Dr. eng. V. BIȚĂ
Computer Centre
of Chemical Industry

Objectives for the Informatic Systems

The study underlines the objective necessity of raising the efficiency of the informatic systems, of defining some of their clear and precise objectives.

The possible objectives of an informatic system, classified in two groups: final and intermediate, as well as the modality of establishing them are presented . Moreover, stress is laid on the role of the enterprise managerial body in defining the objectives of the informatic system to be achieved.

The efforts made by our State, especially in the past decade to ensure the promotion of modern management methods based on an ever wider use of electronic computers and of other means of computation technique are well known.

At the end of a ten-year period during which the affirmation of the technical and scientific progress in the field of management was based on a Programme adopted by the Central Committee of the Romanian Communist Party [1], we note the impressive advance scored by our country-following the clearsighted policy of the Party leadership and first and foremost of its General Secretary, Nicolae Ceaușescu — in this respect, through the creation of a modern, top industry such as that of electronic computing technique.

At the same time, some remarkable results were obtained in using the respective equipment for the automation of many scheduling and registration activities, at the level of enterprises, industrial groups, economic ministries and at the level of the national economy, as a whole.

For example, referring to the chemical industry, we note that whereas in 1971, the computation electronic equipment was rarely used (3—4 enterprises), at present, over 70% of the enterprises and plants belonging to this industry currently benefit by the services of the electronic computers either of their own, or of the territorial computer centres.

We also mention that at the end of 1980, informatic systems have been homologated in the chemical industry, at over 70 plants and enterprises, 12 of which are complex information systems at some of the most representative plants or enterprises.

Thanks to the informatic systems and applications achieved in the national economy in the past two five-year plan periods, a number of economic results have been obtained, materialized in the reduction of the volume of work for the functioning of the information system, in an increased physical production, in supplementary profits, etc.

However, it should be mentioned that related to the envisaged objectives and requirements, to the material and human efforts made, these results are most often below the facilities provided by the use of electronic computers.

Therefore, in the new Five-Year Plan we have just entered, a five-year plan of quality and efficiency, special targets are set before the informatic activity, especially as regards quality.

We consider that a very clear and precise definition of the objectives pursued already in the incipient stages of the action of carrying out the respective informatic system might have a special influence in using, at a higher qualitative level as regards efficiency, the electronic computers in the optimal management of enterprises.

It is an indisputable truth, that before taking any action, it is very important to establish for its success the final goals which are taken into account.

Although in the case of the informatic systems, the defining of the objectives, especially their quantification is a rather complex operation, sometimes difficult to solve, the introduction of electronic computers-which as is known requires big financial resources-cannot be an exception from the general rule.

In current practice, the achievement of an informatic system is often started without establishing beforehand the concrete effects expected from the use of the computer; it is done generally and rather vaguely. Thus, for example, we often come across "objectives" of the sort: supplying of data for a better substantiation of decisions or for improving the information system, of the decision-making one etc.

Though correct, these objectives are entirely insufficient for orienting the solutions adopted in the informatic system design, for having certain reference dimensions in estimating the results obtained, for mobilizing, stimulating and enhacing the responsibility of the factors contributing to the implementation of the informatic system.

In fact, the lack of precise, quantified objectives is, in our opinion, one of the main reasons for the failure of many applications of the electronic computer or for the obtaining of unimportant effects in comparison with the material, human and financial effort made for its introduction.

The criticism passed in this respect by the Party General Secretary, President of the Republic, Nicolae Ceaușescu is both convincing and mobilizing: "We have introduced computers, have created computer centres and endowed them with a large number of people but, we have not cut the registration and financial staff." [3]

Of course, the criticism refers directly only to one of the main objectives of the use of electronic computers but it also stands for other objectives regarding the introduction of modern computation technique including those which should be reflected in the improvement of management and organization.

THE POSSIBLE OBJECTIVES OF AN INFORMATIC SYSTEM

As regards the technical-economic parameters of the economic system for the management of which the electronic computer is used, the objectives of an informatic system can be classified as follows:

— *final objectives* regarding the results to be obtained by using the electronic computer in the decision-making system and to be reflected in the behaviour parameters of the managed system (the economic processes and phenomena of the enterprise);

— *intermediate or derivative objectives* strictly regarding the functioning parameters of the information system as a system of connexions between the management system and the managed system; naturally the attainment of the intermediate objectives will condition the implementation of the final objectives.

By taking into account the fact that the use of electronic computers in the field of socio-economic activity mainly aims at improving the management of enterprises and of other socio-economic units, an improvement which should be reflected in the raising of the technical-economic parameters of functioning of these economic systems, it results that the informatic system should be subordinated, in the first place, to the carrying out with best results of their objectives by the respective units.

