

ON ENTERPRISE MANAGEMENT

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Abstract. *The enterprise management process is studied and promoted in the scope of many scientific disciplines. In this study, the authors point out the place of management, decision-making theory, quantitative analysis and informatics in the process of management in economic systems. Their positions are shown by the following relations: aims are achieved over results, results are obtained over actions, actions need decisions, decisions are made on the basis of information.*

1. Modern economic conditions are characterized by strong turbulence and environment complexity, as well as by the deficiency of resources, time and information in an enterprise. Because of that, the problems of economic systems management are becoming more complex. The application of scientific methods in studying and solving the management problems has been an obvious necessity. The managing process needs permanent research and the application of new methods of analysis and planning, which will lead to deeper and more objective understanding of economic flows. That should expand the efficiency and quality of economic systems management. Studies and experiences point clearly to the fact that technical - technological development is not enough in a successful enterprise development if the management methods are not researched and developed at the same time.

All the premises above are the reasons why we permanently study and improve the process of economic systems management. All our studies are so important and intensive that certain parts of the process itself are separated and developed as independent scientific discipline. So, today, in both practice and science, we have and develop: management, decision making theory, computer science, quantitative methods, entrepreneurship and many other fields of relevant knowledge for management process. Besides the fact that these fields are developing as separate disciplines, they must depend on one another in the way that conditions for their development are created mutually. The development of one discipline creates the conditions for other disciplines. To be sure, there is no suc-

cessful management without harmonious, permanent development of all the fields mentioned above.

Each of these fields represents a process consisting of many phases and operations. All the processes are directed to managing decision-making, which should provide efficient work of an economic system (an enterprise). The process of managing decision-making is supposed to be an activity, which operates according to a particular technology, using different methods and means. It is an activity directed to searching the way out of a certain managing situation by creating and realizing some effects on managing system. That is the technology of solution determination and realization. So, different approaches to knowing and improving this technology try to present it in a form of algorithm. As all the algorithms are directed to finding a solution, we can notice that all scientific disciplines use the same or similar phases and operations. It is interesting and important to see what their processes have in common, and what makes them different or typical.

The aim of this study is to see and to compare the concepts and instruments of the processes mentioned above in economic systems. Such an approach (in this kind of study) includes possible danger: the subject in question could not be presented in a systematic and complete way. So, considering the subject, we must start from some appropriate definitions, and on the basis of those definitions we shall see the characteristics of the process. As we are concerned with the disciplines, which have rapid development, it is hard to choose definitions, which will cover all aspects of our observations. However, we start from the fact that knowing the chosen characteristics of certain processes could be a useful means for improving management qualities.

2. There are different definitions of management, which depend on aspects of observation. Management can mean industrial management or collective management, or even managing aspect. We say that it is a particular aspect of the activity directed to achieving optimal results on the basis of rational use of working, material, financial informational and organizational resources where numerous principles and methods are applied. More precisely, management is the process of efficient realization of aims through planning, organizing, directing and controlling of both human and material resources in an enterprise. We can draw a conclusion that management is a process directed to attaining the chosen goal on the basis of resource allocation decisions. The important thing for this process is that it has an appropriate information system, which will make possible the collecting, processing, storing and distributing of information.

All activities of this process are heterogeneous and complex and so they require the use of different skills, in order to be successful. Those skills include the models and methods of quantitative analysis. Besides the skills, we should mention operational means, which include: methods and motivation of workers and control system. Operational means together with resources are management potential. The potential is initiated and helped by decisions. Now we get to the most important part of each managing activity - decision-making. Some authors use management as a synonym of decision-making. Because of its great importance, decision-making becomes the matter for consideration of a special scientific discipline.

For the sake of this study only decision-making process is selected from the decision-making theory and taken into detail consideration. Decision making process could be observed as the process of solving problems. Finding a solution to a problem requires an

appropriate decision, so the solution is the most important part of the decision. The solution is the result of thinking, so in the analysis of decision-making process we have started from the analysis and improvement of thinking. The process of thinking starts with some data (about a problem). We analyze the data in order to form a particular conclusion (solution). The conclusions are checked before and during their realization.

The phases of the process of thinking have become the basis for all the following studies and improvement of the decision - making process. The following processes consisted of describing the phases in details. Decision-making must give answers to the following questions: why do we work (idea and aim), what should we produce (quantity and quality), what are the costs of production (resources), how should we work (idea and aim) what should we produce (quantity and quality), what are the costs of production (resources), how should we work (technology), who will work (executives), when shall we work (time limits), for whom (potential buyers), where do we work (place) and what are the effects of our work?

