

## INFORMATION SYSTEMS IN NOWADAYS' MANAGEMENT

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### ABSTRACT

*The dynamics of the economic life and the contemporary informational explosion have turned the different decision-making assisting systems into a must. Despite the limitations caused by the impossibility for a computer to perfectly reproduce human reasoning, today, in management, information systems are indispensable tools for the modern manager. Their continual improvement, doubled by the improvement of the calculation technology, provide increased possibilities of taking over ever more comprehensive segments of the reasoning activity carried out by the human decision-maker. We shall note that under the conditions created by the Internet, the information system has set itself free from the enterprise and has even gone beyond the scope of the enterprise, providing a direct connection with banks and providers, and offering the corporate leadership data on the leadership of the modern enterprise is no longer satisfied with operative information; it wants forecasts, it wants to foresee its competitors' future moves and the future evolution of the market, taking into consideration what is going on at present. For this reason, although no such decision-making support systems have been designed so far, we can state that the modern information systems should look beyond the perimeter of the enterprise.*

**KEYWORDS:** *decisional process, information system, assisted decision-making*

**JEL CLASSIFICATION:** *M00, M15*

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### 1. INTRODUCTION

In a market economy where the relation *product-market-competitors* is becoming increasingly complex, decision-making people find it increasingly difficult to fulfill their mission. A modern organization should benefit of a *leadership style based on flexibility, dynamism and forecast*. In the context of the diversification of the present socioeconomic environment, decision-making supposes not just the use of inspiration, talent or chance, but also the use of *scientific methods* in the approach and solving of the dilemmas related to the leadership process in the economic systems. The issues related to the decision-making act concern the corporate data gathering, processing and selection difficulties, in general. *Information*, adequately integrated in the *decision-making process*, constitutes an *important resource* for an organization, as long as it is high-quality information, and, at the same time, as long as it is obtained and used at the right time. Therefore, at the basis of any decision making there has to be *complex, operative and high-quality information*.

The meeting of certain criteria regarding the value, the accuracy, the depth, the age, the usefulness of a piece of information is a must if we want it to contribute to the improvement of the product, human skills, management methods, and strategic position of an organization, and to awareness of the corporate development opportunities and an increase of corporate profitableness. Checking the degree to which information is useful for the corporate management in the activity analysis and regulation process, removing the factors that could alter the cause-effect relations in the economic

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phenomena, assuring a rigorous information supply process are pre-requisites that a piece of information should meet in order to have the possibility to be profitably used in the decisional process of an organization.

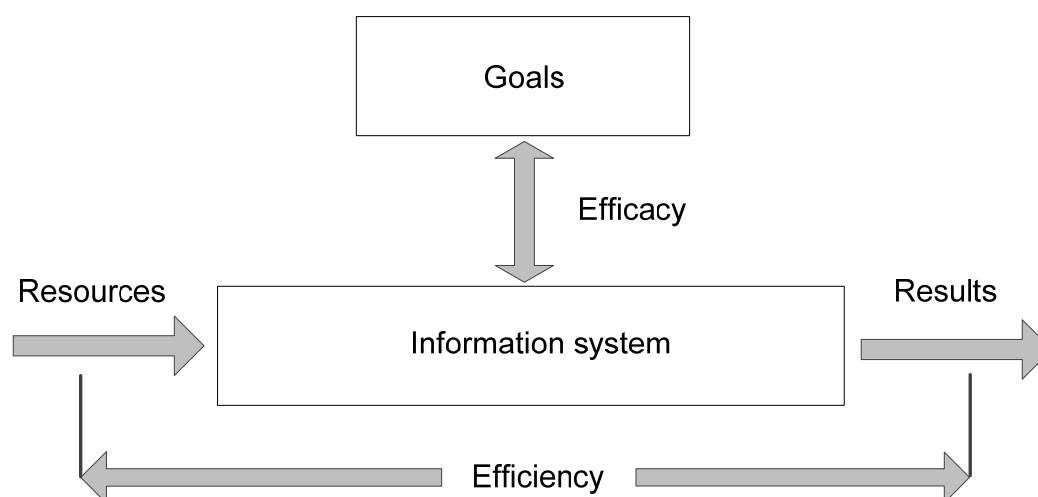
## 2. THE PLACE AND THE IMPORTANCE OF THE INFORMATION SYSTEM IN THE MANAGEMENT SYSTEM

