OSVRT NA OPSTE PRIHVACENE OSNOVE INZENJERSKOG MENADZMENTA S' ASPEKTA EMPIRIZMA I RACIONALIZMA

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Rezime:*Autori su, posredstvom iznetih razmatranja, pokusali da skrenu paznju naucnoj i strucnoj javnosti, da se u oblasti inzenjerskog menadzmenta puno toga mora istraziti, uraditi i urediti, te da se o inzenjerskom menadzmentu mora govoriti kao o multidisciplinarnom problemu, iz ugla tehnike i ekonomije. Znacajan doprinos treba da se da iz ugla filozofije i psihologije. Ovde razmatrani relevantni koncepti inzenjerskog menadzmenta zasnovani su na saznanjima u oblasti inzenjerstva, organizacije i ekonomije, kako bi se ova oblast najpre ispravno shvatila, uz siroko prihvacene odgovarajuce metodologije i tehnologije. Dominantno su reprezentovani aspekti empirizma i racionalizma. Definitivno je dat i osvrt u vezi uskladjivanja sadrzaja na razmatranu temu sa zakonomernim principima i pravilima, kao kod standardno ustanovljenih modela menadzmenta u slucajevima kada se analiziraju stanja ili procesi klasicnog inzenjerstva i ekonomije. Razmatranja su izvrsena u skladu sa prezentiranim dijagramima i tabelama, koji sami po sebi predstavljaju odgovarajuce rezultate pretezno proceduralnog tipa. Autori su svesni da je i ovo samo jedan od skromnih doprinosa da se ukaze na dominantno sistemsku dimenziju inzenjerskog menadzmenta, te da se otpocne objektivnije i pouzdanije pisati i raditi, da bi nauka dala svoj puni doprinos zazivljavanju menadzmenta u privredi, imajuci u vidu dosadasnja dostignuca i dileme i sto vise reprezentativnih rezultata.*

Ključne reči:*. Menadžment, inženjering, empirizam, racionalizam, razvoj, nove procedure*

REVIEW OF THE GENERAL ACCEPTED FOUNDATION ENGINEERING MANAGEMENT WITH ASPECTS OF EMPIRICISM AND RATIONALISM

Summary: *Authors through the presented discussion, tried to draw the attention to scientific and professional public, that in engineering management has much to explore, perform and edit and to the engineering management must be referred to as a multidisciplinary problem, from the perspective of technology and economics. A significant contribution to that from the perspective of philosophy and psychology must be done. Presented discusses are relevant engineering management concepts are based on the findings in the field of engineering, economics and organization to this area, first for properly understanding widely accepted the appropriate methodology and technology. Dominantly, aspects of empiricism and rationalism are represented. Definitely a review of the harmonization of the content on the topic being considered regulations with the principles and rules, as defined in the standard model of management in cases when analyzing the situation or process engineering and classical economics. Studies were carried out in accordance with presented diagrams and tables, which themselves represent the corresponding results mainly procedural type. Authors are aware that this is only a modest contribution to indicate the dominant systemic dimension of engineering management, and needs to begin to write and work more objectively and reliablly write, so that the science could give full contribution to establishing a management of the economy, taking into account the achievements and dilemmas, and the much more representative results.*

REVIEW OF THE GENERAL ACCEPTED FOUNDATION ENGINEERING MANAGEMENT WITH ASPECTS OF EMPIRICISM AND RATIONALISM

1. Introduction

The problem of scientific engineering management can be considered through the basic questions of epistemology. So that is here, for the initial consideration of engineering management, attention is directed firstly at the basics of the epistemology of the relevant problem.

From comparative literature [1-5] can clearly be indentified that central questions of epistemology are:

(1) What is knowledge – which is that correct analysis or definition of conceptual knowledge?
(2) What includes all of our knowledge – from which things our knowledge comes from?
(3) What are the sources of knowledge – on what way is certain knowledge acquired?
(4) Is there a primordial knowledge?
(5) What is a justified belief - under what conditions a certain belief can be considered justified?

In the history of philosophy, philosophers have only sporadic interest in this last question, but still it becomes of crucial importance for many philosophers of the twentieth century and today. It will be mentioned that general scepticism is the beginning of epistemology in a way that it is traditionally understood, and this is just an attempt to justify the claim that knowledge about things is possible and to determine the role that the senses and the intellect play in acquiring that knowledge. In present context, should always be born in mind Plato's teaching. Plato can be considered the true beginner of epistemology, since he was the first to deal with the attempts of providing answers to fundamental questions of epistemology: What is knowledge? How much knowledge can we meet, and how much of that what we usually think of as knowledge can be considered true knowledge? Are our senses the guide to knowledge? Can common sense be replaced with the knowledge? What is the connection between knowledge and true belief? – So all these questions are present even today. There is the opportunity to initiate this work in a broader discussion about sustainability of "Engineering Management" at the level of the concept, process and industrial content and even wider!

Beliefs that in terms of engineering management has reached certain acceptable level (especially in our country) are based on good or bad assumptions about what the experts in the field of science should speak and present evidence that encourage a subject presumption to which these beliefs are based. Usually, when a belief is true and when it is based on established principles of area it originates, we can say that this is knowledge. However, the most important question for us is whether is it justified to claim that certain class of truths is the knowledge (or, is knowledge about certain class of truths possible at all), which make that those epistemological questions are asked as general even here.

Epistemological directions depending on the source of knowledge are related to: rationalism, irrationalism, empiricism, sensitivity, criticism, intuitionism, dogmatism and skepticism.

