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INFORMATION - ESSENTIAL ELEMENT IN DECISION PROCESS MODELING

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Abstract: The development of information technology brought to the inclusion of information as the sixth organization resource, besides human resources, machines, financial resources, materials and management. Even in the condition of not-to-touch state, information represents an extremely economic and efficient way to rejoin the other resources of the firm. In this work we propose to realize an approaching of information respective to its place and role in decision process modeling. For this, we'll analyze the information quality and making decision methods considering the precision and the completeness of data.

1. INTRODUCTION

One of the characteristics of every social and economic system, within the firm it is considered, is finality, that is, the tendency to evaluate for realizing certain objectives. Admitting the worldwide character of entropy rule, whereupon in nature, order tends to turn into disorder, it means that entropic state is characteristic to social and economic systems too. In these conditions, trade societies, as systems, must continuously adapt to the influence of some troubling factors – external or internal – which oppose to gaining purpose objectives or make it difficult. This conformation self-adjusting of firm operation is realized by means of manage stuff activity which essentially represents a chain of interdependent decisions [3].

Decision is main point of management activity because it is regained in all its functions, and more, firm integration within environment depends on the quality of decision. The same time, the quality of decision process influences cost reduction, the efficiency of using funds, gaining increasing etc.

For a good while, management was considered a real art, skill gained after learning from attempts and errors. A variety of particular styles, often relied on creativity, human reasoning, intuition and experience, have been used for solving the problems of same kind, and this, in the disfavor of quantitative methods and scientific approaches.

The complexity of business and their deployment environment has clearly increased in the last decades. There are some major causes which have produced this cause of complexity: the very big number of possible solutions, the heaviness of the long time forecast of consequences because of the increasing of doubt degree, error effects in taking decisions can be terrible because of the complexity of operations and the chain reaction which an error can produce in several branches of micro and macroeconomic levels [5].

The importance of information and informatics systems has been synthesized by J. Naisbitt from the result of a calculation that has tried to establish how many percents of working power of USA is directly engaged in making, using or delivery of information. Pointing that the study has been realized in the middle of the eighth decade of last century, the results are impressing, even to USA – the percent of so-called knowledge *workers* has proved to be about 70% from the whole [7].

The development of information technology brought to the inclusion of information as the sixth organization resource, besides human resources, machines, financial resources, materials and management. Even in the condition of not-to-touch state, information represents an extremely economic and efficient way to rejoin the other resources of the firm. Additionally, information is used both to the assistance of the other five resources in the coordination of organization activities and for planning, direction and checking of these activities. In this context, informatics system building reliable for decision assistance, appears as priority for the new wave of managers.

In a classification of resource importance in management, in the second place, after human factor, there is the quality and repetition of information in business. Nowadays, even if information is no more under-evaluated, under-estimated and under-used, like the last years, however, there is a series of problems joined to its use within decision process. Generally, these problems refer to the quality and value of information, to the amount of information sent to managers and to their cyclicity [10].

2. QUALITY AND VALUE OF INFORMATION

In an ideal case, managers would have to be able to define the type of information that they need and informatics system of management should have to be able to offer them. Practically, this thing is not allays possible. Insomuch as Peter Drucker considered, „*the most decisions must rely on incomplete knowledge either because the information isn't available or it would cost too much in time and money to get it*". However, for take correct decision, managers must dispose of relevant information which bring to knowledge increasing, reduce the incertitude and are useful for the purpose [5].

There is also extremely important from managers the value of information, value that derives from the changes in decision behavior produced by the availability of information. In evaluation of information value, must be also considered its cost of making. Thus, data gaining, working, recording and processing, whatever used means, don't produce values and suppose only expenses. The value appears only when data are communicated and understood by sender, thus turning into information. In the evaluation of information in what concerns made value, its user and also the way within the information is used for improving decision process has a main role [6].

Quality information is that information which creates value through use and is characterized by the following elements: it is relevant for its objective, is exactly enough for its objective, is complete enough for the problem whereat it refers, is from a trusty source for the user, is communicated at time for its objective, is suitably detailed, is communicated through a suitable channel and it is understood by user.

3. THE INFORMATION QUALITY AND MAKING DECISION METHODS CONSIDERING THE PRECISION AND THE COMPLETENESS OF DATA

The precision and completeness represent two distinct attributes, which are giving the utility measure of a data set, with the intention of extracting necessary information for decision process.

The lake of a certain precision level compromises the stability or even the minimum decisional meaning of the obtained solution. The lake of a certain data lead to their supplementation with imprecise estimations (or inconsistent hypothesis) having the same effects [1, 11].

The accuracy and the completeness high related to the date of a model make possible, with good results, a deterministic approach. This is the case of technical

systems, which can be checked, relied on the almost sure access to the complete and exact data.

