UDC 378.6:33

V. V. DIK
"Sinergy" University, Moscow
A. I. URINTSOV, I. V. PAVLEKOVSKAYA
Plekhanov Russian University of Economics (PRUE), Moscow

MONITORING SYSTEMS OF APPLICATION EFFECTIVENESS ARE BACK

In this paper we have investigated the existing methods and computer tools used to support decision-making and control of execution of decisions at all levels of subjects of economy in the information society. Decision support systems (DSS) are a class of information systems, which are a set of tools that support the process of forming solutions. Mandatory element of the architecture of these systems is the knowledge base.

Keywords: DSS, computer-aided design, APM, control of execution of decisions.

В. В. ДИК
Университет «Синергия», г. Москва, Россия
А. И. УРИНЦОВ, И. В. ПАВЛЕКОВСКАЯ
Плехановский российский экономический университет, г. Москва

СИСТЕМЫ МОНИТОРИНГА РЕЗУЛЬТАТИВНОСТИ ПРИЛОЖЕНИЙ ВОЗВРАЩАЮТСЯ

В этой статье авторы исследовали существующие методы и компьютерные инструменты, которые используются для поддержки принятия решений и контроля за исполнением решений на всех уровнях субъектов экономики в информационном обществе. Системы поддержки принятия решений (DSS) представляют собой класс информационных систем, которые являются набором инструментов, которые поддерживают процесс формирования решений. Обязательным элементом архитектуры этих систем является база знаний.

Ключевые слова: СППР, АРМ, контроль исполнения решений.

Development of corporate information systems, as control of the Russian economy is closely linked to changes in the various fields of application. The transition to a civilized market economy is characterized by changes occurring at both the macro level - in sectors of the economy as a whole, and at the micro level - enterprises, organizations and institutions. The result of the above mentioned is the emergence of a fundamentally new economic objects and concepts, changing the nomenclature provided by business entities and services. Under these conditions information systems, which are tools that support the business, undergo a radical change. The rapid growth and differentiation of demand for all kinds of information, including scientific, technical and, increasingly, economic as well as increased requirements for its content and presentation, is the dominant stimulus for the development of DSS. Thanks to scientific and technical progress, there are new hardware and software solutions, new approaches related to the design and use of information CSIT as a means to support management decision-making, which is a necessary and sufficient condition for survival and profitability in the face of increasing competition [1].

The fundamental directions of development of methods (principles) of knowledge representation allow analyzing information technology known today, implementing DSS, in a manner reflecting the knowledge. All DSS reproducing human thought processes should be divided into two classes, both conscious and unconscious. This follows from the division of the two forms of psychic reflection in man: the conscious and the unconscious [2, 3] (We may use the terms "explicit" and "implicit" knowledge are used instead of "conscious" and "unconscious" knowledge.). The first class covers a wide spectrum of information technologies, in order to find out which of them belong to this class we need to isolate the typical mental procedures performed only by a human expert and not only man, but also a system that claims to the title of the adviser (the more such procedures it can perform, the more reason it gets to be called this way).

During the decision-making process it is natural that a problem of experience, intuition and other semistructured knowledge reflection appears. Decision-maker should indicate in the system the main ways of decision search, that are preferred. Precise methods (optimization, simulation, etc.) can be helpful only when the main strategy for decision search is identified. Moreover all quantitative methods can not characterize qualitative sides of the problem and therefore can be used in the next steps of decision preparation. Completely formalized methods of decision preparation are based on well-known optimization methods are not much popular today but they contributed much to the development of this scientific field.

Management practice showed us that in the majority of cases the results we get with methods of this kind hardly reflect the realities of manufacturing practice, because they cannot take into account the abilities of an individual.

However the analyses of development in the field of decision-making support show us extremely poor set of means and methods used to solve such kind of problems. Especially it concerns advising systems that are able to answer a question "What should I do to...?" The problem of inconsistency between theoretical basis of decision-

making support systems and changing requirements of the enterprise management quality are more and more important today. Theoretical methods of decision-making support systems known today do not allow us to design tools that can support all steps of decision-making process and synthesize formal methods of decision preparation with knowledge and experience of a manager.

