

ONE APPROACH TO SELECTION OF THE EFFECTIVE PRODUCT IN THE DOMAIN OF INTERNAL TRANSPORT

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Abstract: *In this paper, an estimate method with technical and economical aspects of products is considered. This complex management method is based on the intuitive concept, in the first phase, and algorithmic model in other phases. The best project solution is selected according to results of the optimization and analyzes of variance of the feasible product definitions. According to the presented method is possible to perform best solutions therefore of other products for different purposes and operational conditions. This method contains universal methodology for optimal products choices.*

Keywords: *management, internal transport, effective product, development, estimate of variance, rank of ideas*

1. INTRODUCTION

Increasingly stringent demands of the market and the general need for high-performance products, obviously and according to rule require the identification of suitable models for the selection of optimal variants of products that, with reasonable risk, can go into the development, production and marketing and thereby not making positive effects of low intensity or losses. It is now usual in all areas of marketing products and services. In the future, we should expect complex and stricter market demands.

The problem of internal transport and storage of materials and goods is randomly selected, only as an example for analysis using the model specified here (not the most important for companies and society but must not be underestimated, especially because of the significant impact on total costs generated during the preparation, production and selling of goods).

Otherwise, problems and solutions of internal transport and storage of materials in recent years are expressed fully. Specific needs have grown, so all the more serious demands in terms of logistical support to production and cost reduction requirements based on inventory, shorten development time and improve product quality are obvious.

It is obvious that the by the means of lifting primarily technical, ergonomic and functional levels of resources and the level of overall quality of internal transport and storage (storage and keeping) of goods and materials, these requirements can be significantly more satisfied, achieving more ambitious dynamics of and marketing, as well as lower costs of producing market-oriented products. It is clearly necessary to develop suitable and (more rational and more reliable) resources within the system of effective transport and storage. For this purpose, appropriate means of effective development methodology were proposed whose basic principles will be presented in this paper. The complete procedure of developing devices includes phases of identification, conceptualization, formalization, implementation, and opinions that would definitely provide a reliable means of stable quality in the serial production. Regarding all this, the question of training of new propulsion company-producers of the equipment must be asked. New products, their identification, development and production planning are one of the most important results of forecasting and predicting product life cycle (there are few products that has an extremely long life cycle, as the technology in all sectors of the economy changed extensively). New products must be developed and placed in a time when their predecessors

just passed the zenith of its cycle, and not at the very end. Only in this way it is possible to ensure steady growth and development of specialized companies with a distinctive program identity and offer new and better means to market.

2. INITIATION OF PROGRAMME AND SELECTION OF SOLUTIONS

The procedure, from initiation of the program (first articulation and selection of ideas for new means of production) up to a variant of realization is shown in Figure 1 according to [2]. Always, after the identification of market needs, is necessary to conduct a proper analysis for investigating the necessary conditions (available and new to be provided) under which the program can be implemented, if the technical and economic risks are minimal.

