V. PESCARU

The Management and Data Processing Systems

"The rapidity with which transformations are taking place in the world, the ever closer interdependence among various social-political, economic technical-scientific and cultural phenomena confer on the science of the management a fundamental role in ensuring the advance of human society on the road to civilization and progress".

Nicolae Ceauşescu

1. THE ROLE OF MANAGEMENT IN DEFINING THE CONCEPTION OF DATA PROCESSING SYSTEMS

In defining the objectives of the conception and achievement of data processing systems, one sets out from the necessity of subordinating these objectives to those of management; at the same time, the data processing systems (informatic systems)[1] are considered indispensable instruments for management.

Since the main objective of management is the continuous increase of the efficiency of work in the respective unit, and the objectives of the informatic systems — in their capacity of instrument of management-must also be subordinated to this main goal. Consequently, the indicators of the efficiency increase of work in the economical unit represent the main criterion for estimating the utility of the economic-mathematical methods and of electronic computers in designing and organizing the informatic systems.

[1]) We mean by informatic system the totality of methods, techniques, models, programmes, specific technical means used for the collecting, registering, transmission, processing, questioning and keeping of data (including the object of these operations — data) used for presenting in best time and of an optimal structure of the necessary information (synthetic, selected, analytic, etc.) at various levels or information and/or decision taking points.

The experience gained so far both in Romanía and in the world, powerfully evinces the efficiency of the use of the economic cybernetics methods, of operation research and of electronic computers in the qualitative growth of economic activity and of social life in general, and in the improvement of management activity, in particular [4], [7], [10].

The mere existence of such technical methods and means, in spite of the potential we dispose of in the raising of the efficiency of economic-social activity cannot be a sure guarantee for their turning into an effective and efficient instrument of management. This desideratum may be achieved only if their real possibilities of utilization are known and turned to account and only if the necessary conditions for implementation are ensured, as part of which the level of professional knowledge, the high degree of organization and professional discipline are playing an extremely important role [1], [3].

Hence *a first conclusion*, extremely important both for the conception and designing of informatic systems and for their achievement and utilization, namely the fact that *an extremely important role in the achievement of these systems is incumbent on management.* Management must fully exert its attribute of taking decisions and of control over their fulfilment also in the activity of conception, designing and achievement of informatic systems. Without denying the important role of analysts and designers of informatic systems, of programmers and specialists in the working out and application of economic cybernetics models and of operations researches, the fact should be underlined that the leadership must not delegate these specialists ("technicians") in taking decisions linked with the definition of the theme and objectives for the designing the new informatic system and with the establishment of the necessary and possible resources. However, the "technicians" (either in or outside the system) have the important task to help the leadership in taking decisions in these activities, to be its good advisors, to prepare the necessary information for substantiating and taking of decisions, to elaborate and experiment the most efficient programme and model systems, and solutions.

The activity of conception, designing and achievement of modern informatic systems is characterized by a continuous process of analysis and taking of decisions by the leadership, respectively by the acceptance of the activities of the previous stages or phases and by the approval of passing on to the next stage or phases (see figure 1.).

The quality of a project for an informatic system greatly depends on the clarity of the project theme and of the objectives and on the way in which it embraces and defines the problems which have to be solved [3], [19], [33], [37].

A project theme for an informatic system (because the achievement of these systems is reached by a complex and laborious designing and experimenting activity) can be adequately formulated only by "the user of the instrument", the only one capable of defining the utility of this instrument. Hence, the *second* important *conclusion*, namely that *the clarity of the objectives for the informatic system* and the very quality and performances of the

system *greatly depend on the clarity and exactness of the objectives of management at various levels of the respective system.* Obviously, to actively participate in the conception and achievement of informatic systems and most efficiently to use such a complex instrument based on the application of economic-matematical methods and on the use of electronic computers, *it is necessary for their users to know as much as possible about the possibilities of these systems.* This requirement may be considered as a *third conclusion* concerning the tasks incumbent on the leadership at various levels in the achievement of modern informatic systems.

The role of management at various levels in determining the conception and achievement of informatic systems can be synthetized as follows:

1 — the objectives of the conception and achievement of informatic systems are subordinated to the objectives of the managerical body of the respective unit or organization;

2 — the managerial body of the unit at various levels has an essential role in establishing the conception of informatic systems and in defining the theme and objectives of these systems;

3 — for defining the theme and objectives of the informatic system which are to be achieved in full concordance with the real requirements of the activity of the respective unit or organization, the managerial body (the user) must know as much as possible about the possibilities offered by modern informatic systems and the application of cybernetics methods and of operation researches in economy;

4 — the adequate definition of the theme and objectives of informatic systems greatly depends on the quality of the objectives of leadership at various levels in the respective unit or organization;

5 — the right to decision and control in the conception, designing and achievement of informatic systems must be exterted by the leadership of the unit or organization in which the respective system is introduced.