The authors here choose only two directions, believing that this will be enough to provide an initial answer to this question, otherwise, the authors continue to believe, that there is a danger that engineering management is adopted as a dogmatic model (based on the axiomatic approach), which it mustn't and cannot be. That is why we should expand perspectives, critically examine the theory, models, solutions and general achievements in engineering management and rationally contribute to its implementation there where it is important from aspect of achieving the good effects in establishing and managing a reliable system models. It isn't everything in engineering management as a legacy algorithm, since some of its variables do not behave in accordance with deterministic models.

It is worth to say that the size of irrationalism, sensitivity, criticism and dogmatism shouldn't be ignored, since it is about people as essential elements through which the engineering management is realized.

For initial identification of the underlying problem we will firstly start from the widely accepted definitions of engineering.

The current definition of engineering refers to the use of basic mathematical principles, models and tools for developing useful solutions, tools and objects in different fields of engineering, technology, energy, economy and other realms of construction or achieving results in different line sizes.
Today, practically there is no enterprise that can be performed without the application of knowledge and achievements in the field of engineering. Thus, in terms of generalization we can indentify two primary groups of the project that is activity:

- Researchable and developmental activities in order to achieve a new product and/or process,
- Design, technical and technological and production activities related to implementation of complex objects of different types, sizes, degrees of complexity and function.

2. A problem identification

Therefore, in accordance with the definition of engineering, item 1, the logical conclusion is that engineering management is actually management of engineering programs and processes.
The term engineering originates from the word engineer – like someone who operates an engine, in accordance with [8]. The term engineering is used in practice to refer to a discipline that applies different methods, scientific and technical knowledge and experiences for designing and implementation of usable products, objects or processes.
The term engineering is therefore used in practice to mean the organization or process in which the discipline of engineering is applied [8].
Engineering as a discipline for pragmatic realization of various projects can be defined as an engineering in several different levels:

a) Engineering in the broadest sense, includes the study of choice concept, the activities of designing and design and carrying out an investment project, which includes facilities, equipment, products and / or processes, applying project management.
b) System Engineering - Systems engineering, includes a series of evolutionary systems made of integration of more engineering disciplines and functional engineering, for the realization of complex engineering projects.
c) Engineering Management - Engineering Management, as the area that connects engineering and management, and includes the entire management of the organization

with an orientation to the definition, documentation, realization, engineering, technology and production.

The term engineering management (or, preferably immediately establish the correct definition: Engineering Management System), evident and final, not unnecessary category invented, area and direction, or the need and compatible process with other processes essential for the successful realization of global or super-process that overall leads to the highest successful or final results and objectives, including the satisfaction of all participants in the realization of engineering interventions.

The central part of the engineering structure is the system (as already stated), which if not fully defined, the way the nature of the problems, standards and users applications demand, allows participants in the realization of "management procedures" to do the selection, analysis and optimization of irrelevant or even the wrong variables, and to manage inappropriate model and processes while they (wrongly of course) think that they are coming to optimal and rational solutions. So, without exaggeration, in a set of errors and deviations that may accompany engineering management, we can talk about the wrong model of engineering management that, instead of reflecting managerial engineering, treats the problem in its bases (not) of the control engineering, i.e. one can speak of a process that can be characterized as a "model of violence" and not the management model (model, in the broadest sense of the word model as an object, product, process, etc.).!

Firstly to determine the trends of science development and technology is necessary to put the relevant objectives of the company in various domains (humanistic, educational, cultural, technical, etc...) relating to:

- elimination of hunger
- elimination of war
- disease prevention
- adequate treatment and prolonging the active human life
- fighting against delinquency
- prosperity
- improving levels of education
- reduce the share of physical labor
- reducing working hours and etc.

Apparently the place and role of science and technical-technological development is clearly defined in the system development to the benefit of people. Tendencies of technical and technological development should be seen in the regulatory process to achieve adequate performances of technical systems (product, design) in terms of mechanization, automation, electrification, computerization, use of new working systems and etc.

By comparing products made at different time we can see a tendency towards changing characteristics (dimensions, weights, design, safety and reliability, strength, speed, power consumption, environmental protection, safety and health protection of employees in the workplace, price, etc…). Technical features in overall clearly define the technical level of products. For example, the evolution of means for transporting people and goods (ships, trains, cars, airplanes) in terms of increasing the operating speed (ranging from a few tens of km / h up to several times faster than the speed of a sound, for the last hundred years) may consider the relationship of these features and technical level to the level of science, technology and available materials, production and control facilities, etc.., at the appropriate time. So, it is clear that the technical level of products changes with time. Similar thing happens in other domains too.

Evolution of product demand also changes with time. At some time period new and old products supported by adequate processes are regularly in exploitation. New products don't immediately displace the old ones (for example specialized agricultural machines didn't entirely substitute agricultural tools, cultivators, tractors, harvesters). The old machines are still used but with reduced volume of usage.
In accordance with stated above it can be clearly indentified:

- saturation of the market and reduced demand for old products
- slowing down the product demand in standard application
- growth in demand when it comes to the modernized existing products
- affirmation and growth in sales of new products and
- promotion and establishment of new products - prototypes of innovative content.

Demand depends on the product market needs, market stability, political, social and economic conditions, the correct segmentation of the market and etc. Evident is the fact that thanks to technical progress using the product cycle is constantly decreasing. That is way the cycle of demand and product placement also decreases. All of this should be taken into account in identifying market needs, research and development, design and construction, production and verification, as well as marketing of new products.