Le Moigne (1990) considers that the information system is a corporate system processing and allowing the information to circulate between two other systems: piloting (decisional) system (the one that sets the goals and establishes the way of turning them into practice) and operating system (the one that realizes the basic activities).

**The goal** of the information system is to render information in a directly usable form and at the right time, the “realization of the own goals of the socioeconomic organism in agreement to the general goals of the society in conditions of maximum efficiency” (Tofan, 2009a).

The information system has two main features (Ali, Ionescu, Cosăcescu & Feleagă, 2007) (Figure 1):

- *efficacy* (possibility to yield results according to the goals of the enterprise);
- *efficiency* (capacity to optimize the use of resources), permitting to satisfy information “consumers”.



**Figure 1. Features of the information system**

Source: Processing of the information systematized in Ali E., Ionescu B., Cosăcescu L., Feleagă I. (1997). *Informatica generala*, Bucharest: Sofitech Publishing House

According Nicolescu et al. (2001), the enterprise’s information system is made up of several closely interconnected components, respectively, *data and information, informational circuits and flows, informational procedures, information processing means*.

The relations between the information system and the organizational system of the enterprise are both functional and structural-constructive.

*The whole information system is based on the organizational structure of the enterprise.* The data and information processing, the operationalization of the information flows and procedures, the use of data processing means are the result of the managers’ and the employees’ exercise of their tasks, skills and responsibilities in the organizational structures of the enterprise.

One can confidently state that the more a corporate organizational structure is wisely and functionally built, the more it assures a favorable base for its information system.

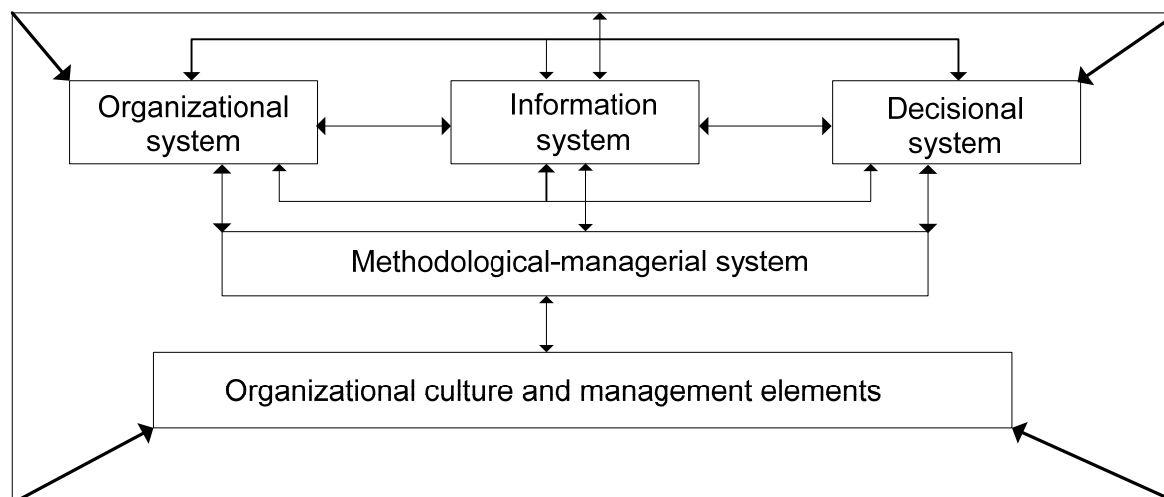
*Complementarily, the information system, through all its components, conditions the functionality of the organizational system.* In this context, we shall note the decisive role of data and information,

for each post-holder in the enterprise, in the accomplishment of their tasks.