2. WHY ONE MUST START WITH THE DEFINITION OF THE THEME AND OBJECTIVES

> *"Finally, the correctness and efficiency of management depend on the clarity of the objectives pursued by society, of the tasks raised in various branches of activity"*
>
> **Nicolae Ceauşescu**

Before passing on to the emphasis of the objectives of the informatic systems, we consider it useful to underline why it is necessary to set out in the designing and achievement of economic informatic systems from objectives [3], [19], [25], [30], [31], [32], [33]. It might seem that the explanation to this necessity, being given the logic and obviousness of the fact, would be only the repetition of some very well known things. Yet, the importance of the definition of the objectives, their direct influence on the results of

various actions of the leadership makes this problem be lively discussed within the scientific preoccupations tending to materialize in the science of management. "In any book about the science of management which does not begin with the objective a big mistake is made, because the organizing principle of any structure is finaly, the aim or the objective. Therefore, very many reasonings on management collapse because of the vagueness of the objective "what do we want?". This is the first question which is put"[1])

Only after having specified *what* objectives are facing the informatic systems, what tasks they must answer, we can pass on to the next stages — of determining the necessary resources *(with what, with whom* can we achieve the objectives?) and of establishing the methods of transforming the resources. *(How* shall we transform the resources?) for attaining the objectives. To find an adequate answer to this last question, we must apply also to the methods and techniques of optimization of the transforming process and of the use of resources.

We want to emphasize the importance of the stage of conception of the new informatic system (the stage of study and analysis of the system) in mapping out and establishing the best ways for the achievement of such a system. The conception stage has the task of defining the theme, the objectives and the necessary and possible resources for the attainment of the objectives; only afterwards, one can pass on to the other stages of designing and achievement of the informatic systems. Consequently, there is a compulsory sequence of these stages within which in any condition, for any system, maximum priority should be granted in due time to the stage of establishing the objectives (see figure 1).

The better we think in this first and decisive stage (and, in many cases, the quality of results is directly proportional to the time assigned to conception), the more precisely and more clearly we shall outline the objectives and the easier the next stages will be, stages which are also extremely complex and laborious. The attempts at shortening the necessary time for the designing and achievement of informatic systems by a forced reduction of the period of specifying the objectives and of clearly outlining the conception of the new system have ended and will always end with effects against initial intentions. In such cases, the time required by reformulations, corrections, re-designings, by the re-analysis and remarking of some algorithms, models and programmes will considerably increase, surpassing by far "the economies" of time which had been intended to be obtained.

Figure 1 presents in a synthetic way, the stages which have to be covered by the managerial body of the unit in defining and achieving the objectives of a project of informatic system as well as the illustration of the weight of the contribution of the managerial body at various levels of the respective unit or organization in these stages [37].

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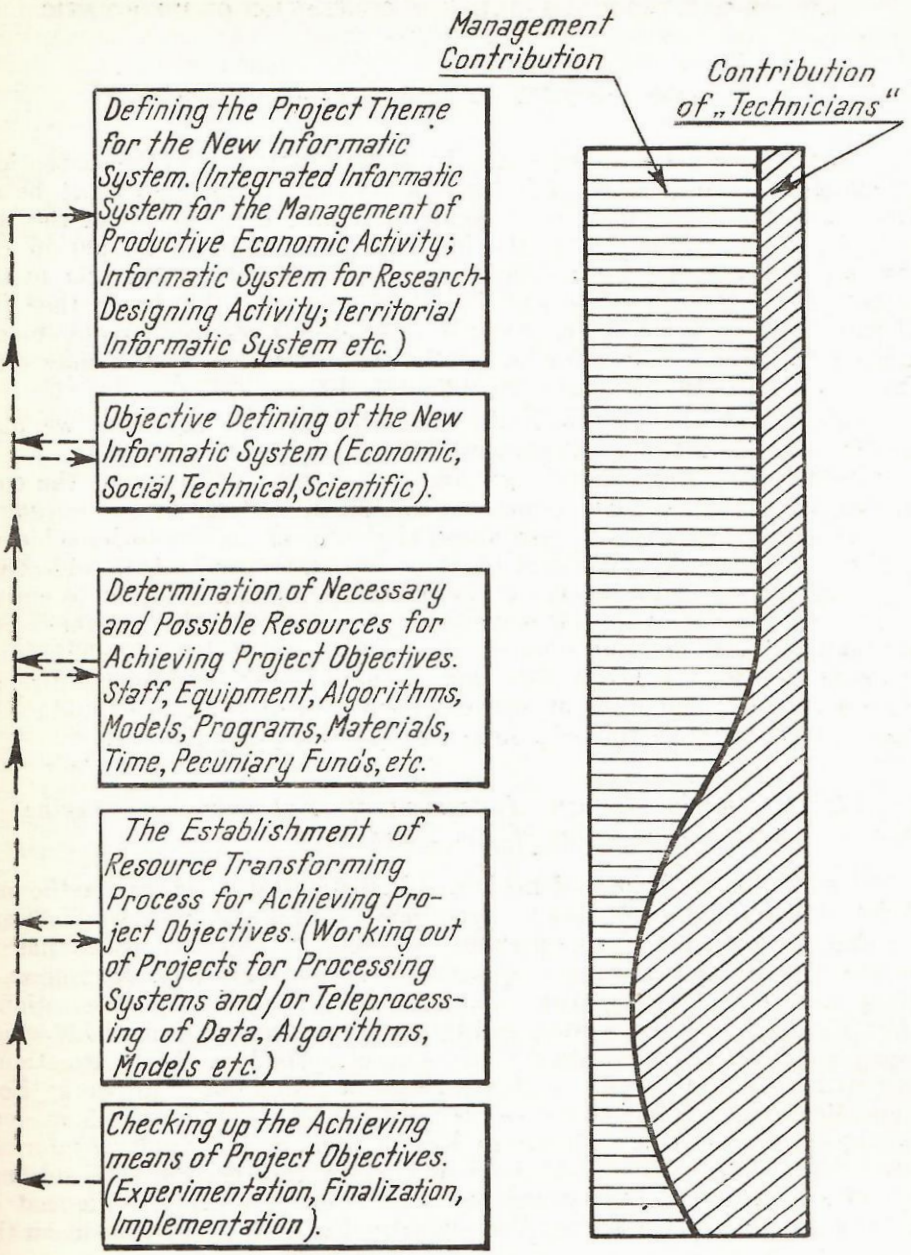
[1]) Mircea Malița: *Art or Science of Management*? FORUM, no. 2, Bucharest. 1971.