The technology of decision-making process has been analyzed in recent years and besides that, a lot of effort has been made on improving the technique used in some phases and operations of the same process. The development of computer science helped the mechanization automatization of decision-making process. There are also new scientific methods of drawing conclusions and making solutions. In that way, we have good conditions to study the problem of decision-making and to solve that problem by the use of scientific methods. In this field, the formulation of large number of quantitative methods is of great importance. Their rapid development started during World War II (for the effective war). At that time, a number of very suitable and effective methods for making optimal solutions of the economic problems was formulated. These methods are known as Operational Research and because of their great importance in the process of decision-making they are developing as special disciplines.

It should be said that the structure of decision-making process also depends upon the kind of decision and their importance for the managing system, as upon the method which will be used in some phases of decision-making. Because of that it is difficult to make a model of that structure which could be used for all decisions without corresponding adjustment. That is one of the reasons different structures of decision-making process are formulated. Not mentioning numerous authors and their opinion on decision-making process, respectively about the phases from which it consists of, we believe that process consists of the following phases:

1. Phenomenon of managing problem, respectively task
2. Data collecting and analyzing
3. Forming (mathematical) model and selection of the solving method
4. Solving the model and calculating the solution
5. Decision - making (according to solution)
6. The solution realization (organization of fulfillment) and its quality realization stimulation
7. Solution realization control

It appears that this formulation is general enough and can be used in great number of cases.

It can be observed in this model that the decision-making process is met finished with decision-making phase. The purpose of decision-making is to come to a decision, but the decision is not the final point of decision-making. According to decision - actions are made, activities are performed through which certain results will be realized. Finally, goals are achieved by the results. Such a decision-making observation presents an initial managing activity in the decision crucial procedure of managing process. In more and more complex conditions of earning the number of decisions, their importance, their connection and the of their fulfillment consequences increases. Because of that all the decision-making process researches are directed in two directions: first, to ensure making quality decisions (which eliminates the need for making improvable decisions) and second, to rationalize the process of decision-making, that is to shorten it as much as possible. Through mathematical methods, the optimal solution is being found according to which the decision considered to be the most quality one, having reference to chosen criterion, is being made. We must also remark here that the quality of the decision will depend, beside the rest, from conditions and situation in which the decisions are made, we have: 1. Decisions which are made in situations of certainty, 2. In situations of risk, and 3. In situations of uncertainty.

The use of mathematical models and methods represents a modern scientific access to economic system management. In this access there are no emotions and pressing, it's goal is making a real surface for decision making process. The basic characteristics of this access are in the following: an appropriate mathematical model for the managing problem is formed; the management goal is defined (and quantitatively formulated) acting as a criterion for choosing the appropriate solution; the restrictions inside of which management is choosing is defined. This access also starts with data modifying them into important information's for decision making. The use of mathematical models and methods demands preparations and the use of numerous relevant data and information of appropriate quality. Their use, in the other hand, represents the methodology for transforming ingoing information into qualitatively new, outgoing information's.

It can be concluded from this that the use of quantitative methods, also, has it's own characteristically stages. Solving the problems using these methods takes place inside the following stages:

1. Problem selection and defining,
2. Solving problem selection method
3. Useful data collecting and elaboration
4. Forming the mathematical model
5. Solving the problem with the help of model and the chosen method
6. Analysis of the obtained (optimal) solution

The advantages and the benefits quantitative access of defining the problem solution offers can easily be remarked. Those advantages, however, can only be expressed inside continuance use of quantitative models and methods. That continuance is especially necessary for forming and "carrying" the statistical data and information's.

It should be kept in mind that the management process in the enterprise is always about numerous complex problems. Depending on characteristics of some problems, a great number of different models are formed. There is also still no (universal) method through which the different models (that is, problems) would be solved. That's why this

kind of management consists of making an order of optimal solutions and decisions for every chosen problem. Only that way an optimal use of available company production resources can be ensured. Here we extract only two methods and point to their importance for decision-making about the company resources allocation, and those are: Linear programming and net planning.

Linear programming is widely used technique of mathematical modeling for helping the manager in planning and deciding about the resources allocation. Resources (machines, work, money, raw material and material) are used for producing the different products and/or favors. The problem is to provide the maximal economic effect with optimal usage of limited resource amounts. This problem matches the following mathematical model.

The optimum solution of this model is found after fulfillment of the condition

$$Y_0 A_j \geq C_j, j = 1, 2, \dots, n$$

The symbols used in the model have got the following meaning.

x_j - the quantity of "j" product, which has to be produced

C_j - the economic effect per the "j" production unit.

a_{i0} - the "i" resource available quantity (capacity)

a_{ij} - the "i" resource quantity for the production of "j" product

A_j - the all kinds resource consumption vector per "j" production unit

y_0 - the (relative) price production resource vector

h - production number ($j=1, 2, \dots, n$)

m - different production resource number ($j=1, 2, \dots, m$)

Diagram planning application in the management process helps that process arrange in an obvious way, to expose the process characteristics, the necessary activities and useful means structure. The diagram-planning project represents the management process graphic show, where all activities (whose realization is necessary for the achieving of the certain aim) are shown in certain technological connection and dependence.

