Microsoft Business Solutions-Axapta as a basis for automated monitoring of high technology products competitiveness

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Abstract. One of the conditions of normal performance of the Russian economy is the problem of high technology products competitiveness. Different tools of these products estimation are used nowadays, one of them is automated monitoring of the high technology products in mechanical engineering. This system is developed on the basis of "Innovator" software integrated in Microsoft Business Solutions-Axapta.

1. Introduction

During the last 22 years coal mining industry, mechanical engineering and other industries have undergone a number of deep reforms and have changed drastically. Both qualitative and quantitative indexes of these industries have changed, the role of these industries in the system of international economic relations have become more significant [1].

The aim to modernize the economy of Russia based on innovations was declared about six years ago, but the achieved results turned out to be far from those expected by the authors of the concept and the society [2].

The problem is that now the domestic producers do not treat the issue of competitiveness seriously. However, there is a tendency that without the competitive high technology products modern companies cannot retain their market niche.

The major part of the issue of the high technology products competitiveness consists in the problems of a technical character. For example, in paper [3] technical parameters are used to increase the durability of cutters of mining and road-making machines. However, the issues of competitiveness should be considered not only from the technical point of view, but from ecological and social points of view as well.

That is why the problem of reliable estimate of high technology products competitiveness, creating an automated decision-making system on producing and consuming high technology products is of great urgency.

2. Integration of automated monitoring of high technology products competitiveness in Microsoft Business Solutions-Axapta

There are various tools to estimate competitiveness, and one of them is automated monitoring of high technology products competitiveness in mechanical engineering (AMCCE) [4].

The integrated system of company management of *ERPII* class *Microsoft Business Solutions-Axapta* is a scalable system for small and medium-size businesses, corporations, holding companies that require a uniform solution.

The AMCCE system has been developed based on functional module «Questionnaire» of *Microsoft Business Solutions-Axapta* in combination with "Innovator" software (Fig.1).