Stages of Defining and Achieving the Objectives of an Informatic System Project

Fig. 1

3. THE OBJECTIVES PURSUED IN THE CONCEPTION OF INFORMATIC SYSTEMS

3.1. *An Effective and Efficient Instrument of Management*

As we have already been stressed, the main objective of the conception, designing and achievement of informatic systems is that they must be an effective and efficient instrument for management at all levels of the respective system. Consequently, the informatic system must be put in the service of the user, in the service of the leadership and not the user in the service of the informatic system. The conclusion may be drawn that the informatic system must be conceived so as to answer the user's requirements and not the user to adapt himself to the services such a system may offer him [4], [5], [10], [15], [19], [21], [29], [30], [32], [33].

Identifying the user with the leadership at various levels we may consider the informatic systems as *management informatic systems*[2])

Setting out from the recognition of the basic objective of the conception, designing and achievement of informatic systems as an *instrument for management*, we can easily establish the other objectives to be achieved by these systems, objectives which are subordinated to the basic objective. As an instrument of management, the informatic system is meant to ensure its best satisfaction with the information necessary for the substantiation and taking of decisions and to pursue the carrying out of the taken decisions. The condition for the best satisfaction of the needs of the leadership refers to both the level and moment of the presentation of information and to the quality, form and structure of information [18], [32], [33], [37].

3.2. *Informatic Systems Instrument of Automation of Taking of Decisions and the Elaboration of the Plans*

Under the conditions of modern informatic system based on the use of electronic computers, of data teleprocessing systems and on the applications of cybernetics methods and operation research, an objective which has to be achieved by the informatic systems is *the automation of the process of taking decisions* [10], [15], [16], [26], [31], [32]. "The creation of a rational informational flow in enterprises and the use of mathematical methods which should establish the quantitative relations comprised in the informational data within the flow, professor Manea Mănescu points out in his work "Economic-Mathematical Modelling" — are likely to allow the use of modern techniques of processing and transmission of primary and resulting informational data to the taking of decisions inclusively, thus ensuring the automation of management activity and the correlation of its level with that of the technological processes"[3]). Consequently the task is incumbent on the

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[2]) As one of the main attributes of management is the taking of decisions and the pursuing of their carrying out, we consider adequate also the name of *informatic-decisional system (or the informational-decisional system)* [19], [20], [39].

[3]) Manea Mănescu: *Economic-Mathematical Modelling. Contributions to the Development of the Theoretical Problems of Socialist Economy.* Volume 2. Editura politică 1971. Bucharest.

informatic systems not only of supplying information in due time and of adequate quality and structure but also of taking over from the leadership, from man, where possibilities exist, part of the function of elaborating decisions. The automation of decisions does not imply the elimination of man, of leadership from the process of elaborating decisions but, on the contrary, it requires an increased concern materialized in the explanation and description of the whole set of methods used by it in the elaboration of decisions in order to make possible the transfer of these operations to the electronic computers.

Of course, the passing on to the automation of the process of taking decisions is possible only in the conditions in which this process is or may be known exactly and algorithmized. The exact description of the process of taking decisions can be elaborated only by the persons who concretely and analytically know this process, respectively by the leadership in whose attribution enters the taking of these decisions.

The requirement for the effective participation of the leadership in defining the conception of informatic systems and its responsibility for the achievement of these systems is still more obvious in case of the approach to the automation of the process of decisions elaboration. The additional efforts which the leadership has to make in the stage of preparation and transfer of decisions to the informatic system are fully justified in the stage following the introduction of the automatized decisions, both through the increase of the quality and efficiency of such decisions and through the ensurance of a supplementary time at the disposal of the leadership necessary for a more attentive elaboration of non-automatized decisions as well as for the conception and prognosis activity. The active participation of the leadership in determining the conception and achievement of informatic systems including the decision automation systems proves, as a matter of fact, the receptivity of the respective leadership to the new efficient instruments of management and its innovating, prospective thinking.

