

Розділ I
ФІЛОСОФСЬКІ СТУДІЇ

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**PROJECT MANAGEMENT SOFTWARE
IN EDUCATING ECONOMISTS**

The development of information technology and communication means influences the project management process. Management theory and practice have been modernized, the role of the subject of management has changed, significant progress has been made in the field of computer data processing systems, competition between project developers has increased, so the use of software has become especially important to increase project efficiency. Project management with software can be defined as a technology for managing activities to achieve a goal in a set period [3, 14].

The implementation of information technology in project management is an important competitive advantage of efficient companies and has been recognized as one of the best methods of planning and achieving the project goal. Significant experience has gained in the use of information and communication technologies in the field of project management, software product integration and theoretical research (in particular, development of methodology, the study of methods, tools, instruments) of project management.

Increasing the volume and accelerating the dissemination of information necessitates a reduction in the time required for decision-making, which in turn leads to the increasing use of new information technologies in the production of goods and services and management, including strategic management, personnel management, management of quality of product and services, marketing, office work, etc. Management and management decisions require special software, as it increases the efficiency of information resources, saves time, energy, raw materials, equipment, manpower,

etc.; helps to optimize and automate the activities of managers, employees and even society as a whole, as project management software is part of more global production and social technologies.

The use of information technology plays an important role in improving the interaction between people, is actively assimilated by society, as it increases comfort and well-being. In particular, it solves many domestic, industrial and social problems caused by the processes of accelerating the pace of life, globalization and integration of individual societies into a single world community, increasing intensity of national and international economic and cultural links, population migration and more.

The use of software in project management allows:

- clearly define the purpose of the project and justify it;
- to reveal its structure (main stages of implementation, intermediate goals, etc.);
- determine the term of the project and make a schedule for it;
- select contractors according to certain criteria, in particular by holding a competition;
- calculate costs and sources of funding;
- take into account and anticipate risks;
- organize the implementation and control over the project, etc.

The choice of project management tools and methods is determined primarily by its type (technical, economic, organizational, etc.), complexity, duration, scale (international, national, regional, etc.), availability of relevant specialists, society's willingness to accept innovations, demand for project management software.

The introduction of information technology in project management helps to adapt the object of management to rapidly changing working conditions, reduces the interaction time of its elements, minimizes costs, indirectly affects the institutional mechanisms of network economy management. Thus, a detailed study of project management programs in the training of administrators, managers and other specialists in economic specialties is a necessary condition for the training of competent professionals.

The paper purpose are the generalization of knowledge on the use of information technology in the project management process on the example of software Microsoft Project, Primavera Project, Spider Project; substantiation of the need for a detailed study of software for project management in educational institutions that train specialists in the use of information technology in the field of economics.

The methods of theoretical analysis, the generalization of experience of leading researches in the field of information

technologies, general scientific method of synthesis, system approach, comparative analysis, analysis of research results are applied in the paper.

One of the most popular projects management software is Microsoft Project. They choose Microsoft software products because of their efficiency, short implementation cycle and well-known user interface, typical for all Microsoft Office programs, which facilitates its mastering and use.

Microsoft Project allows you to manage a project throughout the process of its execution: from defining the structure of the project to completion. It allows you to import data from files in other applications and environments, such as Microsoft Excel and Microsoft Access, and enables online interaction and collaborative work, including redirecting tasks directly to project participants' computers; send answers and reports to the project management; update the project schedule programmatically. In the literature, it is noted, in particular N.Kultin [2, 98] that the advantage of Microsoft Project is the ability to use the programming language Visual Basic for Applications (VBA), the standard for office applications.

The developers of the Microsoft Project program strived for maximum clarity and convenience of visual presentation of project elements and the process of its implementation. Visibility of the provided information is provided at the expense of its display by colour registration, selection of fonts, auxiliary lines and forms, adjustment of a time scale. The standard interface of the program greatly simplifies its mastery of tools by new users. Due to the need to quickly process large amounts of information in a short time, the formation of logic and data visualization become a prerequisite for the productivity of the software product [5].

The capabilities of Microsoft Project allow you to use it to manage a large number of projects, however, as indicated in the reference and training literature, it is best suited for small and medium-sized industrial projects [2, 3]. It can also use to study the functionality of project management software products and build their generalized model.

Compiling a list of works is one of the key elements of project planning. To determine the hierarchy of works and the order of their implementation, it is necessary to analyze and summarize the requirements for the project and determine the content of works, describe in detail the results of the project. Structuring the project, dividing it into simpler components helps to manage the project more effectively, simplifies the process of division of functions and

responsibilities between executors, more accurately determine costs, resource requirements, deadlines for individual tasks and the project as a whole.