Without adequate information, both qualitatively and quantitatively, reaching each post-holder in the enterprise in time, the post-holders will not be able to carry out their activity adequately.

An important impact on the enterprise activity as a whole and on the links of the organizational system goes to the information processing means and procedures.

The components of the corporate managerial system are decisively influenced by the organizational culture and other management elements, as one can see in Figure no.2:



**Figure 2. The components of the corporate managerial system**

Source: Tofan, C. A. (2013), Information System - A Component of the Management System, *Review of General Management*, 17 (1), 188-194

The growth of the information system in point of dimension, complexity and importance, during the last two decennia, has been reflected in the delineation of the so-called information management. According to Nicolescu et al. (2001) *information management* is the use of the managerial principles on forecasting, organization, personnel employment, coordination and control in the information domain.

This type of management includes three major components, namely:

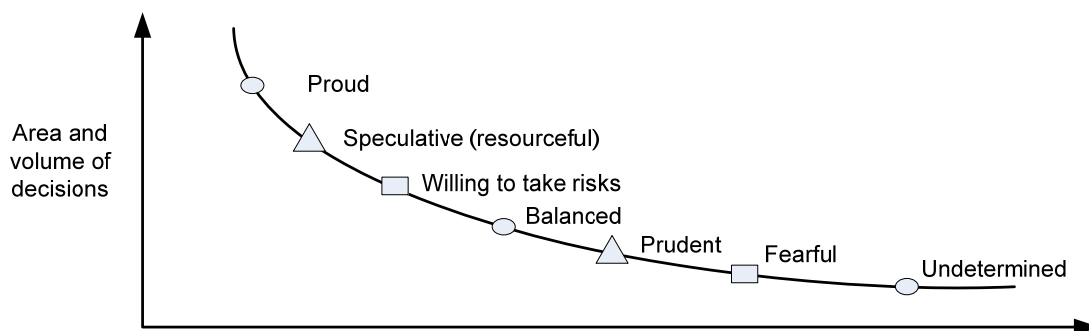
- data resources management;
- information processes management;
- information technology management.

For the performances of any enterprise it is essential that the information subsystem should not to be approached on its own, but in correlation with the other sub-systems that are part of the managerial system.

The specialists should be endowed with anticipative skills based on knowledge, making them able to have a prompt reaction to environmental changes. The success of these approaches starts from the training of a new generation of executants and managers: intelligent, pragmatic, creative, dynamic, supporting informatization and high-quality management.

The choice of the best qualified executants in the managerial domain can be based on the capability diagram presented in Figure 3.

The model of a company proposed by us has the following characteristics: - informatized equipments led by professionals; - teams of specialists interconnected by means of a computerized structure; - schemes of personnel with a low number of hierarchic-functional levels; - convergence between the technological and the managerial perspective; - realization of a "brain-organization" aware of its performances; - the strategy of this company relies on an interactive innovation system supported by a high-performance intellectual capacity; - company endowed with intelligent knowledge processors and self-led specialists.



**Figure 3. Managers' capability curve**

*Source:* Processing of the information systematized in Vădan M. (2011) *Reingineria întreprinderilor mici și mijlocii în vederea integrării în economia digitală*, Doctoral Thesis, Braşov, p. 41

An investigation of the SMEs that are part of the Romanian economic structure has been carried out, in order to highlight what is missing and to determine a solution bringing them closer to the structure of the SMEs of the European economy.

In order to establish the optimal variant to be used by the trading companies in their information-gathering and decision-building, we took into account, beside the informational flow, the hard-soft structures and the set of models allowing for a stimulation of the marketing relations, price models, consumer behavior models, market simulation models and decision-building models in conditions of risk and uncertainty.