In the socialist state, based on a planned economy, in which the state plan, represents the main form of the decision, the application of cybernetic methods and of informatics is an indispensable instrument in the elaboration and optimization of this plan. The indestructible link among the activity of management, of the taking of decisions and planning activity leads to the necessity for a common approach to the problem of the automation of decisions and the automation of the activity for the elaboration of the plans and of production programmes [2], [3], [7], [13].

In the conditions of the present complexity of informational relations and processes characterized by a rapid and substantial increase of the volume of information which has to be collected, selected, transmitted, processed, analysed, etc., operations which evince ever more difficult to achieve with the classical methods and means, the automation of decisions, of the activity of elaboration of the plans and of routine technical operations for data processing mainly pursues a double goal: the ensurance of the fulfilment of these tasks in due time, of an adequate quality and with a minimum possible effort on the one hand, and the release of man from routine tech-

nical operations by their transfer from man to the machine, in favour of the increase of time assigned to activities of conception, prognosis and creation of material goods, on the other hand.

3.3. *The Informatic System — an Instrument of Keeping Records, of Control and Precision*

It is well known that without a full exertion of the control attribute over the implementation of the plans and decisions taken, the efficiency of management activity is considerably decreasing [1], [2], [3], [8], [10], [13].

The control of the fulfilment of the production plans and programmes and of the implementation of the decisions taken by the leadership at various levels is continuously generating a considerable volume of information which has to be effectively collected, transmitted, processed and analysed with a view to ensuring the taking of new decisions, in due time, for bringing the plan up to date and, if necessary, for mobilizing new resources. As we have already been pointed out, such requirements can be adequately satisfied only in the conditions of the existence of efficient informatic systems based on the use of cybernetic methods, of modern electronic computers and of management scientific methods [1], [2], [4], [5], [7], [11], [15]. The inseparable couple represented by decision and control, the plan and the pursuing of its fulfilment also points to the objectives which have to be pursued in the conception of the informatic systems. When we accept as the objective of these systems the automation of decisions and of the activity for the elaboration of plans, obviously, we must also accept the condition for the informatic systems to represent also a main instrument for the pursuing and control of the implementation of the decisions and plan targets.

The informatic system must also be an efficient instrument for keeping records (operative technical, book-keeping, statistical, technological, etc.) and for the control over the unfolding of technological, economic and social processes, over the use of human, material and financial resources, over the relations within the respective system and over the relations with the exterior [10], [26], [29].

Besides these requirements, the informatic system must ensure an adequate level of exactness of information and most faithfully mirror the phenomena, processes and relations characterized by it. The quality and realism of the plans and decisions, depends, to a great extent, also on the quality of the data at the basis of their substantiation.

3.4. *The Informatic System, an Instrument for Diagnostication, Simulation and Prognosis*

The release of the leader in particular and of "the office staff" in general from the routine technical operations for the processing of information on the unfolding of the processes and phenomena in the previous periods leads

to the establishment of the best relation between the period of time assigned to the analysis "of the past" and that assigned to the peraparation of the future. Without denying the importance of the analysis of the development of the economic and social phenomena and processes in motion, of the experience gained in the previous periods, however, the fact should be underlined that between the time assigned to the analysis of the past and that assigned to the study of the future development of the process and of the respective system, there should be a clear difference in favour of the latter.

Through its conception and construction, the informatic system must meet the requirements of a previsional management, the latter being another objective of these systems. Based on the application of the methods of economic cybernetics and of operations research in the concrete economic-social activity, the task is incumbent on the informatic systems of helping through the prognosis and simulation methods in mapping out the evolution trajectory of the system serving it, of suggesting the future trend and of being able to supply information on possible negative phenomena before the latter to become an obstacle or to cause undesired perturbations in the development of the respective system [6], [10], [30], [32], [37], [40]. The roles of diagnostician, simulator and of prognosis can be rightly attributed to the informatic system for management.

4. SOME CONDITIONS OF THE CONCEPTION AND ACHIEVEMENT OF INFORMATIC SYSTEMS

4.1. *Compatibility Between Economic-Social Synthetic (Output) Information and Technical-Operative Information (Input)*

The units or systems pertaining to the sphere of material production, where information with a technical character, technological information have an important share within the respective information systems, through the conception and achievement of informatic systems, will have to perseveringly follow the ensurance of a relation and compatibility between information with a technical character and information with an economic and social character. Under the conditions of these systems, the information necessary for the preparation of decisions, the synthetic information with an economic and social character, the reports generated by various forms of records represent, to a great extent, a synthesis of technical information and of the information on the unfolding of the technological processes and of production [10], [12], [13, [16], [17], [24].