All set requirements should be developed in accordance with clearly defined realization program, which contains an optimal technical-technological product definition, activity plan with the bearers of the tasks and procedures and process for determining the complete work list, and control of critical parameters. All this is supported by a wide variety of management processes.

For the purpose of efficient realization of the underlying tasks many methods of research have been developed, development and design, which can roughly be divided into two groups:

- heuristic (intuitive)
- algorithmic

Depending on whether we want to discover new scientific facts and knowledge, or we are looking for the instructions that are prescribing the sequence of activities during the design and execution of engineering interventions. The main stages of the project realization are principally related to:

1. Recognition;
2. Programming;
3. Planning;
4. Research and development;
5. Designing;
6. Preparation of prototype production;
7. Development and prototype testing;
8. Preparation of serial production of a product;
9. Development and serial products testing;
10. Product delivery;
11. Products monitoring in production and exploitation.

Activities under the number 4) and 5) are represented at all levels of project development (ideal design, preliminary design, technical design, and detailed design) in accordance with the chronological phase order of the product. With this level and scope of the above-mentioned facts, the problem will be understood in a good possible way if there is still something

differently structured and analyzed at least minimally from the aspects of empiricism and rationalism. So, first things first!

3. The aspect of empiricism

Without too many comments, if you look at engineering breakthrough, one can easily establish a correlation between achievement and actual goods, effects and experiences with them. For example, the findings such as: lever, wheel, gunpowder, steam engine, sus engine, electricity, hydraulics, pneumatics, mechatronics, servo-technology, robotics, nano-technology, through which we can clearly analyze all technical and technological important for revolution and the development of society. All is being created in different evolutionary period of conscience and action of a man with different duration of definite fine tuning applicable solution, figure 1, and of course everything has been subjected to empiric's evaluation and verification.

Empiricism in philosophy is defined as the direction towards which the whole knowledge is based on experience, there are no innate ideas, but only acquired ones ("Nothing exists in the mind that wasn't in the senses before"). In the present context, methodologically speaking, it is a direction that collects, processes, and evaluates the empirical facts and generalizes the knowledge with inductive reasoning [2-4].
From an engineering point of view, empiricism and rationalism are difficult to distinguish, and even more difficult to exclude, and it will be in a such way, taken into considerations in this paper, able to spot during the discussion about each of these models.

The issues of product development (products and services) are very complex both from the aspect of designing technology, and aspects of the philosophy and methodology of defining, implementation and product placement. It is being studied and discussed on the basis of achievements and models establishment in the different disciplines, both technical as well as the other, primarily economic and mathematical. The goal is to through engineering management, i.e. through managing and regulatory processes fulfill a given goal and achieve the maximum possible effect.
The reasons for extending the domain of definition and products design are primarily related to:

- General trends of product development (increasingly stringent requirements in terms of function, ergonomics, safety and reliability, ecology and quality control and testing, etc...),
- Methodology and technique (the use of appropriate mathematical models and optimal procedures) that allows effective product designing with a different objective function (minimum weight, high performances, effectiveness of implementation technologies, rational planning of production processes, rational maintenance of a product in exploitation, optimal parameters of process control in manufacturing and testing of a finished product, the application of statistical analysis and drafting of empirical models related with products, etc..),
- Market requirements (product with reasonable price, timely and continuous supply of products of stable quality of the market), as well as
- Special demands of the users on commercial and special purpose funds dealing with specific contract situations.

It is clear that science is based on the overall achievements in science but also in developments in the industry, where it can clearly be seen particularly rapid progress especially in the last quarter of the last century.

The efficiency of manufacturing firms depends on the market competitiveness that is measured by the cost, quality, on time products delivery and adequate logistic products support, in exploitation. In the same sense are evident new trends of development and modernization of existing products and the requirements that the company presents to designing organizations in terms of developing and products designing for the market.
Identification of market needs and providing the necessary conditions (organization, equipment, materials, personnel, documentation) for the realization of appropriate products quality is a priority of manufacturing firms. Therefore, manufacturing firms must promptly and continuously change and adapt the program orientation and product range, quality, price and performance of products and resources involved in realization of a new profitable program.

A trend of your own research - development and project oriented companies regarding the establishment and implementation of new products is evident. The reasons should be sought in the need for quick and clear view of the organization and the possibility of establishing effective systems of work in accordance with available resources. It is still the most realistic and most common variant of the product development based on the unambiguous division of labor between production companies and specialized organizations of design.

The task of science is to investigate the object in the process of development and design, and to reveal the internal lawfulness of the development process and on that basis to develop regulations and procedures that will enable the work process to be rationally governed and controlled.

Science should provide the secure base for solving the project tasks and to implement hierarchical essential procedures for solving different tasks on the same basis of clearly defined procedures and practices. With the advent of computers, for example, in the designing process and calculated construction budget (CAD / CAM / CAE), a new phase of the science designing with the trend of developmental methods that will enable more comprehensive and universal application in this field is generated. The computer is suitable for operation in all areas, from setting requirements / tasks, through the elaboration of a functional structure, searching for solutions for every partial feature of structures, conceptual problem solving, decision making in various forms, the technical and economic evaluation of options, to designing, development and project control documentation and database creation and definition of technology for the realization of the product [9]. It is similar in other areas. It is evident that empirical dimension is dominant here.
The man release of a physical work is also the subject of research procedures that lead to faster development and putting a new product into operation.
A number of other properties of various systems and structures such as aesthetic, manipulation, ergonomic, technological, and economic properties, properties in terms of energy efficiency and environmental characteristics, and product compliance with legal standards, make a significant impact on research and product development.
Therefore, it is necessary to use scientific methods more effectively, increase the motivation to better design and establish the appropriate methodology prototype testing to verify the developed products in order to guarantee that the same is in operation to behave with set requirements.
The typical products development in the period from the eighteenth to the second half of the twentieth century is given in Figure 1, in accordance with what is set out in [9].
To be able to carry out more realistic analysis of the indicators in Figure 1 it should be considered the appropriate conditions in terms of science conditions and working conditions of

creative people at the appropriate time. It is clear that at the present time the designing process was developed primarily on the basis of science and in the earlier periods was dominant experience.

