which it may be helpful customer expectations it solves in terms of customers, prioritizing product features based on customer feedback, because not all have the same importance for the client to compare "x "functions of the product with the customer's point of view, ultimately resulting in a product whose attribute corresponding maximum cost to a minimum and maximum value for the clients.*

The importance of characteristics / attributes of a new product is made using the procedure of comparison two by two main functions and requirements of the new product, using a square matrix type. Proceed as follows:

1. Denote by F_j the main attributes of the product that you enroll in the first column of the matrix squares;

2. Denote by F_k the same main attributes but they score the first column of the matrix;

3. The matrix compares attribute F_k to attribute F_j;

4. If F_j is the attribute greater importance F_k only attribute, that $F_j > F_k$ (6), kj's box in the matrix is compared with a figure, that is

paramount, that akj = 1 (7), and symmetrical about the main diagonal of the matrix, the signifiance will be very small box and therefore make zero, ajk = 0 (8). If the resulting two attributes the same importance, we continue the investigation to differentiate them;

5. Main diagonal square matrix is completed with a figure, ajk=1 (9);

6. Determine level of importance of attribute nj Fj using the relation:

$$Nj = \sum_{K=1}^{N} akj \qquad (10)$$

7. We calculate the share of the value attribute F_j new product, denoted by q_j

$$q_j = \frac{nj}{\sum_{j=1}^{N} n_j} \qquad (11)$$

where nj is clear from formula (10).

The level of significance of an attribute of the product can range from a turnover and N, where N is the total number of new product attributes. Where a number of clients that would complement a sample table hierarchy of attributes, the level of significance of attributes will be the arithmetic mean of the level of importance arising from the sample used, where the relationship:

$$q_j = \frac{\sum_{v=1}^{v} n_{jx}}{V} = \frac{\sum\sum_{v\ k} a_{kjv}}{V} \qquad (12)$$

A study of 150 food companies from Moldova to the concerned attributes importance of agri-food clients vision and experts, revealed:

Table 1

The importance of product attributes in food buyers and experts in the field of vision

Product Attributes food	Attribute importance to clients	Experts attribute importance	Attribute hierarchy in terms of customer	Rank attributes in terms of experts
Nutritional value	21	16	2	3
Taste	10	25	5	25
Smell	22	49	3	1
Price	35	4	1	4
Services	12	6	4	6

The table shows that the attribute is important for the consumer price is less interested in other attributes. The reason is given for the sins committed because he has little knowledge about the composition of the product and is not informed advance food product attributes. Unlike the clients, experts who have sufficient knowledge about product attributes, provides a level of maximum importance attribute smell that satisfies customer requirements. For specialists the other attributes we look more on the manufacturer of this product.

Systemic analysis of attributes

Systemic analysis of the attribute goal is to identify critical attributes of the product, whose costs are much higher than their use value, unsupported costs to customers.

Identification of these attributes is critical in comparing the share of the utility value of the product qj with pj share in the cost of production, the ideal is achieved when: pj = aqj (13), where the coefficient a=1, so pj=qj (14).

The function of an ideal product can be placed on a graphic form:

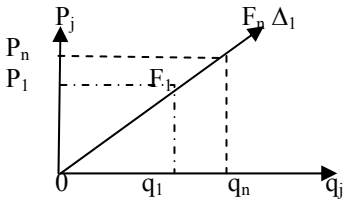


Figure 5 **Systemic analysis of a new product but ideal**

From the graph it is noted that all the attributes of an ideal new product is right Δ1. For a real product, in which a ≠1, product attributes can be shifted as a straight regression (Δ2) and in its neighborhood because the angle α ≠ 450.

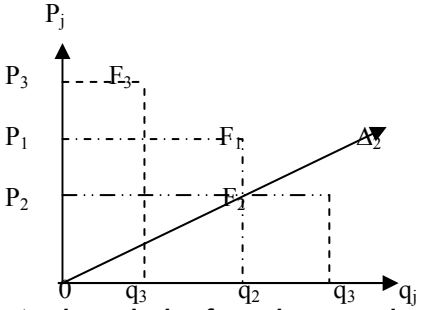


Figure 6 **Systemic analysis of a real new product**

We can determine the differences that exist between attributes and their contribution to the costs of use value for clients. Thus we write the equation right Δ2:

$$P_j = b \times q_j \qquad (15)$$

where b is the angular coefficient.

Right Δ2 should be as close as possible to real points, a condition expressed by the formula:

$$S = \sum_{j=1}^{N} (qj - b \times qj)^2 \Longrightarrow \text{minim} \quad (16)$$

from the differential equation

$$\frac{\partial s}{\partial b} = 0 \qquad (17)$$

follows:

$$b = \frac{\sum_{j=1}^{N} p_j \times q_j}{\sum_{j=1}^{N} q_j^{\,2}} \qquad (18)$$

and right angle Δ2 with abscissa: $\alpha = \text{arctgb}$ (19)

where:

S = degree of scattering of points F_j in the plane p_j 0 q_j, respectively entropy of the system. Follows: the lower S values as the points Fj is closer to the right product is considered well designed Δ2.Un when $S \leq 0.01$. Analyzing the chart shows that the F3 and F1 are critical attributes with small weights at a very high value of the object. The product should be redesigned to achieve a maximum level achieved with minimal consumption of resources by the relationship:

$$IV \Longrightarrow \text{maxim} \quad \frac{Vi}{Cp} \quad (20)$$

where: IV - value engineering; V_i - newly created value for customers, P_c - cost of production of new product design.

Maximizing the ratio of formula (20) can be achieved by: increasing the use-value (V_i) for clients, keeping costs of production (C_P) notes, keeping the use value (V_i), but decreasing costs of production (C_p) can increase or decrease the use value (V_i) of the new product but with a corresponding variation in production costs (C_p), leading to maximization of the ratio formula (20).

Minimizing the cost has become a key issue in business agro-food current due to objective causes, such as: customers prefer products / services at the lowest possible prices, product life cycles tend to be reduced continuously, companies can use in this case two alternatives: innovation and performance, by raising trading costs through additions, decisions on price, are not well founded, the competition forced marketing, where the company needs to build methods to create, communicate and co-opt value, in order to survive, successful firms must develop its own strategy of establishing strong prices to meet the growing demands of customers and cope with competition, pricing strategy is not quick nor easy, intelligent and innovative solutions to changing needs, culture must be customer-oriented pricing and sales, to attract profitable growth, on the Moldovan market, most companies do not take into vision to the price increase.

The complexity of economic phenomena in the contemporary world, requires the study to take into account a multitude of factors influence the cost, which require new evaluation techniques, such as for example, identifying customer expectations for a given level of cost a product / service appeared on the market, taking into account employment status, monthly income / year, age, culture, etc.

CONCLUSIONS

Value engineering aims at designing new products/services with high performance based on customer value creation. It determines the exact functions / main and secondary features for each product / service, assigns a cost of production so the price is less than clients-perceived economic effect, but not less than the price of the company's profitability.

The method applies to any product / service or complex, applying the chosen variant selection of performance - cost - benefits, allowing companies to develop positive way to build business and make a large profit to propel them among top companies. Many companies from Romania is applying value method and results are satisfactory. But the methodological approach of multivariate analysis of variables is extremely complex and requires knowledge and use of mathematical models and methods available to only a small group of specialists. But without this analysis of "problem" falls into the derisory.

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