The biggest volume of information which has to be collected, transmitted, processed and registered concerns this sort of data. The most frequent generations, changes and updatings of data also belong to the category of this information. It can be underlined as a conclusion that the frequent changes in the information necessary for the substantiation of the decisions are partly due to the changes in primary technical data characterizing the production process. For this reason, the achievement of compatibility of the input information, of the primary technical-operative data and of techno-

logical data with the social-economic synthetic information obtained as a result of processing (output information) is an indispensable condition for the achievement of integrate informatic systems. The weakening of the preoccupations for the achievement of this objective will have direct and obvious repercurssions on the carrying out of the main objective of the informatic systems, that of an efficient instrument for management.

4.2. *The Ensurance of Solid Relations on a Horizontal and Vertica Line among the Structural Elements*

This condition of the conception and achievement of informatic systems for management aims at ensuring solid and easy relations on a horizontal and vertical line inside the system among its structural elements and outside it [9], [11], [15], [19], [21], [23], [25], [28], [29], [30], [38]. These relations should be understood both from the point of view of the flows of data and of that of decisions, respectively, both in the direction from the effectuation to the decisional level and inversely. The ensurance of solid and easy relations with the exterior units of the same level (horizontal relations), relations the complexity of which is growing with the development of the process of specialization and co-operation as well as the relations of integration, inclusion within some wider, higher structures (vertical relations), such as for example in the department or territorial systems, decisively conditions not only the normal functioning of the informatic system but is also playing an extremely important role in the carrying out of the main objectives by the unit in the respective structure.

The necessity of achieving integrate informatic systems also derives from the objectives of the management systems which aim at increasing the power of symultaneous capacity of the system, the fuller exertion of the function of control over it, the increase of the capacity of information, selection, synthetization and estimation (analysis) of information for a substantiation and most efficient taking of best decisions. These objectives can be considered as being subordinate to the general objective of management which can be synthetized in the fact that under the present conditions in which the evolution of systems is ever more dynamic and complex, the leadership must know most truthfully and rapidly the reality for being able to direct it.

4.3. *The Easy Adaptability of the System to the New Conditions*

The requirement of adaptability of the structures is one of the essential concepts of evolution of the systems under the conditions of the technical and scientific revolution and of its decisive influence on contemporary society. The more obvious by appears this requirement in the achievement of informatic systems, as main instruments for management which besides the necessity of adapting themselves to the new conditions imposed by the evolution

of the systems will also have to help management to an easiest and most rapid adaptation. The objective of adaptability which should be pursued in defining the conception and achievement of informatic systems appears the more necessary as the task is incumbent on the informatic systems themselves, as has already been underline, to supply the leadership, in due time, with information on the reasons and moments when such adaptations are necessary [30], [32].

The informatic systems must be conceived as flexible, modular systems and be as independent as possible from a change in the organizational structures, be conceived in such a way as to easily adapt themselves to such changes. It is absolutely necessary that the development and improvement of the existing informatic systems should be achieved by avoiding redesignings, remodellings and repeatings of experiments. This desideratum can be attained only under the conditions in which already at the stage of conception of the system, the inevitable developments and improvements the respective system will have to bear in the future were taken into consideration. Among the above-mentioned objectives is also that the informatic systems should be conceived in such a way as to back previsional management. The objective by which the adaptability of the informatic systems to the conditions of subsequent development is pursued reveals the necessity for a full use of prospect and prognosis thinking in the very conception of these systems.

4.4. *Increased Efficiency and Convenient Cost of the System*

The condition of increasing economic efficiency by the informatic system which is to be achieved is confounded, to a great extent, through its very subordination, with the main objective as an instrument for management.

If such an instrument does not help in the qualitative increase of activity within the respective system, it is only natural that it should not be accepted. However, it should be underlined that the modern informatic systems based on the use of electronic computers and of the methods of economic cybernetics have fully evinced their utility and efficiency in most cases, more precisely, in all cases in which they were achieved on the basis of an adequate, scientifically substantiated, conception inspired from the concrete requirements of management and materialized through the best use of resources available, by giving attention to the ensurance of the necessary staff of specialists and especially of the own staff in the system.

The ensurance of an increased efficiency of activity served by the respective informatic system must be measured both through the degree of achievement of the objectives proposed and through an increase of benefits, through an obvious qualitative increase of activity in the system. The practice of the use of electronic computers in close relation with the application of the instruments of economic cybernetics, of operations research, of the theory of decisios, etc. powerfully evinces that the highest efficiency offered by modern informatic systems is being ensured, first and foremost, by sol-

ving those problems which could not be approached and solved with the previous techniques and methods. Worth mentioning among them are the operative information collecting, processing, refinding and presentation systems; the models for the optimization of production processes, the models for the elaboration of plans, the models for the optimization of transport network, the econometric models for economic development, systems for best programming of production, models of economic-social prognosis, models for multidimensional decisions, models and systems for optimization and operative control of stocks, etc.

It is only natural that by pursuing to obtain an increased efficiency of the newly proposed informatic system in comparison with the previous system, the obtaining of an ever more reduced cost of the respective system should be also pursued. This means, first of all, to find those ways and solutions which should allow the full satisfaction of the objectives proposed with minimum expenses. This, finally means to choose the ways and means corresponding to the requirements emanating from the objectives pursued and their best use.