Measuring the performance of a manager demands new type of indicators development and these indicators must fit stated goal adequately and measure exactly what we need to measure and analyze, and nothing else. Also, when we make decisions based on the indicator, it is supposed not to influence negatively on other indicators. We can find the origins of an idea of performance indicators system of objects and processes creation in works on quality control.

However, the question systems had an indicators' system connection neither vertically nor horizontally (i.e. the indicators on the same level). There are two opposite views on the indicators complexity in scientific literature that is severely poor with indicator ideology. The first is pragmatic. It states that to measure processes and objects we can use as much indicators as needed that due to theirs diversity will give a complete view for analysis. The second is the theoretical view. It is based on the idea of the complex indicators creation that can be decomposed different ways. It is a kind of an integrated indicator that completely measures the main parameters of the process (like aircraft instrument "auto-horizon"). The majority of complex indicators utilized in economics conform to the idea of U. Ashby told about the necessity of bringing into concordance the mechanism of system management and system's multiplicity.

However the main problem here is coupling indicators of different management levels. Especially it concerns the top-management level where the strategy is generally defined verbally or probabilistic way and sometimes even the way of uncertainty. The second problem lies in the full connections of lower level indicators and strategy opacity for personnel. An average employee of an inferior level has a vague idea of how he influences on overall mission implementation process.

The problem of conducting calculations lies in the dimension of indicators harmonization and, in fact, conducting calculations. Generally trajectory goals that are set by the manager to his subordinates are economic indicators only. Management staff of the company should create their own indicators and if they suppose qualitative assessment, it is necessary to set up a correspondence with quantitative characteristics. To do so we should work out appropriate scales. The important question is the evaluation of indicators performance and also ensuring their consistency if in decomposition the low level indicator is linked to more then single higher level indicator. Moreover, the multiplicity of complex indicators decomposition methods can result synonymy and ambiguity.

Indicators, that are used for measurement and monitoring which help to solve practical management problems, should support strategy implementation.

At the same time different departments performance indicators should be in concordance with each other and organizational chart should provide coordination of its indicators and processes' goals. It removes contradiction between functional and operational management. According to the Key Performance Indicators (KPI) concept all indicators can be grouped the following way: branch-wise; corporate; departmental.

Such indicators system can have the problem of duality. Contradictions initiate movement, and their resolution lies in "dynamic balance" between system stability and its constant improvement, in other words - searching for new management decisions, because old stereotypes cannot be used under conditions of permanently changing environment. One of the fundamental contradictions marked by G. Simon and typical for companies is the connection duality of individual employee and the company in general. On one hand a company should give him as much freedom as possible to utilize his creative potential, but on the other hand the degree of organizational influence should be strong enough so that the activities of the individual remain in the field of organizational directions and do not contradict them.

Decision makers usually perform the following thought process: draw conclusions based on the analysis of complete, incomplete and unreliable knowledge; explain and can justify why they have come to a certain conclusion; improve their knowledge, their re-systematize, and trained on his experience of others; make exceptions to the rules, use the contradictory and implausible information; determine the level of their competence, i.e., determine whether they can make a decision or not in this case. These procedures are rarely performed by a specialist in full and, as a rule it is limited to the first three. Therefore, the fundamental difference between the DSS is their ability to reproduce and manipulate the fragmentary, inaccurate and inconsistent knowledge. These systems must be capable of reasoning not so much based on formal mathematical logic, but rather on the basis of computer logic, i.e., close to human logic. Moreover, the system must be able to explain why it has come to a certain DSS conclusion reproducing most of these procedures constituting the first class, a feature of which is a static reflection of conscious mental activities of a man. Such reflection is done either by deterministic dependencies (equations, inequalities, algebraic expressions, or other), or with the help of logical rules based on first-order predicate calculus. Hence, in first class DSS it is appropriate to allocate settlement systems, named now application performance monitoring systems (APM), for the purpose of their creation is to monitor the state of any objects or processes, timely signalling the emergence of negative phenomena, the last assessment and issue recommendations for their elimination. These systems have been specially developed in areas such as economic and technical monitoring. The task of technical monitoring includes monitoring of deviations from their expected state parameters. APM search for quick solution in case of deviation from the normal characteristics. This could include information systems,

accompanied by a continuous production (e.g., operation of power plants) or systems that control the movement of vehicles. Less-developed monitoring systems are social, designed to monitor social phenomena and control the effects of the adoption of certain socially significant decisions. With regard to economic monitoring, until recently, the public need for such a system has not been formulated. [4, 6] Concepts such as inflation, discount, exchange rate, and other emissions were practically absent as the indicators used to control the socialist enterprise.