In economics, with a wide applicability is flexible optimization - a domain which can be synoptically presented in the figure 1.

The alternative decreasing of the precision or the completeness leads to a stochastically, a game theory, or of a fuzzy type approach. The alternative decreasing until certain limit allows a suboptimal approach based on multicriterial type models, with heuristic methods and simulation techniques [11, 12].

The learning to „trials and error" and their use though pertinent analogies with systems or process well known are tries of compensate major decrease of the completeness, respectively, the accuracy.

Practically, the incomplete information leads to indetermination in the „calculus" of the system's behavior [13].

The proposed methods are: the accumulation of extra information (the learning), the parameterization of the inputs (the simulation), the limitative arguments (the suboptimal solutions), the minimum risk strategies (the strategic game theory).

In fact, the vector creating difficulties in obtaining of an added accuracy and completeness of the information is the complexity of the tackled systems.

As a rule, the information is obtained on a hand, in the statistic way, which have a permanent, organized character and on the other hand, the specially instituted way, appeared in necessity case and with non-periodical character (for example the investigation). In both cases, a numerous distortions of the information appear, some of them randomly, some of them apparent – randomly [14].

After the information gathering and the distortions' evaluation, the primary information obtained cannot be used accordingly, because the quantification of this as model variables is necessary.

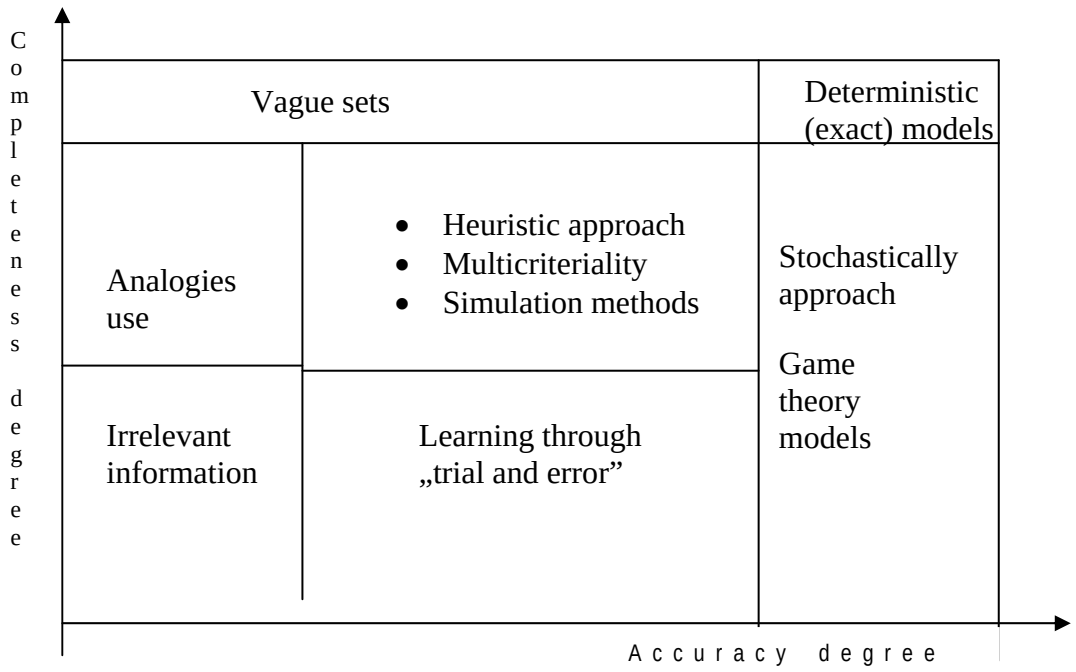

Fig. **1.** *The domain of flexible optimization*

In the moment of the transition from the primary information to the variable which is used into the model, new distortion appear. If the received information is exact and the variable is considered being deterministic, then the distortions are minimum [9].

Generally, if there is a concordance between the variable character and the gathered information, then no distortion appear.

In the case when the estimation concerning the type of the variable according to the character of gathering information was favorable, then no distortion appear.

In the case when a pessimistic appreciation was made, a justified distrusted in results appear, and an extra-effort is required for the data processing.

In this way, a multitude of possible combination among the types of variables and the types of information is realized, having implication on the economical results obtained.

4. INFORMATION AMOUNT AND CYCLICITY

Another big problem wherewith managers fight is the big amount of information. A big amount of data can produce not only system bottlenecks and crowds but also clog managers at their task achievement.

Prior informatics systems were having a big amount of data but those data were turned into information only when they were implied in the process of decision assistance. Unfortunately, in many cases, data are confounded with information and this brings to situations wherein managers are obliged to take important decisions because the lack of suitable information. A good planning and control of operation through effective decisions must rely on an important flux of good quality and real time information. Data must be processed and sent of suitable receiver in a time short enough for wholly change or control the operational environment [2].

