

PROJECT MANAGEMENT AS A TECHNOLOGY FOR OPTIMIZING RESOURCES IN TERMS OF REFORMING SOCIO-ECONOMIC RELATIONS

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Abstract: Project management is based on a systematic approach that corresponds to the post-industrial stage of development, which allows to productively implement the investment for innovations that ensure the development of organization; however, in assessing the effectiveness of project management, there are reserves that make it possible to make project management more perfect at all stages of their life cycle. The article discusses the concept of "project management", its content and essence in the context of resource management. Special attention is paid to the Agile project management methodology. It is substantiated that the assessment of the effectiveness of project management and project groups can be carried out from different positions: project managers; performers (groups of performers) of individual works and their aggregates; project customers, who are usually also "operators" of project results. The interests of these groups are partially different, which in the general case may require the development of compromise solutions.

Keywords: Agile, Institutionalization, Planning, Project management, Resources.

1 Introduction

Project management in the last decade has become a powerful technology for change management in a highly competitive world. Effective application of project management methods and tools allows implementing successfully any project in accordance with high quality standards, achieving goals on time, saving time and reducing risk. With the globalization of the world economy, project-oriented management is becoming one of the most important factors in a company's victory in the competition and in conquering new markets.

The relevance of the article lies in the fact that today it is the key concept of modern management science, for which a project is a way of organizing activities, that opens up huge opportunities for the embodiment of the most daring ideas and the achievements of the most ambitious results. Nowadays, projects are necessary tools not only in industry and construction, but also in culture, science, education, as well as in the social sphere, medicine, and business. That is why project management is the most important tool in modern socio-economic conditions.

Many are accustomed to believe that management, in principle, is, in a certain sense, an algorithmic process, thanks to which, there is a certain amount of human and material resources, some activity can be planned and performed in an expressively scheduled and short time frame. However, project management is not an algorithm, but a creative process that takes into account a lot of various factors.

The ongoing transformation of the economy into a qualitatively new state, the growing competition of companies, the need for them to quickly adapt to a complex and constantly changing market, the pressure of new complex technologies distributed among different owners indicates the need to focus the activities of companies on constant development and improvement, which should ensure, maintain and increase their competitiveness both in the domestic and foreign markets [40].

That is why the most urgent task in the field of management is to increase the level of adaptability and efficiency of development of organizations, that is, their ability to respond faster, more economically, more clearly and more adequately to market

changes by releasing new or modernized products, introducing new production and marketing technologies, restructuring, improving the system of internal management and the use of the latest marketing strategies. As a result, development becomes an effective market management tool and one of the company's competitive advantages. The company itself, its internal processes, market and business become objects of development in order to increase competitiveness in the long term [54]. A closer examination of the problems of managing the development of companies showed that it needs to be formalized, streamlined, managed, with monitoring and measuring results, and based on available resources. Project resource planning is a very important process, which is the basis not only for determining resource requirements over time, but also the basis for planning the supply of resources, the basis for determining the possibility of providing resources for the conclusion of contracts for the procurement of resources, and also the basis for prudently distributing the resources already purchased resources for the works of the project.

2 Materials and Methods

Today, the scientific paradigm of project management is the theory of managing an organization in conditions of limited resources, time, with the obligation to ensure the agreed quality of the project product. Modern science has at its disposal significant developments (in theoretical and practical areas) of methods and means of managing an organization. However, a significant part of projects end in failure, which is understood as varying degrees of exceeding the planned budget, execution time, and also not ensuring the required quality. At the same time, all projects go through standard procedures of initiation, planning, control, and management, however, at none of the stages, predictive indicators of failure were detected [39, 45, 50]. It is obvious that the existing paradigm platform for research and modeling of project management processes is not able to adequately describe the processes occurring in the project management system.

The study of the system properties of projects led to the formulation of the laws of project management [5, 7], which were first put forward for public discussion in September 2008 at the IV international conference on project management. The law of project initiation, the law of the "power of dreams", the law that "market chooses the best" [41], the law of proportionality to the expected benefits and real losses to the level of risk, the law of continuous improvement of project processes, the law of project completion – these laws are associated with the names of outstanding scientists in the field of project management: S. D. Bushuev, Hiroshi Tanaka, V. A. Vaisman, I. L. Vorobyev, K. V. Koshkin, etc.

However, the presented laws did not reveal the features of projects as open systems. The use of evolutionary algorithms for project management is proposed in for modeling project resource management processes, but not all project resources are consumable [12]. For example, such project essence as knowledge or "know-how" are characterized by the concept of accessibility, not exhaustion [8].