For reproducing the structure of the project, it is necessary to determine the objectives of the project, planning criteria, the scope of work, methods of implementing technical requirements, etc. Higher levels of the structure can be planned at the initial conceptual stage of the project, and further, detailing can be done during the project preparation process. Structural decomposition of works can be carried out “from scratch” or using templates and elements of similar projects. It can be carried out by elements or activities of the project, stages of the life cycle, etc.

Planning is one of the most important stages of the project and ensures its successful implementation. The plan should be comprehensively analyzed, contain time constraints, information on the required amount of resources, the amount of funding required, the purpose of the project, clearly defined roles, functions and responsibilities of each participant, key parameters of the desired result, step-by-step implementation strategy and more.

In the process of developing the project, the main task (its purpose) is formulated first, which in turn is divided into simpler components, which are also subject to fragmentation until the field of work required to complete the project is finally defined. Thus, the project can be considered as a set of tasks, where the main task is the sum of the cost and duration of simple tasks and works. And the lower level task is part of a more general task.

The project is implemented through the creation of a monitoring system is the set of formalized methods for collecting and analyzing information and responding to deviations from the plan or in the behaviour of responsible persons.

Project monitoring is the process of analysis and control over the implementation of the project to achieve the goals defined in the project management plan. It is an aspect of management that is carried out throughout the project. The purpose of monitoring is «to ensure the implementation of project targets and increase the overall efficiency of project planning and control functions» [8, 109]. Monitoring and control cover the project as a whole and each of its parts.

One of the effective methods of control is the analysis of the basic project plan. That is, the officially adopted project implementation plan, which contains the detailed content of the project, calendar plan and approved budget. If deviations are in the basic plan, the new one can be adopted.

Risk management is a necessary component of project management, as risks involve the hidden danger of increasing the time of implementation of individual tasks and the project as a whole and, as a consequence, increase the cost of project implementation. Events or processes that cannot be predicted are usually considered risks. The reasons for the risks may be an incomplete project implementation schedule, resources, even the uniqueness of the project. Microsoft Project has special risk management tools: there is the ability to plan risks and risk prevention tools.

Therefore, this software has a significant number of settings that make it flexible and allow you to take into account and adapt to most production needs and situations. Hierarchical structuring of the project is used as an effective method of its planning. Cataloguing and formalizing project elements simplify project planning and reduce project preparation time. Microsoft Project provides project management from the beginning (formulation of its purpose), throughout the life cycle and to completion in compliance with the requirements for time, budget and level of work. However, as noted by experts, in particular, A.Gulyaev in his book points out that MS Project is not a “universal problem solver”, but a technical tool to support decision-making. It helps to identify existing problem situations, but the manager must find a way to solve it [1, 229].

The next example of project management software is the Primavera Project, created taking into account the specifics of particular industries and individual organizations.

Primavera Project software provides the following features:

- due to the creation of a unite corporate project management system, all levels of project management are jointly provided access to the use of information about the project, taking into account the right of access of each user and coordinate the actions of all project participants;
- automatically identify the critical path, allocate resources and resolve resource conflicts;
- to accelerate the project planning process by using the databases of the company/enterprise and the use of templates of standard projects;
- to predict the project implementation process and possible risks related to the tasks, to offer implementation options that best meet the project goal.

A feature of the Primavera Project is a clear delineation of user rights regarding access to the database and the distribution of their functions. Even when working with multiple projects, this software

has a wide range of capabilities for the selection and generation of aggregate information according to certain criteria. Multivariate analysis, a flexible approach to project planning and re-planning are used. The presence of the Primavera Expedition Express module, which runs on the Palm platform, allows you to enter current project information remotely.

Primavera Project is based on a specific project management methodology called Concentric Project management. It involves the visualization of data when each project and its results are known to all participants. Coordination is a joint movement of the strategic course of the company, support for dialogue within all persons involved in the project. Strengthening is awareness of the importance of their work, which is part of the overall strategic task, transparency in assessing the work of individuals and the team as a whole, enhances the dedication of each employee. The competitive advantages of Primavera Project are to improve the quality and speed up decision-making, the ability to choose a competitive project and get the most profit.

Concentrated project management is based on the following principles:

Structuring: the value of the structure increases with the size and complexity of projects. The Primavera Project management system assumes that all projects have the same structure and uniform rules for the construction, implementation and management, transmission of information. The single structure of the project allows you to coordinate the activities of individual departments and create a general picture of the organization/corporation on various projects. Structuring enterprise projects allows you to manage projects and project teams independently, with the simultaneous ability to analyze and summarize the data of all projects, with varying degrees of detail and depending on the overall goals of the organization;

Integration: each project is considered as an element of a single strategic activity of the company and affects its future. Primavera Project is created on a modular basis and provides flexibility and a high degree of integration of its tools with other information systems used by the client.