The finality of an informatic system will thus be estimated only from the point of view of the final goal of the economic activity carried out by the respective enterprise, because we cannot speak of the finality of an informatic system as long as the functions for which the enterprise was created are not fulfilled, as long as it does not evince its utility.

Thus, it means that the main objectives of the use of electronic computers for enterprise management cannot be others than those of the enterprise proper or deriving from them.

Similar opinions can also be found in some specialized works which consider that the starting point of the analysis and design of the information network must be the enterprise objectives or, the fact that the present designing methodology of the information systems should be amended, namely the deepening of the analysis and design from the point of view of the enterprise objectives and its activities.

It is worth mentioning that the enterprise objectives may acquire various shares in different stages of development, hence the necessity of tackling the problem of the definition of the objectives of the informatic system in strict concordance with their dynamic character.

For the present stage, the main objectives of enterprises in the national economy have clearly been defined at the Twelfth Congress of the Romanian Communist Party in the Report presented by Nicolae Ceaușescu [4] and in the Directives adopted [2].

Thus, it was pointed out that the main orientation of the future five-year plan is *the more rapid raising of social productivity* through the scientific organization of production and work in all fields of economy. In this respect, the afore-mentioned documents outline that: "action will have to be taken for the cybernetized management of technological processes... the use of electronic technique in production scheduling, in the computation and registration activities and, on this basis, *the reduction to the strictly necessary number of the bureaucratical staff*".

Another important objective established by the Twelfth Congress of the Romanian Communist Party is the higher increase of the efficiency of the economic activity by raising the degree of turning to account the raw and related materials and energy, the intensive use of the machinery and equipment, the reduction of cost, especially of the material expenses and the increase of profits.

The Congress Directives also show that: "special attention will be granted to the improvement of the technical and material supply of production by ensuring the setting of the output rates of material and energy consumption, the extension of the typification of products, the rhythmic unfolding of production cooperation, the corresponding sizing of stocks, the rational administration of the raw and related materials, the organization of their complete recovery and reutilization.

Examining the above objectives, on the one hand and the facilities provided by the informatic systems, respectively by the electronic computers and the economic-cybernetic techniques and methods, on the other hand, we can note that their utilization may greatly contribute, directly or indirectly, to the successful implementation of the respective objectives.

We can thus define as final objectives of the informatic system for an enterprise management, the following:

Table 1

Definition of the final objectives	Way of fulfilment through the informatic system
0	1
a.*analytical* — the reduction of the bureaucratical and registration staff	— the relieving of this staff from doing all the routine work in the registration and computation activity.
— the increase of the volume of production on the existing units and productive areas	— the cut in time and the ensurance of an uninterrupted flow of the production process following the application of automated production scheduling
— the improvement of the use of the basic productive funds	— the use of mathematical methods for establishing the outfit and loading of installations and machines.
— the reduction of production costs, of material expenses, of fuel and energy	— the substantiated fixing of consumption and its rigorous control.
— the reduction of the stocks of raw and related materials and of the unfinished production	— the substantiated computation of the necessary quantities by establishing and checking efficiently the levels of physical stocks.

0	1
— the reduction of unproductive expenses (punishments for the nonobservance of the delivery terms stipulated by contract, payments for extra hours, fines, etc.)	— the launching and automatic control of production, the control of the stocks of finished products, the efficient production scheduling, the checking of the observance of discipline stipulated by contract.
— the reduction of transport expenses and the improvement of the number of the own means of conveyance	— the optimizing of the transport routes the operative scheduling of transport, etc.
— the improvement of the quality of production	— the application of automated control methods and the checking of production quality.
b. *Synthetical*	
— the raising of labour productivity	— the ways shown for the analytical objectives
— the increase of profit and profitableness	— idem
— the increase of the rotation speed of the circulating means	— idem

Besides the above objectives which can be quantified, we can also establish a series of unquantifiable objectives, such as for example: the ensurance of simple and flexible organizational structures; the improvement of labour order and discipline; the raising of the enterprise prestige; the improvement of the general working atmosphere; the reduction of irregular work, etc.

Of course, table 1 includes only the typical objectives; they can be completed with other ones, especially with a specific character.

In our opinion, among the synthetical final objectives special importance should be given to increasing the rotation speeds of the circulating means which, as is known, represents one of the most important elements of the quality of the economic activity of the socialist enterprises.