With the change of economic relations systems have become popular which are capable of timely warning of the changes that occurred in the dynamics of stock prices and are able to calculate the possible consequences of such changes in the near and distant future. And to identify and analyze trends in his work, which arise under the influence of micro- and macroeconomic factors. Economic monitoring methodology considers the following classes of systems offering:

- Production monitoring, intended to detect abnormalities in the financial (accounting) indicators reflecting the work of enterprises and commodity and stock exchanges;
- Institutional monitoring, intended to detect the reaction of the enterprise to changes in legislation and actions of power structures.

If in the world practice monitoring the commodity and stock exchanges has already been mastered, the financial monitoring of enterprises is not sufficiently developed. Its goal, in this case, is to identify the situation and finding sufficiently effective solutions for its improvement.

APM Systems are based on the nature of deterministic dependencies defined to achieve well-formulated goals of management. Identification of the roots of inefficiency of an enterprise depends significantly on the ability of the expert to analyze the state of production and management, to formulate a diagnosis and develop a prescription which is a list of events. [5] Because this analysis involves various functions of the enterprise it is difficult to reflect the results in the knowledge base. The list of components of DSS, which should provide decision-makers with relevant information, is determined by the basic functions:

1. Recognition of the current economic situation, its analysis, the formation of the diagnosis and immediate objectives, the achievement of which will revert to the desired path for the company.
2. Developing ways to achieve formulated goals with the existing enterprise resources.
3. Addition, modification and elimination of obsolete expertise.
4. Providing a friendly user interface (e.g. dashboard).

Implementation of recognition function and solution of the problem requires DSS units diagnosing object management and possible ways to achieve these goals. Central place to replenish and modification of knowledge system is occupied by knowledge base unit, which may be the integration of objectives tree and graph performance. This integration allows, on the one hand, to ask the ultimate goal of control (for example, increase profitability, reduce costs, reduce the amount of work in progress, etc.), and on the other, to present this goal in a set of design formulas. And the terminal nodes of the graph indicate the specific actions of the officers involved in achieving the goal. A special place is occupied by unit calculations, matrix filling solutions and choice of alternatives. By using it we set a state in which the enterprise is located, and sought a way to exit the current economic situation. The considered class of systems is rather complicated, not only in practical implementation. It does not completely solve some theoretical questions, which should include the following. Justification granularity purposes sufficient for an adequate response of the system to external fluctuations are absent. Development of alternatives, sufficient to make effective decisions is problematic. Development of preference function (assessed developed alternatives) is difficult and often impossible procedure. Overlay (synthesis) calculation of formulas for the purposes of the tree is problematic; making it difficult to use these systems in the practice of creating DSS, besides information about the environment is used in limited quantities, which greatly impoverishes produce results.

Summary. Decision Support Systems (DSS) has evolved a number of stages, which were realized in different periods using various methods and tools. Experience of creation of DSS allows us to understand the need for monitoring system performance of applications that are close to the performance of control systems - EIS. But now we are seeing a new interpretation of these systems in the form of APM systems. Monitoring systems provide performance monitoring software and hardware, as well as operational control of management based on the key performance indicators that provide flexible configuration of decision support systems and business performance management systems tailored to the specific needs of the customer.

They offer different types of quality control, both staff and IT business applications and business processes. Among the objectives of APM: To detect problems in the personnel, equipment and software; tracking changes in the personnel of the enterprise; determination of the influence degree of deviations from the object parameters, which allows you to set priorities in the work to eliminate them; more efficient use of resources of the enterprise; providing statistics on the work of IT staff and business applications; improving the quality and efficiency of the staff supporting the implementation of the strategic vision of management by automating the tracking of strategically important business processes and others.

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Надійшла 14.09.2015; рецензент: д. е. н. Алферова З. В.