Century / Product	XVIII	XIX	XX	Time for development /year/
Micro processors				2,5
Integrated circuits				3,0
Transistors				5,0
Radar				15
Television				25
Radio				35
Telephone				56
Steam engine				85
Photography				112

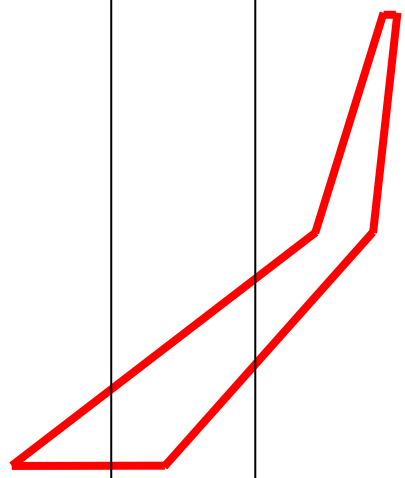

Figure 1. Characteristic products development in appropriate time

4. The aspect of rationalism

How should, all that was discovered found be rationally used concerning the aspect of rationalism.

Suitable applications, organizations, rational energy management and energy efficiency, ergonomics, ecology, aesthetics, safety and health at work, reliability, quality, and permanent research of products parameters, technologies and processes, these are all areas where engineering management reasonably could find a foothold from the aspect of rationalism.

Rationalism is a position in the theory of knowledge according to which the process of learning a critical role and importance of these findings as a measure of value has human reason [4].

With the framework set out in empiricism, further discussion will be focused on the evolutionary product development, as well as compatible and complementary to the whole engineering management focused on the development of products [9]. Evolution of products in general, is primarily caused by:

- Continuous improvement of technical and technological level of products
- Evolution of product demand
- Development of new materials
- Development of production and control technologies
- Development of production and control capacities
- Development of production and control processes
- Type and volume of research and development papers

- Organization
- Standardization
- IT support
- Logistic support of products in exploitation
- Reducing development costs, production and exploitation and
- Other social goals

The procedure for initiating, establishing, implementation and marketing of new profitable products is given in Figure 2 [9], a procedure with identification of specific conditions in terms of security indicators to enter into a new program with a reasonable risk given in Figure 3, a table with the expert evaluation of partial functions, which all in all determinates the level of competence of the company that under reasonable conditions must accept the development of a new product is presented in a table T-1, using equation (1). The content of Table T-1 is based on the optimization equations (usually using several criteria optimization with different types of variables), where must clearly be identified the objective function, variables and constraints of equality type and / or inequality, equation (2) to (5), with the illustration in Figure 4, in accordance with [9].

$$F_{of} = \sum q_i p_j / (p_{max} \sum q_i) \leq 1{,}0 \qquad (1)$$

Where: -F_{of}, is a function of company capabilities

-q_i , is an important factor in the partial functions of the company

-p_j , is a level of competence of the company based on these partial functions (number of points)

-p_{max} , is a number of points for the supposed ideal solution

For a product to be of a highly overall quality it is necessary to be of a high technical level with stable quality indicators with competitive ability in the market, to ensure economic efficiency and that its quality of the normative and technical documentation is high.

The procedure, from initiation of the program (first articulation and selection of ideas for a new product) to choosing a variant of realization, shown in Figure 2 is in accordance with [10]. Always, after the identification of market needs, it is necessary to conduct a proper analysis for investigating the necessary conditions (new and available that should be provided) under which the program can be implemented, providing that the technical and economic risks are minimal.

For respective purposes many heuristic and algorithmic methods have been developed. Here a presented method is based on both concepts. In the first phase, it respects the intuition of a proposer and in the following stages is based on logical and mathematical algorithms.

If the idea of a new program, project or product is positively assessed, according to Fig. 2 and 3, and Table T-1, it accesses the definition of access to the development of products based on research, development and testing concepts. In accordance with the project it is defined and cost successful marketing strategies and techno and economic analysis, based on which the business makes a definitive decision about joining the program, or a decision on the development of technically and commercially reliable product.

Definitely a new product implemented is presented to a market testing to determine whether defined sales system meets the expectations of the company. If it is necessary, the product continues to refine, so as to ensure a standard product whose sales will meet expectations of the supplier. And at this level, if it is necessary, the product is modified or marketing program, or both, in order for product placement to take place in the desired way to a better effect on the basis of profits, sales, sales growth and customer preferences.

Based on complete and clearly defined requirements, a product design is accessed, where the evolution of designing solution begins the task of studying the phase and phase ends with the monitoring and improvement or modernization of a serial product or product that is already in exploitation.