By examining the ways of increasing the rotation speed of the circulating means, we note that the informatic system can ensure, directly or indirectly, the increase of this speed by:

— establishing efficiently and on a scientific basis the necessary supplies, substantiated on the basis of the volume and structure of production and of the indices of fixing the material consumptions and stocks, thus allowing for the conclusion in due time of supply contracts which should express the real needs;

— an efficient control of the level of the stocks of raw and related materials and finished products outlining the materials for which excess stocks are registered, without or with a slow circulation; on the basis of these data, the enterprise managerial body can efficiently act for preventing the elimination or reduction of the immobilization of circulating means and of stock breaks;

— the optimizing of goods transport by applying mathematical models and analytic balancesheets;

— an efficient control over the observance of contract discipline by the suppliers and beneficiaries of the enterprise, outlining the possible nonobservance of the envisaged intermediate terms and thus preventing the possible non-observance of the final terms;

— the shortening of the fabrication cycle by working out production programmes up to the level of equipment and shift, reducing the possible "strangulations" breaks in the technological flow and ensuring at the same time the optimal loading of the production units;

— the reduction of the unfinished production stocks and of the materials stock in the production process by establishing rigorously the necessary materials and by their automatic launching.

The results obtained by using the electronic computer in the management of the economic activity at a number of enterprises in the chemical industry, such as: the Craiova Plant for Chemical Fertilizers, the Pitești Petrochemical Plant, the "Policolor" enterprise for varnishes and paints etc. have fully confirmed the possibility of increasing the rotation speed of the cirulating means, first and foremost, by reducing stocks both in the supply-marketing process and in the sphere of production.

The final objectives of an informatic system cannot be the same for all enterprises. They will have to be established for each enterprise only following a complex, technical-economic and systemic investigation of the behaviour of the respective economic system, conducted by the managerial staff and experts in organization, management and informatics.

Such an investigation is carried out, in the first place, on the basis of the results written down in the records of the unit which are interpreted in the context of its general economic activity, by estimating among other things:

— the evolution of the economic and financial situation of the unit;
— the efficiency with which the financial resources are used;
— the economic efficiency of the use of fixed assets;
— profitability of products (services) obtained, etc.

Following such an analysis, the "weak points" of the enterprise can be identified, the internal reserves, the possible non-correlations and contradictions which could be eliminated or diminished by introducing the electronic computer, in other words the informatic system, the possibility being thus created for a clear and exact definition of its final objectives.

To identify the possible objectives of the informatic system and, implicitely, to quantify them, we shall apply to analysis methods, such as for example: diagnostication analysis based on ratios, the ORTID method (Objectives, Resources, Transformation, Integration, Development), the criterial, method, the factorial analysis etc.

We shall not deal with these methods as they are largely presented in specialized works. However, we mention that the results obtained by applying the chosen methods must be filtered and finalized especially for the quantification of the objectives, on the basis of the knowledge and experience of the members of the analysis team, applying for this to a number of Heuristic methods.

Typological studies can be extremely useful in this respect, several enterprises of the same typological group being analysed, in this case.

The intermediate or derivate objectives will mainly refer to the elimination of "the weak points" of the existing information system by specifying in fact the directions of its improvement, in keeping with the facilities

provided by the modern technique of data computation, transmission and gathering.

Generally, the intermediate objectives aim at rationalizing the information flows and the record documents, at eliminating a parallelism in data gathering transmission and processing, at faciliting the work of the staff employed in the information system, at raising efficiency, etc.

Consequently, the intermediate objectives of an information system could be the following:

Table 2

Definition of the intermediate objectives	Way of fulfilment of the objective
— the increase of efficiency in data supply	— the reduction of the reply time following the use of technical means for data gathering, transmission and processing
— the raising of the exactness and precision of data	— the almost complete elimination of the manual computation operations and the application of automatic control methods
— the increase of the volume of significant and synthetic data	— the aggregation of data on various aspects of the economic activity
— the rationalization of registration forms	— the diminishing of the number of documents following the concentration of their processing
— the simplification of data flows	— the reduction of the number of data gathering and processing points and the elimination of parallelism
— the reduction of the volume of manual work	— the mechanization and automation of registration and computation operations
— data selection	— data supply in keeping with the character of the decision of the data user

Of course, this table has not an exhaustive character, enabling the determination of other objectives in each concrete case, in keeping with the existent situation.

The intermediate objectives can be established on the basis of the study and analysis of the existing information system, in its organic connexion with the managed system and with the decision-making system, also taking into account the characteristics and possibilities of using the technical means for the gathering, transmission, processing and storing of the data which are to be introduced.

Once identified in the way shown above, the intermediate objectives will be expressed in concrete sizes.

The quantified intermediate objectives will be interpreted *as performers* of the respective informatic system, such as for example:

— the reply time of the system for each component (application, problem) taken separately;

— the degree of precision of the data supplied by the system;

— the degree of turning to account the primary data, etc.