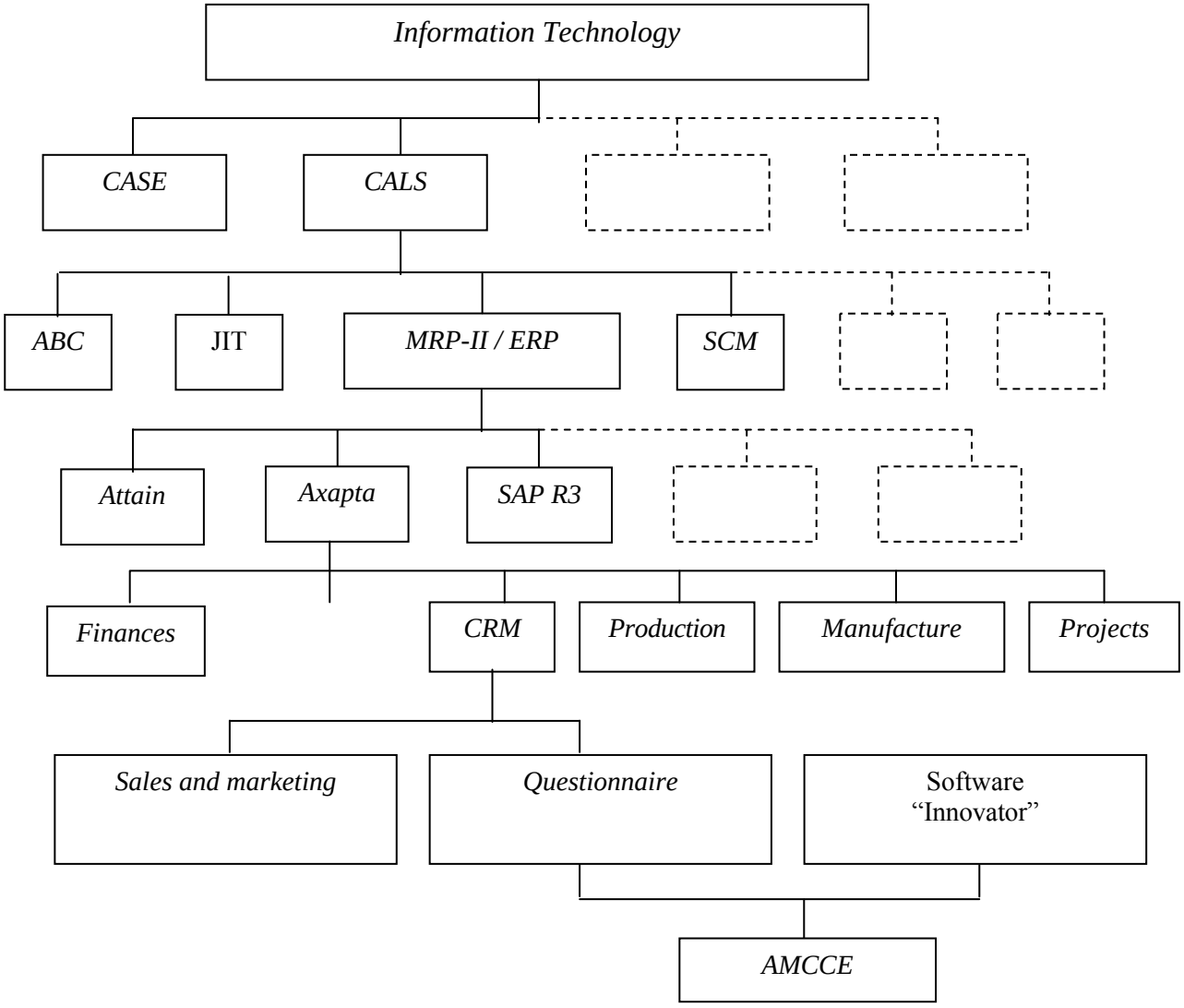

Figure 1. Integration of automated monitoring of high technology products competitiveness in Microsoft Business Solutions-Axapta

The functional modules of the system are Production, Finance, Fixed Assets, Wage, Knowledge Management *(KM*), Human Resources (*HR*), Customer Relationship Management (*CRM*), Logistics, Warehouse Management, Business Analysis, Product Configurator, Projects, Corporate Portals.

The AMCCE system is integrated with *Microsoft Business Solutions-Axapta,* namely its module *CRM,* which allows storing all the information about clients, partners and other contractors centrally. Employees form different departments can input, view and use this information for their purposes. As a result, the coordination of all the divisions of a company can improve, and in the first place of sales and marketing departments. Due to close integration with other modules of *Axapta*, which automate work with customers and clients, the CRM module supports business processes of companies of any type.

Thus, one can build a module in accordance with ones' own specific business processes; there is no need to modify them depending on the system's capacities.

The CRM module allows creating applications for current and prospective customers, and make simulations based on offers. The offers with a selling probability higher than specified can be taken into account in combined planning.

Microsoft Business Solutions-Axapta helps the heads of sales departments manage the operation of certain sales managers and departments in general in a more efficient way, achieving the set goals and increasing the efficiency of operation. The system automates carrying out marketing campaigns, calling and collection of information about the current and prospective clients, suppliers and partners.

Management of sales and marketing in *Microsoft Business Solutions-Axapta* is closely integrated with Customer Relationship Management (CRM). Such integration improves interaction of marketing and sales departments and, as a result, overall performance of a company as a whole. Because all the business information is well structured and stored in one place, the staff of the sales and marketing departments have an opportunity to analyze and estimate various data and to find new opportunities for sales easily. The marketing functions make it possible to define, what information is necessary for clients and the market, to plan, budget and hold marketing events, and to analyze their results.

When organizing marketing campaigns, *Axapta* can segment the target audience. It helps to carry out campaigns more successfully and to analyze their results in more detail, so it is easy to estimate the efficiency of campaigns, comparing their costs to the gained income. Marketing campaigns are presented in treelike structure; the symbol of each campaign is defined by its status. Thus, looking at the "tree", one can immediately define the status of the marketing campaign of a company. In order to regularize the activity of a company, one employee is appointed responsible for a campaign, and others are given individual tasks within its framework. After the campaign is finished, it is possible to produce reports on the results of the campaign, on the resources spent, and to determine the return of investments.