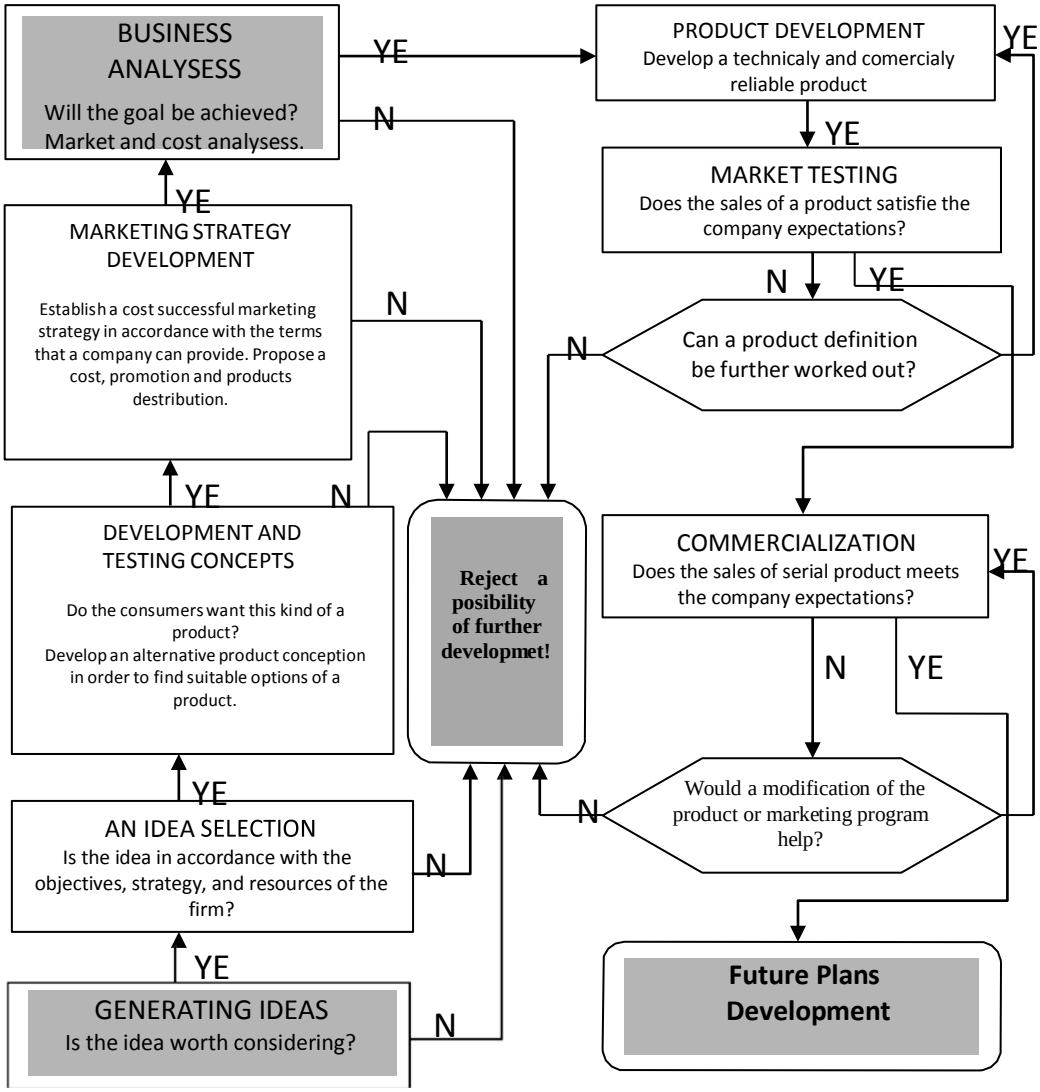

Figure 2. General diagram of a further development of a new product

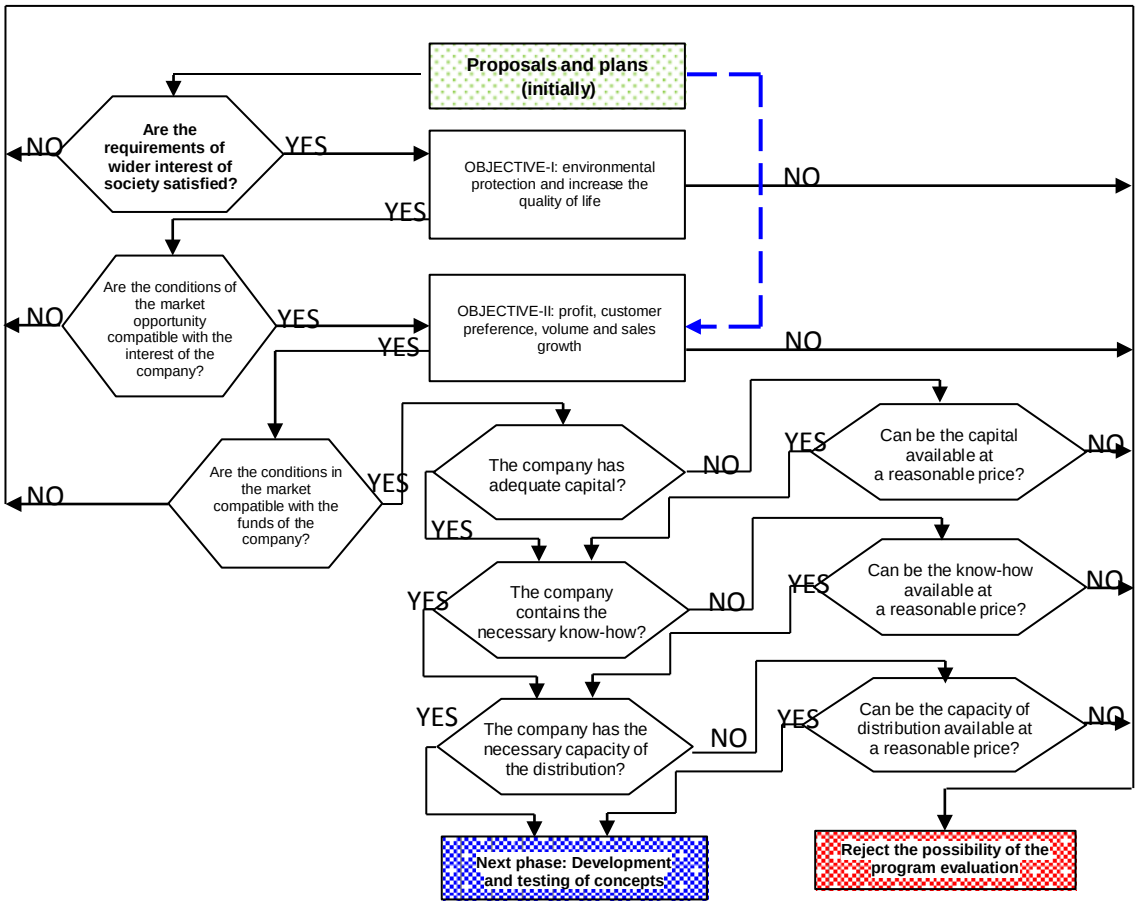

Figure 3. Analysis of compliance requirements in terms of risks based on entry in development and implementation of a new product

The process of studding and decision making is developing in accordance with the importance level of the considered problem and established limitations [9]. This process implies the following global activities:

- Important parameter analysis for establishing concepts of designing task;
- Identification of the main problem of product development;
- The state level of science and technology in the domain of the task;
- Identification of conditions for realization and distribution of products;
- Classification requirements;
- The entire task elaboration.

Based on the foregoing, a competent analysis that needs to give the answer regarding the availability of economically viable variants of the development, implementation and marketing of products should be done, and that defined product will be of required quality.

Product requirements are classified as: primary, alternate and minimal, with important differences. The main requirements are related to the function, capacity, security and reliability, and etc. Alternative requirements are relating to the choice of generators and power, size and

number of devices and so on, and the minimum is related to the disposition of the components, color, etc...
Generally, the problem must be placed at the level of optimization and then can be described by the following set of functions:

$$W = W(X_1, X_2, ... X_n) \qquad \textit{- the objective function}$$

$$\psi_1 = \psi_1(X_1, X_2, ... X_n) = 0$$

..... *- constraints of equality*

$$\psi_m = \psi_m(X_1, X_2, ... X_n) = 0$$

$$l_1 \le \varphi_1(X_1, X_2, ... X_n) \le L_1$$

..... *– constraints of inequality*

$$l_s \le \varphi_s(X_1, X_2, ... X_n) \le L_s$$

Where:

W- is the objective function
$X_1, X_2, X_3, ..., X_i$ – are variables, (*i*=1-*n*)
$\psi_1, \psi_2, \psi_3, ..., \psi_j, ..., \psi_m$ - are functional limitations, (*j*=1-*m*)