We also consider it necessary to underline that when one starts, in estimating the efficiency of the new information system, from the comparison between the cost of this system and the cost of the system which is replaced or developed, erroneous conclusions can be and are even reached. The error is generated by the comparison of two incompatible systems, of two systems which differ and, in most cases, they radically differ both through the objectives pursued, through the possibilities offered by them and through the means and methods used by them. This way of estimating the efficiency of the new informatic systems for management may be identified with the attempt at estimating the efficiency of air transport by comparing the price of an airplane with the price, for example, of 1,000 bycicles.

The objectives of the conception and achievement of the above-mentioned informatic systems are characterized by a close cohesion and a high degree of mutual inter-conditioning. In this way, the weakening of the preoccupations for the achievement of one of the objectives may hinder the results in the carrying out of the other connected objectives. The notion of *package of objectives* comes to emphasize the cohesion and inter-conditioning required by an increased efficiency of the achievement of these objectives. The cohesion and inter-conditioning characteristic of these objectives do not exclude, but on the contrary imply the possibility of differentiating the intensity with which each objective may act. This differentiation is given by the concrete conditions in which the respective informatic system is going to be achieved.

This package of objectives has a high degree of generality for economic informatic systems. It has a wide sphere of action in case of complex informatic systems, characteristic of economic enterprises, of industrial centrals and groups, of production units in agriculture, in constructions and in other fields of economic-productive activity.

REFERENCES

1. * * * *Congresul al X-lea al Partidului Comunist Român.* (The Tenth Congress of the Romanian Communist Party). Editura politică, Bucureşti, 1969.

2. NICOLAE CEAUŞESCU: *România pe drumul construirii societăţii socialiste multilateral dezvoltate.* (Romania on the Road to Building the Manysidedly Developed Socialist Society). Vol. 1—4, Editura politică, Bucureşti 1968—1970.

3. NICOLAE CEAUŞESCU: *Expunere la deschiderea colocviului privind problemele ştiinţei conducerii societăţii.* (Speech at the Opening of the Colloquy on Problems of Science of Management of Society). 6 martie 1972, Scînteia nr. 9130, 26 aprilie Bucureşti 1972.

4. * * * *Hotărîrea Comitetului Executiv al Comitetului Central al Partidului Comunist Român cu privire la perfecţionarea sistemului informaţional economico-social, introducerea sistemului de conducere cu mijloace de prelucrare automată a datelor şi dotarea economiei naţionale cu tehnica de calcul în perioada 1971—1980.* (Decision of the Executive Committee of the Central Commitee of the Romanian Communist Party on the Improvement of the Social-Economic Information System, the Introduction of Management System with Data Automatic Processing Means and the Endowment of the National Economy with Computation Technique in the 1971—1980 Period).

5. * * * *Hotărîrea Consiliului de Miniştri al Republicii Socialiste România, nr. 1719 din 31 decembrie 1971, privind aprobarea programului pentru raţionalizarea sistemului de evidenţă în unităţile socialiste, pe perioada 1971—1973.* (Decision of the Council of Ministers of the Socialist Republic of Romania, nr. 1719 of December 31, 1971, on the Approval of the Programme for the Rationalization of the Record Keeping System in the Socialist Units for the 1971—1973 Period).

6. MANEA MĂNESCU: *Rolul ciberneticii în programarea dezvoltării economico-sociale a României.* (The Role of Cybernetics in Programming the Social-Economic Development of Romania). Studii şi cercetări de calcul economic şi cibernetică economică, nr. 1, Bucureşti 1972.

7. MANEA MĂNESCU: *Societatea socialistă multilateral dezvoltată, etapă nouă a revoluţiei economico-sociale.* (The Manysidedly Developed Socialist Society, a New Stage of the Social-Economic Revolution). Lupta de clasă, nr. 1, Bucureşti 1972.

8. MANEA MĂNESCU: *Progresul economic al României socialiste*; în *„Contribuţii la dezbaterea problemelor teoretice ale economiei socialiste"*. (The Economic Progress of Socialist Romania; in "Contributions to Discussing the Theoretical Problems of Socialist Economy"). Vol. 2. Editura politică, Bucureşti, 1971.

9. MANEA MĂNESCU: *Preocupări cu privire la tehnica de elaborare a metodelor cibernetice în economie.* (Preoccupations on the Technique of Elaborating Cybernetic Models in Economy). Studii şi cercetări de calcul economic şi cibernetică economică nr. 2, Bucureşti 1967.

10. MANEA MĂNESCU: *Modelarea economică-matematică*; în „Contribuţii la dezbaterea problemelor teoretice ale economiei socialiste". (Economic-Mathematical Modelling;

în "Contributions to Discussing the Theoretical Problems of Socialist Economy"). Vol. 2. Editura politică, Bucureşti, 1971.

11. MANEA MĂNESCU: *Preocupări ştiinţifice în domeniul tehnicii calculului economic al cibernetcii economice.* (Scientific Preoccupations in the Field of Economic Computation and Economic Cybernetics Technique). Studii şi cercetări de calcul economic şi cibernetică economică, nr. 1, Bucureşti 1966.