Starting from the fact that, on the one hand, mathematical models represent the scientific component of an information system, and, on the other hand, considering the facilities provided by the use of ICT as part of the information system, the latter constitutes a veritable tool in the scientific management of the economic activity.

The information flow, in an industrial company designing and producing patterns, moulds and other similar products and services depends on the following factors:

- managerial goals established for each hierarchic level,
- production type,
- organizational structure.

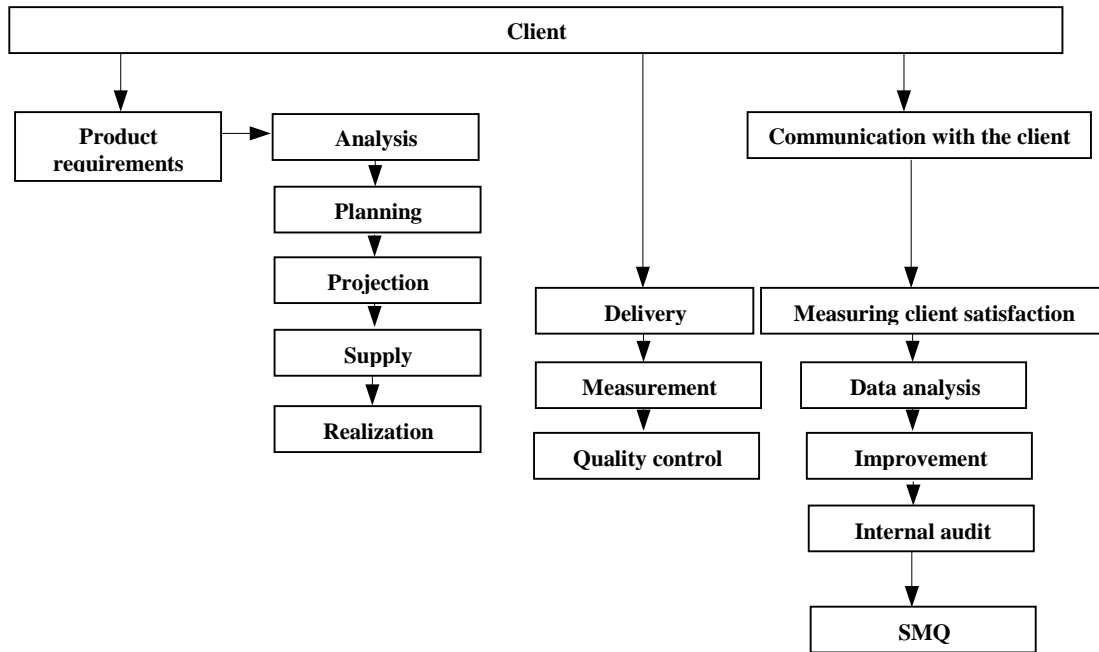
As the managerial information flow needs to comprise all the functions of the enterprise: research-development, production, personnel, finances-accounting, and sales, the managers at these levels need different information types depending on the goals pursued.

The research we carried out has allowed us to identify the following types of information flows:

-Information flows concerning the attaining of the management goals, according to the process scheme presented in Figure 4:

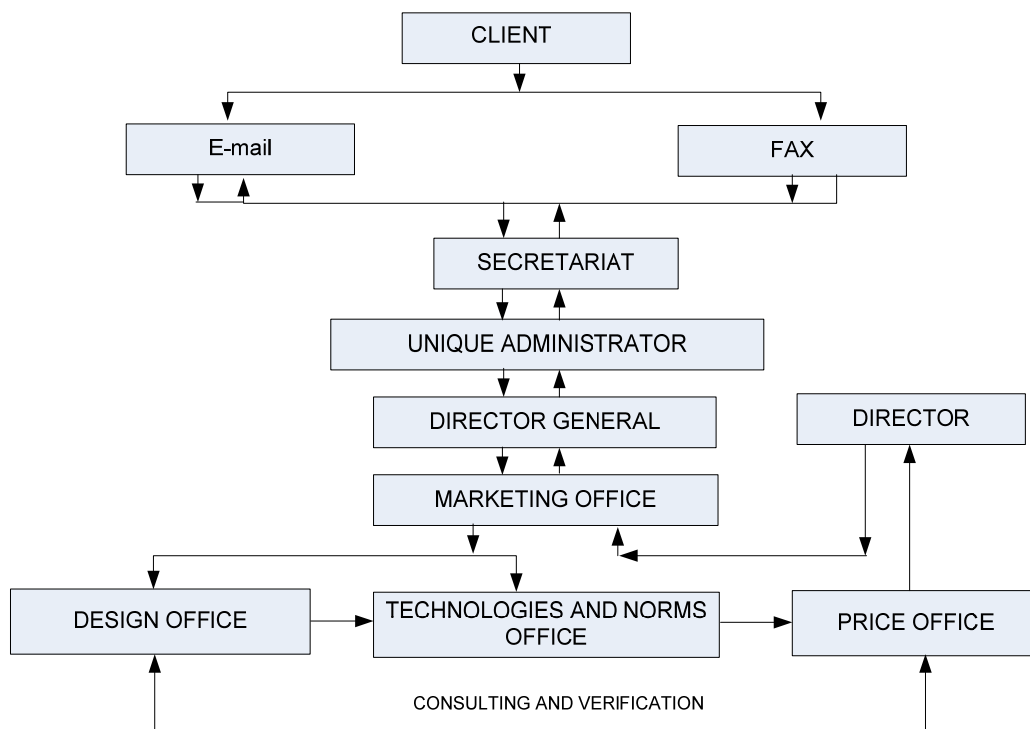
- Information flows dealing with the launch, supervision and achievement of the products

- Information flows dealing with the pre-calculation of the cost per order;
- Information flows dealing with realization degree of a given order;
- Information flows dealing with the post-calculation of the cost per order;
- Information flows dealing with the analysis of the deviations between pre-calculations and post-calculations.



**Figure 4. Process scheme in the management domain**

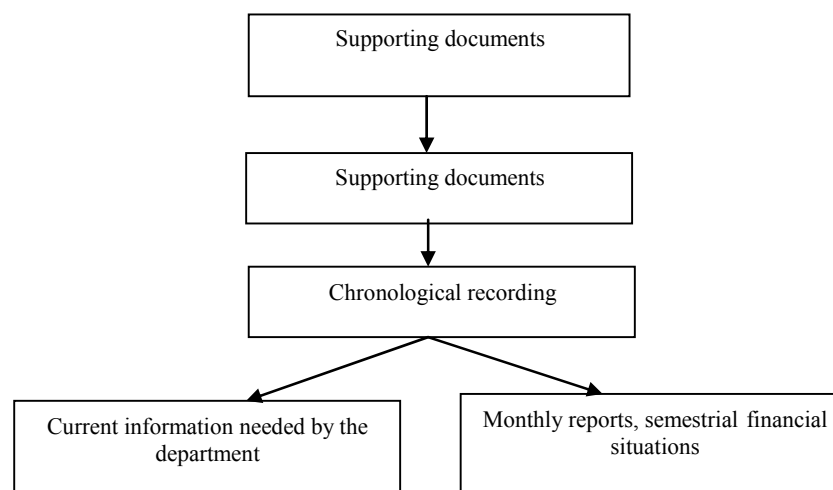
Source: Tofan, C. A. (2009). Assisted Decision-Making, *Tribuna Economică*, 13



**Figure 5. Information flows dealing with the attaining of the economic goals**

Source: Tofan C. A. (2009). Data base concerning the costing management, *Annals. Economics Science Series*. Timișoara, XV, 511-514

We consider that a presentation of these flows according to the information source would be useful:



**Figure 6. Presentation of the information flows according to the information source**  
Source: Bragă V. (2010), *Contabilitatea manageriala*, Pitești: Editura Paralela 45, p. 325

In the economic information system of the enterprises, the great majority of the information is gathered and circulated on supports by the information-bearers that form the corporate recording system, a system divided into three components, namely: system for operative recording, accounting system, statistic system.