$\varphi_1, \varphi_2, \varphi_3, ..., \varphi_k, ..., \varphi_s$ - are regional limitations between lower l_k and upper L_k, borders*(k=1-s).*

A special case of the regional restrictions are page limitations, which require that all variables X1, X2, X3, Xn must be positive.
Functional limitations ψ j = 0 require leading optimization procedure with variables in the form of relations among the parameters, which may be dependent and independent.
Figure 4, grafically interprets some of these concepts in 3D space.

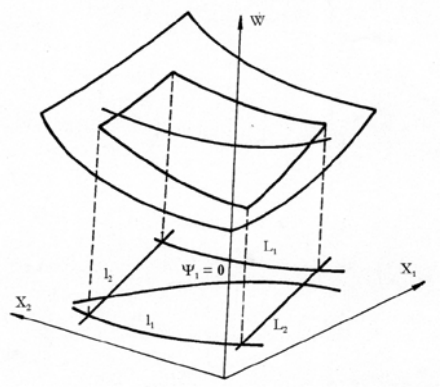

Figure 4. The objective function W(X_1, $X_{2)}$ with limitations in 3D space

The objective functions with more pronounced extremes in mathematical programming, called multimodal functions [9].
In relation of optimization it is possible to search for minimum or maximum objective function.
In mathematical terms, the problem of maximizing the objective function W '(X) in the set X, is reduced to the problem of minimizing the function W" (X) by the relation:

$$W''(X) = - W'(X) \quad (5)$$

Additional considerations regarding the problem of optimization are possible in accordance with [9] and the content presented in the point 6.
Each and every idea should be ranked bringing it into connection with conditions available to possible investors and implementers. Thus, for example many different ideas could be ranked, including ideas for large projects such as: the construction of hydropower plants, construction of power stations, the construction of landfill waste, construction of infrastructure for inter-modal transport, development and manufacture of new construction machinery, development and production of wind turbines, development and production of new cars and so on.
Here the major projects are taken tentatively as projects that involve significant investments, involve high costs, characterized by a high degree of complexity, which bring together a number of specialized subcontractors etc. Here, the idea is not to directly deal with specific projects but to call the relevant methodological approach in respect of obtaining a valid assessment to decide on new projects under specific conditions.