12. MANEA MĂNESCU: *Preocupări şi orientări ale aplicaţiilor matematicii în organizarea producţiei şi a muncii.* (Preoccupations and Directions of the Applications of Mathematics in the Organization of Production and Work). Studii şi cercetări de calcul economic şi cibernetică economică, nr. 5—6, Bucureşti 1966.

13. MANEA MĂNESCU: *Orientări şi tendinţe în cibernetica economică.* (Directions and Trends, in Economic Cybernetics). Studii şi cercetări de calcul economic şi cibernetică economică nr. 1, Bucureşti 1968.

14. ST. BÎRLEA: *Pregătirea cadrelor — condiţie esenţială pentru realizarea sistemului naţional de informatică şi conducere.* (The Training of Personnel-an Essential Condition for the Achievement of the National Information and Management System). Studii şi cercetări de calcul economic şi cibernetică economică, nr. 2, Bucureşti 1971.

15. ST. BÎRLEA: *Sistemul naţional de informatică şi conducere — instrument important în procesul de perfecţionare a conducerii şi organizării vieţii economice şi sociale*; în „Contribuţii la dezbaterea problemelor teoretice ale economiei socialiste". (The National Informatics and Management System — an Important Instrument in Improving the Management and Organization of Economic and Social Life; in "Contributions to Discussing the Theoretical Problems of Socialist Economy"). Vol. 2, Editura politică, Bucureşti, 1971.

16. ST. BÎRLEA, M. PETRESCU: *Reţele de calculatoare şi sisteme informatice în conducerea economică şi socială.* (Computer and Informatic System Networks in Economic and Social Management). Studii şi cercetări de calcul economic şi cibernetică economică, nr. 6, Bucureşti 1971.

17. ST. BÎRLEA, T. HOMOŞ, S. COSTOIU: *Unele consideraţii asupra modelării cibernetice în industria construcţiilor de maşini.* (Considerations on Cybernetic Modelling in the Engineering Industry). Buletinul Institutului Politehnic, Bucureşti, nr. 8, 1969.

18. V. BIŢĂ: *Controlul şi corecţia automată — premisă a folosirii eficiente a calculatorului electronic pentru prelucrarea datelor* (Automatic Control and Correction-a Condition for the Efficient Use of the Electronic Computer for Data Processing). Studii şi cercetări de calcul economic şi cibernetică economică, nr. 4, Bucureşti 1971.

19. GH. BOLDUR: *Informaţia şi decizia în procesul conducerii social-economice*; în „Ştiinţa conducerii societăţii" — Studii. (Information and Decision in Social-Economic Management; in "The Science of the Management of Society-Studies). Editura politică, Bucureşti, 1971.

20. GH. BOLDUR: *Procese informaţionale şi de decizie din economie.* (Informational and Decision Processes in Economy). Editura ştiinţifică, Bucureşti, 1969.

21. G. BAUVIN: *L'informatique de gestion.* Editions Hommes et Techniques. Paris, 1968.

22. J. BROMIRSKI: *Cu privire la instruirea specialiștilor în tehnica de calcul în R. P. Polonă.* (On the Training of Specialists in Computation Technique in the Polish People's Republic). Studii și cercetări de calcul economic și cibernetică economică, nr. 2, 1971.

23. C. COJOCARU: *Atribuțiile conducerii organizațiilor economice*; în „Știința conducerii societății" — Studii. (The Attibutes of the Management of Economic Organizations; in "The Science of Management of Society-Studies"). Editura politică, București, 1971.

24. N. COSTAKE: *Conducerea integrată a producției.* (The Integrated Management of Production). Viața economică, nr. 32 (414), București 1971.

25. A. DELVILLE: *L'information dans l'entreprise.* Dunod, Paris, 1969.

26. M. DRĂGĂNESCU: *Societatea ca sistem*; în „Știința conducerii societății" — Studii. (Society as a System; in "The Science of Management of Society-Studies"). Editura politică, București, 1971.

27. M. DRĂGĂNESCU: *Construirea unui sistem unitar informatic*; în „Contribuții la dezbaterea problemelor teoretice ale economiei socialiste". (The Building of a Unitary Informatic System; in "Contributions to Discussing the Theoretical Problems of Socialist Economy"). Vol. 2. Editura politică, București, 1971.

28. C. M. DRĂGAN: *Organizarea sistemulri de informare economică al întrepriderii.* (The Organization of the Economic Information System of the Entreprise). Sinteză documentară, IDT, București, 1970.

29. N. P. FEDORENKO: *Integrirovannie sistemî obrabotki Dannîk.* Izdatelstvo „Nauka", Moscova, 1970.

30. M. MALIȚA: *Artă sau știința conducerii*?. (Art or Science of Management?). Forum, nr. 2, București 1971.

31. A. MODIN: *Dezvoltarea sistemelor automatizate de conducere a industriei*; în „Probleme ale perfecționării, organizării și conducerii economiei și vieții sociale". (The Development of Automated System for the Management of Industry; in "Problems on the Improvement, Organization and Management of Economy and Social Life), nr. 2, IDT, București, 1972.