There is a capability of integration with other modules of *Microsoft Business Solutions-Axapta*, for example, with "Projects" module.

Let us assume the management of a company is planning to carry out an extensive marketing campaign, offering clients a new training course. The campaign will cost the company a lot. Ten employees will be working on advertising for two weeks, do direct marketing and make the list of calling.

When carrying out campaigns and questioning on the Internet, answers of respondents get directly to the *Axapta* database. In case answers are received too late or there is not enough time for processing of all the received answers, the marketing campaign may not bring the expected results. In order to avoid such situations, the module contains information on how many people took part in the poll, who exactly answered the questions, and what answers were received.

Integration of marketing, sales and service departments is extremely important for effective work of a company. Information obtained by one of the departments has to be available to other departments. It can be obtained by maintaining "Encyclopedias of marketing". Having access to a larger volume of resources, these departments have more opportunities for effective work and development of business.

The "Questionnaire" module of the *Axapta* system is a powerful tool for creation of questionnaires, carrying out polls and the analysis of the obtained results.

Its main capacities are

- Easiness of creating questionnaires and carrying out polls
- Questioning in the internal corporate *Intranet* network and on the *Web* sites
- Convenient means of data analysis and presentation.
- Integration into "CRM", "Human resource management" modules and corporate portal.
- Integration with *Microsoft Excel* and *Access*.

The "Questionnaire" module of *Microsoft Business Solutions-Axapta* can be used for the solution of the following tasks: identification of clients' loyalty, estimation of competitiveness of high technology products, certification of employees, etc.

In our case, any employee of a company can organize and carry out an expert poll about competitiveness of high technology products by means of the "Questionnaire" module of *Axapta*

system. It is possible to create target audience, i.e. to define subjects of dialogue, to create the questionnaire and carry out a poll in a few minutes. No special knowledge or skills are required for this purpose. Integration with the Internet allows carrying out questioning, both within a corporate network, and on the open *Web* sites. When organizing a dialogue of the automated monitoring of competitiveness of the high technology products, a group of independent experts is gathered [4].

When carrying out mass polls. the most important stage of work is the analysis of the obtained results. The "Questionnaire" module contains all the necessary tools for effective calculation, representation and the analysis of results, including summary tables and diagrams.

Due to integration into the "Human resource management" module, it is possible to obtain results of questioning for certain groups of employees. Groups can be created based on tender or age, period of working in the company, wage level and so forth. When questioning third-party respondents (partners, clients, etc.), the obtained results can be synchronized with the "Customer Relationship Management" module.

The "Questionnaire" module can also be used for analyzing management efficiency. In this case, results of questioning are processed in the "Human resource management" module. Along with the analysis of data directly in the Questionnaires module, it is possible to use *OLAP* tools (*On-Line Analytical Processing*).

All the results of polls are stored in the system; therefore, when carrying out another poll, it is always possible to compare the results and to analyze their dynamics of change.

The "Questionnaire" module supports all business functions presented to *Axapta*. It is closely integrated with *CRM* and "Human resource management" modules, and with a corporate portal. It allows using the module for communication with partners, suppliers and clients. The "Questionnaire" module is a part of the integrated system, which makes it easier to compose target audiences for polls, because all the necessary data, including lists of clients, suppliers, employees and information on them is already in the system. In combination with the "Innovator" software, an automated monitoring of competitiveness of high technology products is made.

A wide use of personal computers connected by the local computer network on workplaces in economical, marketing and designing divisions of JSC PA *Yurmash* gives the opportunity to organize on-line individualized information processing. Information capacities are personalized, but the centralized databases supplied with internal and external electronic communication remain. The decentralized data collection and processing on a workplace of the employee allows increasing completeness, accuracy and relevance of the prepared documents, increasing the speed of their preparation. The greatest effect from creation of the system-wide databanks is reached when they are created in the divisions, responsible for carrying out the analysis and assessment of information. In this case, there is a natural accumulation and processing of the data, coming in accordance with the tasks and functions of divisions to the places responsible for assessment and decision-making; completeness and relevance of databanks are provided without breaking the established traditional interrelations.