Table T-1.The company capability analysis dealing with the entrance into development and implementation of a new product (the idea ranking for the product; example 1)

Rating ideas for product													
Requirements for success of product	**Relative humidity** (a)	**Skill level of a company** (b)											**Marginal ranks** c (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 affection	0,08									**0,8**			0,064
Marketing	0,05										**0.9**		0,045
R&D	0,16								**0.7**				0,112
Staff	0,14							**0,6**					0,084
Finance	0,11						**0,5**						0,055
Production	0,12										**0,9**		0,108

Location and communication benefits (advantages)	0,06								**0,7**				0,042
Quality and ecology system	0,06									**0,8**			0,048
IT system	0,08							**0,6**					0,08
Procurement and general logistics	0,14										**0,9**		0,126
(Mandatory)	Σ=1,00								*Overall rating:*				**Σ=0,764**
												***W** is always*	**≤1,00**
****RANKING: W=0,00 – 0,40: WEAK; W=0,41 – 0,75: SATISFACTORY; W=0,76 – 1,00: GOOD***													

Therefore, it can happen that some technical and technological projects are found good, but that in specific setting (because of the lack of available technological and production resources, no funds or would the market response due to the current crisis be inadequate and etc.) they cannot be realized with reasonable risk, and should not be immediately rejected for all time, but they can temporarily be postponed, but still kept in mind, and when conditions are recognized in a certain cycle that the subject projects can successfully be implemented, they should be activated.

Of course, there will be a group of projects that will technologically obsolete, and so it had to bear in mind the final filing proposed with the adding "definitely with no perspective."

According to the results of analysis and condition quantification, Table T-1, under which products can be realized (the parameters are taken conditionally for a particular domestic firm that operates under the principles of a large business system), the idea for the development and manufacture of the windmill ranked (with the mark W1=***0.764***).

It is evident that the idea is attention worthy and it gives a clear indicator regarding the acceptance of the subject for project development with minimal risk.

Based on the presented procedure, Figure 2 and 3, and based on equation (1) to (5) and Table T-1, several possible options are defined and discussed for solutions and new products in terms of project implementation regulated landfills for municipal waste (the idea is marked with W_2= ***0.638***) and for program development of new construction machines (the idea is marked with W_2= ***0.547***).

The complete issue can be extrapolated to the global level of corporate governance, this is directly related to consideration of the information state in the development of a new product or service (as part of the environmental information), or in the context of defining a suitable model of education (for example, concerning the avoidance of entry into programs that carry a high risk in the implementation as well as regarding the terms of total market or business success), and the argumentative favoring different levels of investment projects in order to establish sustainable development strategies that is poverty reduction in Serbia [12].

Further on we could focus the attention on aspects of skepticism, as will be discussed in our future works. Why? -Only when you take into account the widely accepted definition of skepticism, as explained below, everything becomes much clearer [4].

Skepticism is orientation based on a thought that stands its grounds that all lies on a theme-driven consciousness which is negatively expressed about being able to grasp the truth using the senses or the way of thinking.

Skepticism is usually defined as the philosophical doctrine of the doubt. However, skepticism is not a point of a doubt. The term doubt refers to uncertainty, indistinctness and indecision. Philosophy of skepticism is not the philosophy of a doubt. On the contrary it is built on a position of certainty that sensuous and thoughtful cognition does not necessarily lead to the truth. In its doubt, this philosophy is certain in falsity of human cognition [4]. Skepticism is the seeking, exploring (Gr. skepeein - search, explore, skeptikos - or zeletikos – the one that asks, investigates, reviews). The meaning of skepticism is contained in the attitude of trial restraint.
Summary, of what was being stated could be set as the norms of behavior managers and holders of management functions solely as a sustainable management system with an active attitude, critical thinking and creation in the area in which the underlying processes are realized, always respecting the current level of science and practice of the profession.

5. Final notes

There will be, for easier understanding the complexity of the system correctly set problems related to engineering management, firstly a set of loops will be displayed in the multi criteria optimization of the values of variables for a given objective function and the corresponding limitations, Figure 5, which is in connection with unambiguous previously discussed issues regarding the display of diagrams that reflect the evolutionary process of market-oriented solutions, Figure 2, and the process of deciding on joining the new program with a reasonable risk, Figure 3, in accordance with [9,10,11].

To obtain an optimal solution for the generally accepted market model of the product, it is necessary to implement a number of optimization iterations for the different loops, from the mathematical to the market, Figure 5.

Here we clearly see that it is not enough to go immediately to a variant solution from concept to full implementation, since a simple and obvious way cannot establish a set of parameter values that provide the maximum of the product high marks with its positive effects in terms of achieving the objective function, but it has to analyze more variants, and variants within these more specific solutions, so to be to able to develop a reliable product for the market in order to all development and production costs, including investment, be reduced to a minimum.
The logic of selecting the optimal solution, regarding the set requirements fulfillment based on the development, manufacture and new product marketing (new product, technology, process, software, services,) can be seen precisely in accordance with the diagram below, Figure 5.
For the compatible considerations let's remind ourselves of the equation (1) to (5), with appropriate justification, that table T-1, as well as support tools and expert evaluation of proposals for new or existing projects with innovative aspect of conditions fulfillment at required level of firm-supplier regarding the implementation of rational acceptance of each project considered [10].