Scaling: providing campaign managers and employees with software that fits the scale of their work (from large projects to small ones).

The training literature indicates [6, 106] that the use of layouts in Primavera Project is a significant advantage of this project management software product compared to other similar ones. The

layout contains all the parameters and settings of the interface. It is saved for later use by different users and allows you to quickly move from one section to another section of the project.

The project plan can be developed «from scratch», but it is easier to use the templates (methodologies) available in Methodology Management and start Project Architect, choose one of the methodologies. Thus, the structure of the project will be formed.

After the project is completed, the project removal procedure is implemented. It is not deleted from the database, but will not be taken into account in the overall package of projects of the enterprise and the final reports. Primavera Project provides that in the future the deleted project can be, if necessary, returned to the general package of projects.

Primavera Project is designed for organizations that implement a significant number of projects with shared resources, mainly in the economy. The growth of this project management system does not affect its integrity and does not impair the reliability of operation.

It uses multivariate analysis, a flexible approach to project planning and redevelopment. In terms of working with multiple projects, this software has a wide range of capabilities for the selection and formatting of summary information according to certain criteria.

Primavera Project uses a specific project management methodology and has powerful tools for constructing representations of project data by graphical means, which is considered its competitive advantage. A feature of the Primavera Project is a clear delineation of users' rights to access a single database of projects and the distribution of their functions.

The principles of creating this software are: coordination is the cooperative movement on the strategic course of the company, support of dialogue within all persons involved in the project; strengthening is awareness of the importance of one's work, which is part of the overall strategic task, transparency in the evaluation of the work of individuals and the team as a whole, strengthens the dedication of each employee. The competitive advantages of Primavera Project are to improve the quality and speed up decision-making, the ability to choose a competitive project and get the most profit.

The Spider Project software package, according to the developers [4], is designed to manage projects of any complexity, taking into account the strategic course of the company/enterprise. This software has a special advantage in the work of organizations with standardized and strictly coordinated management activities, in particular, government agencies and departments. It provides an opportunity to

get a holistic view of each project, the project portfolio as a whole and to centralize project and resource management.

Spider Project allows management to identify optimal projects, allocate resources efficiently, minimize losses and avoid miscalculations, receive reports on key indicators as quickly as possible, and, if necessary, perform detailed analysis.

The developers position their product as competitive, surpassing similar software from other manufacturers in many characteristics and claim that Spider Project is focused primarily on the Russian market and develops taking into account the characteristics and needs of the Russian consumer.

The reference and methodological literature also state [4, 1] that this software product takes into account the cultural, national and managerial features of «the post-Soviet space», combining the above advantage with the flexibility and compliance with most international standards and requirements for project management programs. In particular, Spider Project is the only project management program that fully supports the PMBOK Guide standard.

Spider Project has features that distinguish it from other project management programs:

- The use of complex mathematical calculations, which allows you to significantly reduce the schedule with simultaneous maximum resource and financial savings.

- Extensive opportunities to model the processes and operation of project elements, including the functioning of project resources, such as modelling shift work, resource allocation based on qualifications, etc., quantitative analysis and risk modelling and, using such models, management and increase the probability of successful project completion.

- Analysis of the economic efficiency of the project taking into account changes in trends in the market, modelling of profits, multicurrency, broad opportunities to work with the budget, including taking into account an unlimited number of its components (investments, expenditure items, etc.).

With the software package, you can carry out the following tasks much faster and easier:

- Define and optimize the goals, deadlines, cost of the project, calculate and minimize risks, optimize the timing of the project.
- Create a transparent system of financing and project management, control over the implementation of works and financial costs.
- Create computer models of the consequences of management decisions on the project, thus reducing the time of decision-making with simultaneous detailed analysis and justification.

- Manage the budget and increase the profitability of the project.
- Formulate the goal of the project and monitor the probabilities of its achievement.

Creating a library of standard projects, saving templates of component projects, the availability of corporate directories, which record the typical characteristics of works, resources, appointments facilitate the conclusion and evaluation of the project implementation plan. The use of directories means that during the modelling of projects, the relevant corporate standards will be involved [4, 6]. Computer models of standard works and complexes of works can use many times in various projects. So the development of the plan and project management is reduced to the compilation of a hierarchical system of ready-made templates [4, 6]. At the same time, the project developer sees how unique this particular project is, and therefore how risky its implementation is.