Sophisticated automation of information processes in quality and competitiveness control systems imply functional and information integration of all of the automated systems operating in production and other organizations. The most labor-consuming operation in creating a system of high technology products competitiveness monitoring is designing software. Labor input is defined by a great variety of data used in a control system, by local nature of automation of individual operating subsystems and management functions.

The information aspect of creating the system of automated monitoring of high technology products competitiveness at JSC PA *Yurmash* consists in solving the following tasks:

- ♦ determining the list of data to be automated;
- ♦ establishing formal relation between the data in order to build an optimal structure of data base;
- ♦ structuring informational messages in accordance with their content and purpose in the management system;
- ♦ organization of technological process of acquisition, processing and output of data, providing its reliability and timeliness.

Information processing in the system of automated monitoring of high technology products competitiveness JSC PA *Yurmash* is carried out on a workplace in the course of a dialogue of a person with the PC. There are three main modes of expert dialogue procedures: linear, alternative and cyclic ones. The dialogue processes with preliminary developed well-defined strategy without iterative operations are solved in the linear mode. The typical application field is collecting data and data input. The tasks of a dialogue, which include decision-making situations connected with the dialog with excluding each other stages, require an alternative mode. The cyclic dialogue mode is used for solution of optimizing tasks and choice of alternatives. These main options are implemented in the system of automated monitoring of high technology products competitiveness at JSC PA *Yurmash* in various mixed forms. The form of implementation of the dialogue modes is the so-called "menu technology", allowing experts without thorough training to work with the PC. In dialogue points, the expert gets access to all necessary information by means of corresponding actions

The main advantages of the monitoring system of the high technology products competitiveness at JSC PA *Yurmash* are:

- redistribution of data traffic between the human and the computer with reduction of the load on the human on storing, analysis and information processing;
- the opportunity to use personal experience and knowledge of narrow specialists;
- ease of learning to use, experimenting with the system, psychological comfort of a user in communicating with the computer;
- high adaptability of the monitoring system of the high technology products competitiveness to new expert knowledge in a problem and the level of users training;
- text, table and graphical representation of the data obtained.

These advantages provide the monitoring system of the high technology products competitiveness with the opportunity to be used to determine the level of competitiveness of high technology products based on the following indexes: "the significance of an engineering solution" [5], "the significance of an economic event" [6], "the significance of the ecological solution" [7], and "the significance of social effect" [8].The high efficiency of the monitoring system of the high technology products competitiveness at JSC *Yurmash* is achieved due to the application of up-to-date software and hardware.

The main software for the monitoring system of the high technology products competitiveness design and operation are *Microsoft Excel*, *Microsoft Access* and the *Questioning* module of *Axapta system.* One of the essential advantages of the monitoring system of the high technology products competitiveness is the capacity to work with data of other sources, including DBMS for personal computers (*dBASE, Paradox, FoxPro,* etc.). Thus, there is an opportunity to develop these forms and reports based on specific data, connecting them by means of simple macros or *Visual Basic* instructions. This software allows connecting new blocks and subprograms, which provides an increase in functionality of the system.

The hardware of the monitoring system of the high technology products competitiveness at JSC PA *Yurmash* includes: PCs, peripheral equipment; network equipment; transmission medium media and data security; communication facilities. The main divisions where the monitoring system is introduced include the marketing management department, the engineering center, and the economic planning department of JSC PA *Yurmash*.

3. Conclusion

Thus, the automated workplaces equipped with the monitoring system of the high technology products competitiveness are personal computers and a complex of peripheral equipment connected with the central computer by means of network devices. They provide collecting, accumulation and transmission data. Depending on the tasks to be solved, specific conditions and requirements, various configurations of the automated workplaces can be created.

At present, the algorithms of competitiveness determination and the volume of investment of a company have been tested based on the monitoring system of the high technology products competitiveness volume of investment at JSC PA Yurmash in terms of group index of competitiveness Ksn [9]. Parameters series of standard size pit barring produced by the company have been simulated.

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