Here are a few of the arguments one can bring in favor of a management of the economic organizations using information systems (IS):

- IS offer the possibility to simulate the economic processes and phenomena both at a microeconomic and macroeconomic level. It gives the possibility to elaborate and implement mathematical models regarding the forecast of the economic development, different plan variants can be elaborated and then the optimal variant can be chosen.
- at a microeconomic level, the use of IS allows for a harmonious correlation between the available resources and the proposed goals (e.g.: assisted decision-making based on costs; capital repairs and revision planning; sequencing programming and production surveillance, stocks management).
- the use of IS makes it possible to implement the *principle of selection and information by exception*. Through the application of this principle, the decision makers are unburdened, being freed of a series of data which are often “suffocating” and cannot be adequately used.

**To conclude**, the information system constitutes a crucial subsystem of the corporate management, which realizes multiple functions and is highly dynamic.

The efficiency of the decisional process is directly proportional to the nature, quality, quantity, periodicity and volume of information available to the decision maker (Tofan, 2009a).

Decision Support Systems and Expert Systems comprise and solve decision problems – structured, semi-structured, unstructured – both during the conception stage and in the assistance stages, using mathematical models of operational research.

The decisional support does not depend only on the decisional processes and on the stages of the solving process, but also on the decision-maker’s characteristics and style. The cognitive style is characteristic for the individuals who organize information during a decisional process forming new knowledge. The features of the Decision Support Systems are the following:

- solving semi-structured and unstructured problems at a different level of performance;
- a rational improvement of the decisional system, towards an enhancement of the accuracy and quality of the solution, so that the response time may be minimal;
- they assist decision makers in building their decision by a fast calculation throughout all the stages of the decisional process;
- Decision Support Systems are flexible and adaptable to the change of the initial conditions of the problems to be solved;

- they teach users how to solve problems and how the new knowledge may be used to improve the approach of real problems.

All decision support is made up of three sub-systems, namely data subsystem, model management subsystem and dialogue subsystem (namely communication interface). These structures form the software of the Decision Support System. To these, one can add the hardware needed for the implementation of the soft and that needed by the manager, namely the final user of the hard-soft structure. The data management sub-system comprises the database and the management system used for these data. The database includes the information used to solve the problem and the relations between different data categories. The database management system comprises a package of programs for data introduction, database updating, extracting current data, controlled access to information and the connection between the database and the applications programs. The classical structure of the database is completed by the component of extraction of data from different sources, external or internal to the system; system interrogation components and the component of recording and cataloguing of the data provided on demand concerning the availability of the origin sources and the significance of all the data in the database. This last component is called directory. The model management subsystem includes: the base of models, the management system of the base of models, the directory or catalogue of models, the order processor, used to apply and to interrogate the models. The base of models includes routine relations applicable to decision problems, which can be called, run, changed, combined, so as to have a pertinent contribution to the solving of the decision problems supervised by human experts. The bank of models includes: strategic, tactic, operational and special models.