It enables analyzing of the certain connections between the executor and the actions, to prepare scientifically based plan of performance of all possible actions for the given task. Such plan based upon the diagram planning and critical activities specification, enables realization of resource distribution and its effective use. There is, also, the possibility of fast data processing (by a computer), providing the manager with timely and complete information on the activities process realization. This key timely previous decision correction is possible as well as the realization forecast from the critical point of view and manager concentration on their realization. Besides that, by using mathematical methods it is possible to determine the plan realization probability and upon that determine the management responsibility regularly.

Concerning the quantitative model application concerning the economic problem solving realization it should be pointed out that certain problem number cannot provide enough and precise formulation on which a mathematical model would be based on, so that their realization would not be possible by certain effective quantitative methods.

In this way the investigation trace the providing of qualified realization by the computer and heuristic problem access. The main characteristics of heuristic access are in this: 1. Available information and problem understanding might be (in certain percentage)

incomplete and inadequate; 2. Because of that it is impossible to generalize all possible alternatives and realization; 3. The decision taken is based more on qualitative than optimistic characteristics. So these decisions "are good enough" (not optimal and the investigation result "satisfies") not extremis the chosen aim.

It is easily realized from previous discussions that the information is a "resource" for the quantitative methods appliance in management, for the decision and management process in economic systems. Among the numerous decisions and management investigating processes lots of them are directed to "resource" investigation - management information. That investigation resulted in fast and special computing development of information systems.

Information system is a general item concerning all actions of data collecting, processing, storing and distribution inside of an enterprise, involving personnel, methods and equipment used in that aim. Actually, especially intensive development of this area starts by involving of information technology into information system.

Information technology passes through fast prosperity in the last decades and represents a powerful means significantly influencing the prosperity of contemporary enterprise.

In a very short period of time the use of computers passed from a very simple routine data processing through integral managing information systems to the business development intelligence and expert systems as the management support systems (MSS).

In that development hardware and software parts are equally intensively developed.

The management support system can be explored and defined by: 1. The means providing their functioning and 2. By the function MSS has over the process of making decision.

The first access observed hardware means and appliances providing the MSS functioning. They are the means and systems - providing fast acceptance of new information, their analysis and display, storing and providing the infrastructural base for all applications and users. The other access is more interesting and starts with the role and function MSS has in the making decision process. Through this aspect MSS is directed to give a support to the user by analyzing and pointing out the circumstances of possible stream of activities in the enterprise. It (MSS) is capable of systematizing the valuable knowledge from the pile of dates - to make "diagnosis" on this basis and recommendations (solutions) as well. It that way MSS adds new elements to the existing base in the solving problem process. It is easily realizable from this that MSS gives support to the making decision process within the great number of problems, being turned to the final user. In order to answer to all these tasks MSS, in accordance with (4), consists of the following three subsystems: the data base (organized data and their relations set, the base model (models, method analyzing data techniques and other problems solving techniques, as well as the user's interface (interactive communication "system between the user and computer - system leading" the user and helping him in using the information material).

3. Concerning the previous observations, it can be concluded that the enterprise management problems (considering their great importance) have been analyzing constantly becoming prosperous all the time within the four (mentioned) scientific disciplines management parts. What connects and provides them into their coherent action?

Management means the set of all necessary actions for better using of the available resources with the aim of achieving the certain goals. It consists of two parts: 1. Management defining (problem identification, possible solution defining and solution choosing.) and 2. Management action leading (information transfer, doing the executive-actions, organization and control of realization decision). In that way we come to the main reason and starter of the all process in an enterprise - these are the goals? Actually, management of economic systems only in effect have got some sense only in the case of familiar goals. The realization system of mentioned goals acts as a criterion for the managing success.

Where is the place of the other parts of management process? It could be observed on the basis of the following connections: the goals are achieved by results, the results are realized by the actions, the decisions are needed for the actions, but the decisions are brought on the basis of information. It is said that the basis of management process is information, and the information task is to improve that base and use it. The essence of management is settled to the process of certain decision making so that the decision-making theory analyzes and constantly improves this process. The main part of the decision makes the (optimal) solution. The solutions could be best defined with the help of quantitative models and methods, so that this method development presents a very important lever in raising the management process affectivity. Finally, management with all its function's skills and means of influence represents the connective tissue of all these processes.

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O UPRAVLJANJU PREDUZEĆEM

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Proces upravljanja preduzećem razmatra se i unapređuje u okviru više naučnih disciplina. U ovom radu su ukazuje na mesto menadžmenta, teorije odlučivanja, kvantitativne analize i informatike u procesu upravljanja ekonomskim sistemima. Na njihova mesta ukazuju sledeće veze: ciljevi se postižu rezultatima, rezultari se postižu akcijama, za akcije su potrebne odluke, odluke se donose na osnovu informacija.