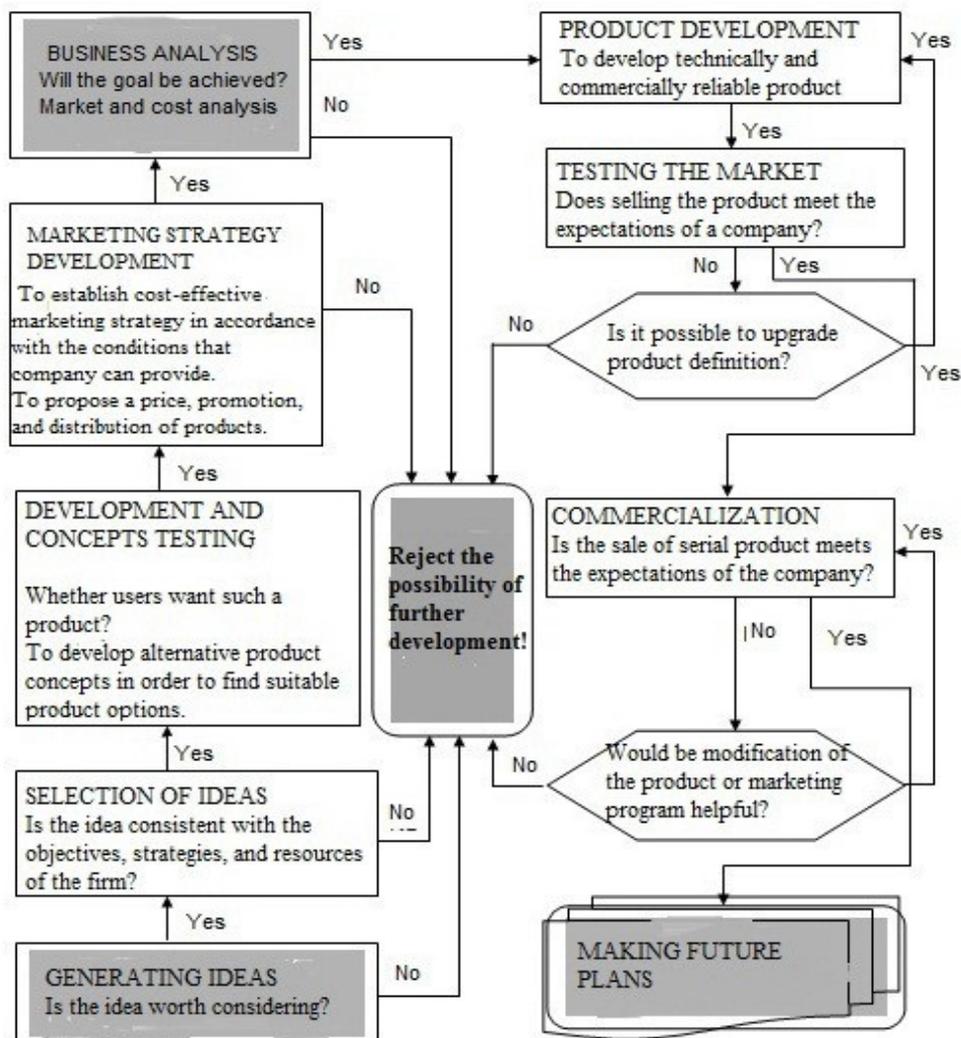


Figure 1. New product development and placement process

Many heuristic and algorithmic methods have been developed for the respective purposes. Method presented here is based on both concepts. In the first phase, it respects the intuition and the applicant in the following stages based on logical and mathematical algorithms.

In order for product to be of high quality, high level of technical indicators with stable quality with competitive ability in the world market should characterize it, to ensure economic efficiency and that quality of normative-technical documents is high.

In the phase of technical definition phase is not easy to determine the properties of products, essentially because there is the physiognomy of the building and its dimensioning isn't performed in accordance with operating conditions, applicable regulations and calculations. In the design phase, the parameters subject to biased estimations should not be chosen. Application of optimization methods is very important for defining the optimal values of design variables on the level of synthesis of each solution, and based on modal analysis technique and comparison with available solutions.

It is necessary to find appropriate solutions for partial features of the system, to identify weak spots in the preliminary solutions.

Due to the limited scope of the paper, the concept of optimization will only be mentioned. Finding extreme value of (usually the minimum) objective function $-F$ with corresponding limits $-G$ for the independent variables- x is defined based on (1).