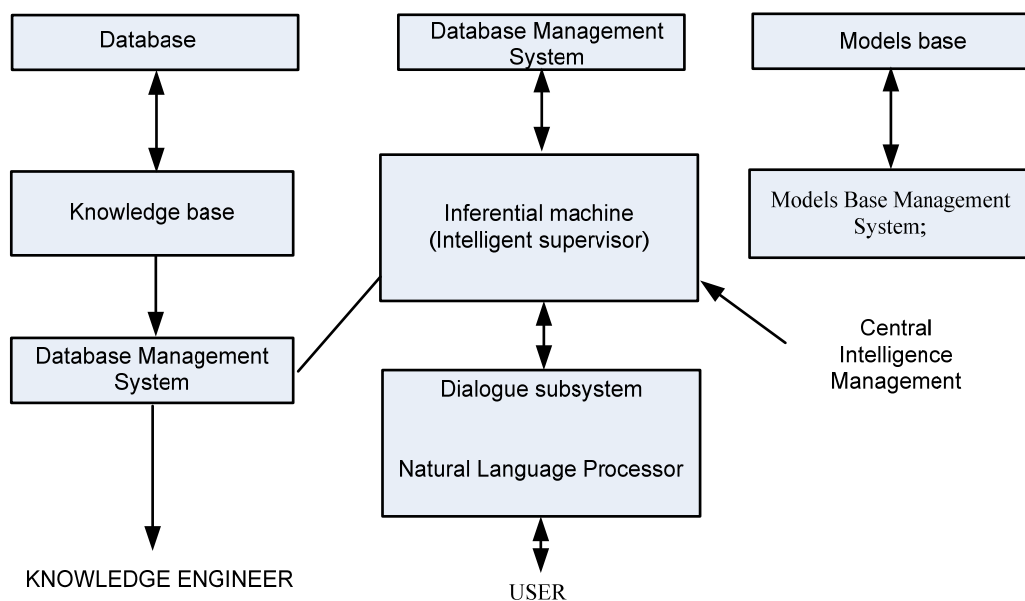
The management programs in a database accomplish the following roles: create models, use specialized sub-routines, update and change models, efficiently coordinate the use of all the models, reasonably use the relations between models and data. The directory represents a catalogue of models, with definitions of their structure and of the main efficiency functions. It indicates, on demand, the availability of the mathematical relations in the structure of the expert system for different applications. The dialogue or control component pursues the execution or integration of the models and assures the interpretation of the instructions by means of an order processor. The user interface is made up of a hard-soft structure in order to realize the communication between the Decision Support System and user. The dialogue process is made up of three components, namely: command language by which the user communicates the deadlines to the decision system; presentation language by which the system communicates outputs to the user and knowledge required in order to be able to rationally benefit of its services. The combination of the hard-soft performance levels defines the dialogue style of the Decision Support System with the rest of the collaborators. It determines the efficiency of the decision. The dialogue process has a hard component for the input (keyboard) and output (terminal, printer, plotter, etc.) and soft for command and presentation languages, including for the processing of natural language and dialogue coordination.

The architectural structure of an intelligent decision system can be seen in Figure 7:

The user of a Decision Support System is a manager faced with decision problems that need to be solved efficiently. He can use the Decision Support System along the following lines:

- the user can receive reports from the decision system on a regular basis;
- the support system can communicate online with the user;
- the decision maker can be a direct user via a sequence-based access technology;
- a direct supply of data to the decision maker by intermediaries carrying out analyses, interpreting results and drafting synthetic reports;

An efficient correlation with the terminal module can be realized by managers knowledgeable in this domain.



**Figure 7. Architecture of an Intelligent Decision System**

Source: Tofan, C. A. (2009), Proiectarea depozitelor de date pentru previzionarea, calculul si analiza costurilor, *Tribuna Economica*, 36

### 3.CONCLUSIONS

A high-quality decisional process has influence on profits, costs and on the efficient use of the production factors. The decisional process involves significant time consumption; during this time, different pieces of information are gathered and analyzed, different people are consulted in order to delineate the decisional situation. The decision-making process and its quality are also influenced by the aptitudes, the training and the involvement of the decision maker. In order to result in a well-grounded and opportune decision, any decisional process needs to acquire, to process and to interpret an increasingly significant volume of information, in an ever shorter interval of time.

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