32. J. ORLICKY: *Le système informatique de l'entreprise* (traducere din engleză „The Success of Computer System). Editions Hommes et Techniques, Paris, 1971.

33. V. PESCARU: *Sarcini ale proiectării și organizării sistemelor de informatică și conducere*; în "Contribuții la dezbaterea problemelor teoretice ale economiei socialiste". (Tasks of the Designing and Organization of Informatics and Management Systems; in "Contributions to Discussing the Theoretical Problems of Socialist Economy"). Vol. 2, Editura politică, București, 1971.

34. V. PESCARU: *Sistemul național de informatică și conducere și pregătirea cadrelor de specialiști.* (The National Informatics and Management System and the Training of Specialists). Viața economică, nr. 14 (396), București 1971.

35. V. PESCARU: *Sisteme de prelucrare a datelor*; în „Organizarea sistemului informațional economic", Documentare selectivă. (Data Processing Systems; in "The Organi-

zation of the Economic Information System". Selective Documentation). Nr. 8, IDT, Bucureşti, 1971.

36. V. PESCARU: *Optimal Planning of Main Petroleum-Product Transportation.* Economic Computation and Economic Cybernetics Studies and Research, nr. 4, 1970.

37. V. PESCARU, R. HOMESCU, C. APOSTOL: *Analiza şi proiectarea sistemelor de informatică economică.* (Analysis and Designing of Economic Informatic Systems). Academia de studii economice. Bucureşti, 1971—1972.

38. V. PESCARU: *Cu privire la automatizarea sistemului informaţional statistic* (Utilizarea registrelor permanente de date). (On the Automation of Statistical Information System) (Use of Permanent Data Records). Revista de statistică, nr. 7, Bucureşti 1969.

39. I. STĂNCIOIU, I. GUNEA: *Perfecţionarea sistemului informaţional în conducerea ştiinţifică a întreprinderii*; în „Ştiinţa conducerii societăţii" — Studii. (Improvement of the Information System in the Scientific Management of the Enterprise in "The Science of Management of Society-Studies"). Editura politică, Bucureşti, 1971.

40. * * * *Prognoza economică şi socială.* Documentar cu privire la metode şi tehnici de prognoză. (Economic and Social Prognosis. Reference Material about Prognosis Methods and Techniques). Consiliul economic. Bucureşti, 1971.

LA DIRECTION ET LES SYSTÈMES DE TRAITEMENT DES DONNEES

Pour définir les objectifs de la conception et de la réalisation des systèmes informatiques on prend comme point de départ la nécessité de leur subordonner les objectifs principaux de la direction, envisageant en même temps les systèmes informatiques comme étant des instruments indispensables de la direction.

Etant donné que le principal objectif de la direction est l'augmentation continuelle de l'efficience de l'activité dans l'unité respective, les objectifs des systèmes informatiques doivent être subordonnés aussi à ce but. C'est pourquoi les indicateurs de l'accroissement de l'efficience de l'activité de l'entreprise constitue le principal critérium d'appreciation de l'utilité de l'emploi des méthodes économiques-mathématiques et des ordinateurs dans la projection et la réalisation des systèmes informatiques pour la direction.

Dans la conception et la réalisation des systèmes informatiques pour la direction il est nécessaire de poursuivre l'accomplissement de certains objectifs: instrument de la direction à différents degrés; automation du processus de décision et d'élaboration des plans; instrument d'évidence, de contrôle et de précision; instrument de détermination, de simulation et de prévision; création de relations sûres, horizontales et verticales, entre les éléments de la structure d'organisation; adaptabilité facile du système aux nouvelles conditions et autres.

Ces objectifs ont une importante sphère d'action dans le cas des systèmes informatiques complexes, caractéristiques aux entreprises et aux centrales industrielles, aux unités de production agricole dans les constructions et autres domaines de l'activité économique productive.

РУКОВОДСТВО И СИСТЕМЫ ПЕРЕРАБОТКИ ДАННЫХ

При определении целей концепции и осуществления информатических систем исходят из необходимости подчинить их основным целям руководства и одновременно считают информатические системы необходимыми инструментами руководства.

Поскольку основной целью руководства является неуклонное повышение эффективности работы на данном предприятии, цели информатических систем также должны быть подчинены этой цели. Таким образом, показатели роста эффективности работы предприятия являются основным критерием оценки целесообразности применения экономико-математических методов и использования электронных вычислительных машин при проектировании и осуществлении информатических систем для руководства.

В концепции и осуществлении информатических систем для руководства необходимо стремиться к достижению определенных целей: инструмент руководства на различных уровнях; авроматизация процесса принятия решений и разработки планов; инструмент учета, контроля и точности; инструмент установления диагнозов, симулирования и прогнозирования; обеспечение прочных связей по горизонтали и по вертикали между элементами организационной структуры; легкая приспособляемость системы к новым условиям и т.д.

Совокупность этих целей имеет широкую сферу действия в случае комплексных информатических систем, характерных для промышленных предприятий и главков, производственных организаций в сельском хозяйстве, строительстве и других областях производственно-экономический деятельности.