The conclusion is drawn from those shown above that greater attention, than so far, should be given to the analysis of the existing system, as a result of which the objectives of the information system can be defined.

At present, in most cases, the analysis made in designing the information system is taking into consideration a whole number of details, such as for example the number of columns of documents, the number of copies in which a report is made. It includes numerous flow-charts but, it does not refer actually to any of the "weak points" in the activity of the enterprise which should be eliminated or diminished through the information system to be introduced.

Due to such a state of things, they usually pass to the designing of the informatic system without taking into account any concrete objective of the category of those shown above which, naturally, has a negative influence on the quality of solutions, on the effects obtained and, in the long run, on the efficiency of the system as a whole.

In the definition of the objectives of the information system and thus, in the use of the electronic computer in the information and decision-making process, a special role, we should say decisive, is incumbent on the managerial body of the respective enterprise.

Although experts belonging to the analysis and design team hold the main share in the working out of proposals for objectives of the information system, we consider that the responsibility in defining the objectives of the information system must exclusively fall on the managerial body of the enterprise and first and foremost on its manager.

This necessity mainly derives from the following considerations:

— the information system is a component part of the decision-making system and should be an instrument of all managerial bodies in exercising their prerogatives and not only of a compartment;

— the consequences and implications of the introduction of the electronic computer in the life of the enterprise can and must be important, as regards the used working methods the enterprise structures and staff;

— the financial means which are to be used in implementing the system are very important (to the value of tens of millions);

— the length and terms for the achievement of the information system commits the future of the enterprise.

Considering that the objectives of an informatic system can be numerous and varied, it is essential for the enterprise manager, for the collective managerial bodies to analyse the importance of these objectives in keeping with the aims and objectives of the enterprise and, on this basis, they should finalize and organize them.

In defining the objectives of the informatic system we should also take into account the prospects of the enterprise, which should be realistic, because the theoretically possible effects cannot always entirely be turned into practice.

The establishment of the objectives of the informatic system by the enterprise managerial body will enable all the managerial staff to learn clearly and precisely about the advantages of using the electronic computer and, at the same time, about the spendings implied by it.

Experience also shows that a sane psychological climate will be created through it for the analysis and design team, enhancing its sense of responsibility for the success of the system.

REFERENCES

1. * * * : *Hotărîrea C.C. al P.C.R. cu privire la perfecționarea sistemului informațional economico-social, introducerea sistemelor de conducere cu mijloace de prelucrare automată a datelor și dotarea economiei naționale cu tehnică de calcul în perioada 1971—1980.* (Decision of the Central Comittee of the Romanian Communist Party on Improving the Socio-Economic Information System, on Introducing Management Systems with Automatic Data Processing Means and of Computation Technique in the National Economy in the 1971—1980 Period), Scînteia, April 19, 1972.
2. * * * : *Directiveele Congresului al XII-lea al P.C.R. cu privire la dezvoltarea economico-socială a României în cincinalul 1981—1985 și orientările de perspectivă pînă în 1990.* (Directives of the Twelfth Congress of the Romanian Communist Party on the Socio-Economic Development of Romania in the 1981—1985 Five-Year Plan and the Future Guide-Lines until 1990). Editura politică, Bucharest, 1979
3. NICOLAE CEAUȘESCU: *Cuvîntare la Plenara comună a C.C. al P.C.R. și Consiliul Suprem al Dezvoltării Economice și Sociale a României.* (Speech at the Joint Plenum of the Romanian Communist Party Central Committee and of the Higher Council for the Socio-Economic Development of Romania), Scînteia, July 7, 1979.
4. NICOLAE CEAUȘESCU: *Raport la cel de al XII-lea Congres al Partidului Comunist Român* (Report at the Twelfth Congress of the Romanian Communist Party), Editura politică, Bucharest, 1979.

OBJECTIFS POUR LES SYSTEMES INFORMATIQUES

On met en évidence la nécessité objective d'augmenter l'efficacité des systèmes informatiques, de définir les objectifs clairs et précis de ces systèmes.

Y sont présentés les objectifs possibles d'un système informatique, ordonné en deux groupes: finals et intermédiaires, ainsi que la modalité de les déterminer. On souligne en particulier le rôle de la direction de l'entreprise dans la définition des objectifs du système informatique à réaliser.

ЦЕЛИ ИНФОРМАТИЧЕСКИХ СИСТЕМ

Работа выявляет объективную необходимость роста эффективности информатических систем, определения ясных и точных целей для них. Приводятся возможные цели информатической системы, по двум группам (конечные цели и промежуточные цели), а также способ их определения. Особое место выделяется роли управленческого органа предприятия при опрделении целей предстоящей информатической системы.

7.01.1981