Conditions, necessary for resolving problems refer to the continuity and differentiability of represented functions. For solving many engineering optimization problems, Lagrange's multipliers are used to determine the value of variables for which F has an extreme value, equations (2) - (4).

$$L(x) = F(x) + \sum_{j=1}^m \lambda_j G_j(x) \quad (2)$$

$$\frac{\partial L}{\partial x_i} = \frac{\partial F}{\partial x_i} + \sum_{j=1}^m \lambda_j \frac{\partial G_j}{\partial x_i} \quad (3)$$

$$\frac{\partial^2 L}{\partial x_i \partial x_k} = \sum_{j=1}^n \sum_{k=1}^n \left(\frac{\partial^2 F}{\partial x_i \partial x_k} + \sum_{j=1}^m \lambda_j \frac{\partial^2 G_j}{\partial x_i \partial x_k} \right) \quad (4)$$

Above-mentioned method was successfully applied to determine the minimum amount of structural material resources needed for storing certain volume of raw materials and goods.

If a larger database important for evaluation, the influence of subjectivism is weaker, since designer defines the parameters and the corresponding factors of importance are determined

using the expert method. The total number of k-points and for variants j - variable is determined based on equation (5).

$$(5) \quad W_{kj} = \frac{\sum_{i=1}^m q_{kj} p_{kj}}{p_{kj}}$$

were q_{kj} – factors of importance for k variant ($k = 1,2, \dots n$), and p_{kj} points for k variant and number of properties j ($j = 1,2, \dots m$).

$$(6) \quad W_k = \frac{W_{kj}}{W_i} = \frac{\sum_{j=1}^m q_{kj} p_{kj}}{\sum_{j=1}^m q_{kj} p_{kj}}$$

Rating of variant is determined by the relation (6), where: p_{max} is the number of points of assumed ideal solution, W_i - total number of points of the ideal variant, and q_j – is the factor of importance for an ideal variant.

Based on (6), if parameter of validation is $W > 0.25$, the solution is accepted as satisfactory, and if $W > 0.88$, the solution is above the set target.

The process of evaluation and decision-making in the design process using hierarchical goals at levels, where the initial level represented by the general purpose is applying, while other levels is receiving using general de-leveling of goals [1]. Determining the sizes of the goal importance is done gradually from simpler to more complex functions that determine the target.

3. EXAMPLE

The analysis in the paper, is given as the description, but has already successfully passed the test in the development of special means of transport without requiring accurate positioning (wheelbarrow - RK), and the funds placed in the material (lattice wall pallets - BP) [3].

The product can be evaluated from many aspects, so it is possible to get technical, economic, and exploitation values of the product. Here we are going to show the results of the analysis of development possibilities, implementation and marketing based on real conditions that meet one company, while the technical value of the product is defined as a set of technical system qualities - products.

Table T-1: Rating ideas for product

RATING IDEAS FOR PRODUCT													
REQUIREMENTS FOR THE SUCCESS OF PRODUCT	RELATIVE HUMIDITY (a)	SKILL LEVEL OF A COMPANY (b)										MARGINAL RANKS (a×b)	
		0,0	0,1	0,2	0,3	0,4	0,5	0,6	0,7	0,8	0,9		1,0
		IMAGE OF THE COMPANY AND BUYER'S	0,08								0,7		

4. RESUME

The presented methodology, compared with a completely intuitive approach gives reliable results and the possibility to evaluate initial evaluation of new ideas for the program (a product or service) with fewer risks, then to determine the cost-effective marketing strategy, analyze the market and costs, and to develop technically and commercially reliable product of high quality and high level of repeatability of production and delivery.

It is clear that any objectification of the goal and finding suitable solutions to come to this goal are more reliable than uncontrolled copying of available solutions on the market or subjective values (usually leaving out a very important element of analysis and optimization that make the variables and factors of lower importance than it really deserve. In this sense, the authors hope to have aroused researchers, designers and business people, especially in the areas of investment and technological development program, to provide higher level of caution regarding entering into new projects, which is particularly important for rational investment of otherwise modest means in these times of crisis (whether it is a budgetary funds, soft loans of development banks, or company's own funds).

Based on this example, it is clear therefore that we must seek to establish a suitable management model regarding costs and effects, to be able to work [8], with the achievement of optimal i.e. rational effects.

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