Spider Project uses three scenarios to manage risks, which reproduces three courses of events: optimistic (taking into account the risks that are most likely to occur), probable (taking into account risks that are more likely to occur than not), and pessimistic (taking into account all significant risks). According to the scenarios, three versions of the project plan are created with their calculation of deadlines, budget, required resources, etc. The accuracy of the results of this method of calculating risks is not guaranteed, but it allows you to identify negative trends and, taking them into account, determine the desired probability of reaching the policy indicators (timing, income, costs, etc.), and Spider Project calculates whether they can be achieved under current conditions. The program also calculates the required reserves (buffers) for risks managed by the project manager and which are not included in the approved base budget of the project. Thus, the degree and trends of the probability of success are determined [4, 18] — indicators that mark the implementation of the project and demonstrate what is happening to it (whether the deadlines, budget, etc. are observed).

Spider Project can manage not only an individual project but a portfolio of projects of the enterprise/company as a whole. Calculate its schedule, the priority of a project, the relationship with other elements of the portfolio, collect information on projects and analyze performance, archive information, etc.

Spider Project has a system of group work, which according to experts [4, 19], differs from other analogues. It clearly defines the term, date, and most importantly, a list of persons responsible for updating information on the project, which prevents discrepancies in

the reflection of the same elements of the project, phases of work, etc., and the introduction of outdated or unverified information. It is possible to work autonomously with a computer model of the project, which serves as a guarantee against external malicious and harmful interference in the work.

This software implements the maximum possible autonomy of work. It has its database, information storage system, etc. At the same time, it can work with Excel spreadsheets and text in CSV format, with SQL Server and Oracle databases, it can import and export projects from Microsoft Project and Primavera Project.

Making the optimal decision under conditions of uncertainty and/or incomplete information and limited time is an indicator of high qualification of the specialist, professional training and efficiency of his work. Thus, the main tasks of the economist, manager is decision-making and sequence of actions aimed at achieving the stated goal. Project implementation and product production technologies include phases of the life cycle of the management decision.

There are a significant number of software products that automate and support the professional work of the manager, including its most complex stages, such as the implementation of the decision. This stage involves the deconstruction of the result of the decision to the level of basic operations and works; calculation of the required amount of resources and finances; taking into account limitations (for example resources, time, etc.) and risks; performance control. The functionality of project management programs significantly increases the probability of achieving a goal.

When training managers and other professionals who use project management software in their professional activities, it is better to use training models of such software. The use of the project management training model provides an opportunity for comparative analysis, objective identification of weaknesses and advantages of software products from different manufacturers. It reproduces the main components and functionality available on the market software products of this type.

The study of project management software is a prerequisite for the training of qualified specialists in those specialties related to the use of information technology in economics. For such training, it makes sense to use training models of project management programs. First, we will avoid accusations of advertising a software product from a particular manufacturer. Secondly, psychological factors, in particular, habit, are of great importance in the learning process. The user gets used to the software product of a certain manufacturer and, over time, it can be difficult to see both the disadvantages of the «favourite»

project management program and the advantages of other similar software products. Therefore, it can complicate comprehensive coverage and uniform presentation of educational material. Third, the model is a generalization of our knowledge about the object under study, which allows us to expose the shortcomings and inaccuracies of our perception of it; to see the weaknesses of the objects based on which our model was built; make a comparative description of the studied objects, identify their advantages and disadvantages. Fourth, to assess the novelty of software products in this area, which are offered to consumers easier, comparing them with the existing model, which reproduces the basic functions and elements of project management programs from different manufacturers. Fifth, in the absence of study time, we will avoid a situation where the study of the course will be reduced to the sound of several software products and a shortlist of their basic functions. That is, we will prevent the deterioration of the quality of the educational process and the superficial assimilation of educational material by students.

The working training model allows to follow the decision-making process, analyze it, identify errors, identify key points that require special control by the manager and those that can be transferred to the implementation of the software package. Creating a training model allows seeing the work of the software product «from the inside», to understand the peculiarities of its operation, which will further form the ability to consciously, professionally choose the software that is best suited for a particular project and make it impossible to blindly use the software, as the proverbial «black box». When hiring a specialist, facilitates easy adaptation to any software that is preferred by a particular company or enterprise.

Project management programs implement the capabilities of information technology in the most time-consuming processes of project management and organizational and planning decisions. However, they are not able to achieve the set goal in cases of use of erroneous data and work effectively without taking into account the methodology and technology of project management. Project management programs perform the function of supporting the professional work of specialists.

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ЛЮДСЬКИЙ РЕСУРС В УМОВАХ ГЛОБАЛЬНИХ СОЦІОТЕХНОЛОГІЧНИХ ВИКЛИКІВ

Ключовим трендом світового соціально-економічного розвитку 2020–2030 років, за експертними оцінками, визначено серйозні трансформації інформаційних та системних макротехнологій (наноелектроніка, молекулярна і нанофотоніка, наносистемна техніка, біотехнологія, нанобіотехнологія, когнітивні науки, соціогуманітарні технології, конвергенція нано-, біо-, інфо- і когнітивних технологій тощо), які відкривають нові можливості