Within these conditions and regarding the accelerated rhythm of business, it appears the defined necessity to use an informatics system which to assist the managers. The system needn't embarrass managers' rational process but must increase their capacity and become an extension of their rationing.

In the case of informatics systems for manager assistance, workers are represented by managers. Till about nowadays, all the speeches about productivity ignored the problem of management productivity, they being concentrated over the productivity of workers of the low levels of one organization.

Considered of exclusive financial point of view, work and workers' productivity represents only a part of organization productivity. For example, if management decides to launch a new product that customers won't buy, it's irrelevant whether the workers who realize the product work efficiently or not. To have the good product at the right time has a bigger impact over the organization than the improving of work productivity at the level of workers [4].

One of the reasons wherefore no special importance for management productivity have granted yet, is also that the manager, through the decision which he takes, doesn't realize an independent product. Therefore, there is difficult to measure its productivity by the means of classical methods (quantity of made products, necessary time etc.). Management productivity must be measured through decision quality and necessary time for its taking. This depends especially of the quality and cyclicity of information.

5. CONCLUSIONS

Competition became an actual and difficult problem for every organization. Therefore, it appears the necessity of getting by firms of some competitive advantages. In this sense, a way is using of right information technology, this being the task of informatics systems for the edge management. Computer and data communication technology change the parameters wherein competition in all activity branches is developed.

If in the past, informatics technology pointed to data storage, in modern world it must assure a dynamic vision over organization, easing firm adaptation to environment changes and insuring thus the competition power. This way, information technology becomes a competition weapon, extremely efficient for reach organization objectives. Additionally, it is usable in every activity domain and irrespective of organization size.

For information to be used by an organization as the sixth resource, it must accomplish the following conditions:

- to answer as quickly as possible to the changes of competition conditions; this way can be worked faster the new opportunities and can be reduced the sensible competition points;

- to increase internal efficiency and productivity of organization, pointing managers' productivity; this think supposes a better coordination of functional elements of organization;

- to improve the creativity, productivity and the efficiency of particular and grouped decision stuff within the organization; this think supposes the insurance of suitable instruments for crop real and real time information, the improving of information analysis and decision quality and sending, assistance and monitoring of the implementation of actions and management decisions.

These three conditions are imposed to information for gaining the certitude that it will insure getting of competitive advantage for organizations and the improving of management productivity.

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REFERENCES

[1]. ANDREICA, M., STOICA, M., LUBAN, F. (1998), *Metode cantitative în management,* Editura Economică, Bucureşti
[2]. BEL, G., DUBOIS, D. (1985), *Modelisation et simulation des systemes automatises de production*, APII
[3]. BOLDUR-LĂȚESCU, Gh. (1973), *Fundamentarea complexă a procesului decizional economic*, Editura Ştiințifică, Bucureşti
[4]. COCULESCU, C. (2005), *Realizations and tendencies in economic processes modeling*, Revista „Economic Computation and Economic Cybernetics Studies and Research", vol.39, nr.1-4/2005, pp.187_191, Bucureşti, ISSN 0424-267X
[5]. COOKE, S., SLACK, M. (1991), *Making Management Decisions*, Prentice Hall, (UK)
[6]. DOBRE, I., BĂDESCU, A., IRIMIEA, C. (2000), *Teoria deciziei - Studii de caz*, Editura SCRIPTA, Bucureşti
[7]. GOODWIN, P., WRIGHT, G. (1991), *Decision Analysis for Management Judgmen*, John Wiley and Sons
[8]. HAKEN, H. (1983), *Synergetics – an introduction*, Springer-Verlag, Berlin
[9]. NEGOIȚĂ, C. V., RALESCU, D. A. (1974), *Mulțimi vagi şi aplicațiile lor*, Editura Tehnică, Bucureşti

[10]. RACZYNSKI, S. (2006), *Modeling and Simulation*: *The Computer Science of Illusion*, John Wiley & Sons.Ltd.
[11]. RAȚIU-SUCIU,C. (1997), *Modelarea şi simularea proceselor economice*, Ediția a II-a, Editura Didactică şi Pedagogică, Bucureşti
[12]. RĂDULESCU, D., GHEORGHIU, O. (1992), *Optimizarea flexibilă şi decizii asistate de calculator*, Editura Ştiințifică, Bucureşti
[13]. SHIN, Y. C., VISHNUPAD, P. (1996), *Neuro-fuzzy control of complex manufacturing processes*, International Journal of Production and Research, v.34 no. 12. S.U.A.
[14]. TEODORESCU, H. N., CHELARU, M., GÂLEA, D., NISTOR, S., TOFAN, I. (1989), *Sisteme Fuzzy şi Aplicații*, Institutul Politehnic Iaşi