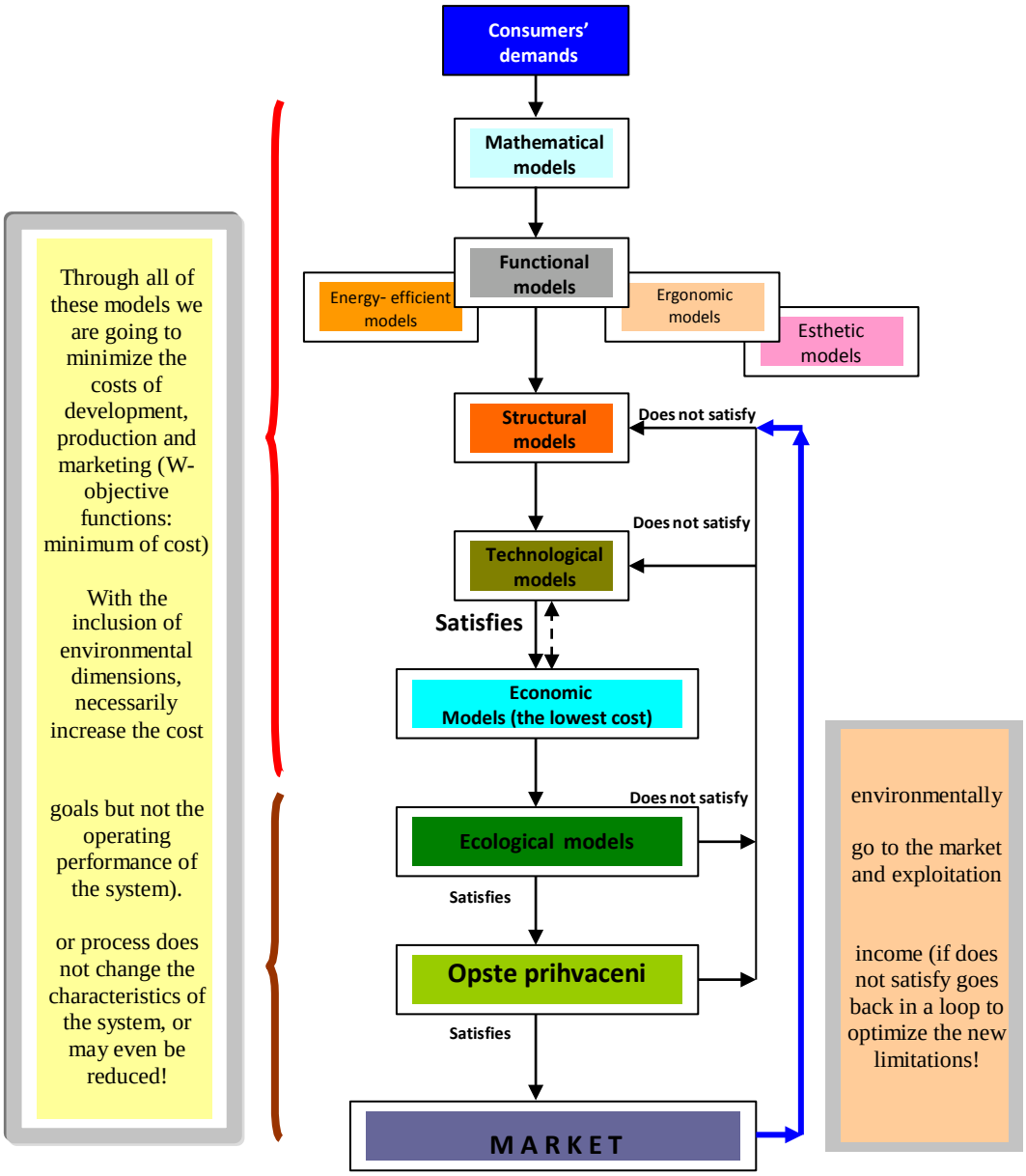

Figure 5. Complex block of optimization solutions for the general market successful product

6. Conclusion

The authors, through the consideration set forth above, tried to draw attention to scientific and professional public, that in engineering management has much to explore, edit, and do, and that the engineering management must be referred to as a multidisciplinary problem, from the

viewpoint of technical persons and economists who have the appropriate upgrade to the epistemological aspect parameters, and the point of view of philosophers and psychologists who deal with (i.e. which necessarily have to deal with) models of engineering management from their own perspective and upgrade in the field of engineering, organization and economy, to this area is first properly understood and defined, and then establish the level of widely accepted methodologies and technologies, and definitely would be brought into line by legitimately principles, as defined in the standard model of classical condition or process engineering and economics.

It is the long way, to come to valid results, and above all through the impact of engineering management, but it is time to proceed with less enthusiasm to say that we have adopted the subject area, widely accepted and applied, to understand and to continuously generate better results , which in nowadays it is not true, and what would the next day with a systemic and systematic work had to be leveled with the rules. In accordance with the general effort to get to higher level of knowledge through various types of education, in the interest of reducing overall poverty in Serbia, the relevant aspects of management can be seen in [12].

Today, in countries with extensive development, the results are accomplished of which could be related with interventions based on engineering management, without any surprise are likely to speak in favor of withdrawal from such operations, but in favor of its acceptance, because the results of the subject types are of low rank and importance in relation to the results realized by renowned pragmatist, primarily in industry and economy.

In fact, for the purpose of making the correct assessment we should first start with the fact that the engineering management can be implemented only where there is order, and with us in most cases the order, in the full sense of the word, there is none (at various levels, often in companies that are lead conventionally, which long time ago stopped to learn and innovate processes, organization, management and leadership, as well as lower-level processes in this environment, the level of the firm or project), and where there is no order cannot be controlled but it leaves the possibility of different kinds orientation of stochastic type, and therefore the results of low rank are achieved that are present today in under developing countries. Engineering management involves regulation of the system, establishing a cautious and responsible i.e. the host taking care of everything that is important for the sustainability of a system [10].

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