In existing programs for managing projects and sets of projects, the choice of resources is usually carried out without taking into account the dependence of the quality of the final results obtained on the composition (set) of the resources planned for use. However, in practice, the choice of resources (both labor and material) can significantly affect the quality of performance of individual work and the results of the project (group of projects) as a whole, although the formal goals of project implementation are achieved in all cases. For example, when developing a software tool with the formal provision of a given, that is, reflected in the terms of reference (TOR), development functionality, its quality can be determined by such factors as the

speed of the software; its requirements for RAM and other computer resources; convenience (intuitiveness) of the user interface; the probability of the presence of logical errors in the software that were not detected during testing and acceptance tests; visibility of presentation of the results of the work of the software the level of information security during the life cycle of the substation operation, etc. [2]. Thus, the quality of software development, with formal observance of the conditions for successful completion of the project from the point of view of its users, will affect the “usefulness” of the software, risks during its implementation [10, 12], operation, etc. Therefore, the purpose of our study was to analyze a set of issues related to the impact of the quality of work performance on the “usefulness” of the results achieved and the risks associated with the planning and implementation of projects.

In general, by interest in projects (project results), the following groups of individuals and entities can be distinguished: organizations in which PM specialists work; specialists directly implementing PM; performers of work involved in the implementation of projects (including group leaders); organizations/departments interested in using the results obtained during the implementation of projects. The latter can be both “external” customers (organizations) and “internal divisions” of those organizations in which projects are being implemented [12].

Each of the listed groups has some expected positive effects from the implementation of projects; estimated costs of their implementation; expected levels of quality and timing of work; risks associated with the implementation of projects (they can be estimated in monetary units) [59, 60]. It is important to note that in most of the available publications in relation to the effectiveness of project implementation, these groups are not divided, although such a differentiation seems appropriate. Obviously, it is easier to carry out “alignment of interests” in the case when projects are “internal” for the organization [19]. In the general case, the solution to the issues of “reconciliation of interests” is of a compromise nature.

In the course of solving the set tasks, the following are used as the main methods: the method of historicism, which reveals the formation and development of project management as a management paradigm and a system of social practices; the method of structural and functional analysis, which made it possible to identify institutional elements in the system of social practices related to project management, the main directions and forms of institutionalization of these practices; formal-logical methods that allow recreating the integrity of the project management system by revealing its elements and their interconnection; a systemic method that provides consideration of the object of research in the form of a system, identifying its integrity, analyzing the interaction of system elements, constructing system models; a method of contextual analysis, consisting in the study of materials presented in scientific research literature, their analysis and comparison.

3 Results

Modern project management as a management paradigm and a system of social practices is a product of the post-industrial era. Its socio-historical background includes acceleration of innovation processes; informatization of production; globalization of the economy; change of modern culture to postmodern culture [56-58]. Moreover, the specificity of project management at the present stage is that for the first time in the history of mankind it turns into an independent profession and acquires an institutional base.

The use of a project management system has a number of advantages: determination and analysis of investment efficiency, centralized storage of information on the schedule of work, resources and costs, the ability to regulate project management procedures, providing a structure for monitoring the execution of projects, accounting and management of project risks, management and control of supplies and contracts when

providing project activities, determining information flows of project activities, the ability to quickly analyze the impact of changes in the schedule, resource provision and financing on the project plan, the use of mathematical methods for calculating the time, resource, cost parameters of projects, ensuring quality control of work, supporting the use of the project archive and accumulation knowledge, the ability to automatically generate reports and graphical diagrams, develop project documentation.

By bringing management processes to a controlled loop, introducing standards, providing participants with the necessary automation tools, it is possible to more clearly plan timelines and resources, improve execution, disseminate best practices, and provide timely solutions. This will undoubtedly have a positive effect on implementation, but it does not guarantee either a reduction in timelines or a reduction in budgets [16].

In order for the project to be successful, it is necessary to be able to manage the project resources. Resource management is a section of project management that reflects only those processes that are sufficient and necessary to ensure the goals of the project through the optimal use of available resources.

Resource planning is the main component of project management. It is not only the development and analysis of resources and works that are aimed at achieving the goals of the project, but it is also the development of a resource allocation system, control over the progress of work (comparison of actual and planned work parameters, selection of corrective actions), selection of performers.

Project resource management includes the following: project resource management processes; basic principles of project resource planning; resource procurement management; supply chain management; inventory management; logistics [40].

In addition to resources such as raw materials, the project has human resources. Project HRM is an integral part of the art of project management. In fact, project human resources management is a process during which the effective use of the project's human resources is ensured. By human resources of the project, we mean any project participants: subcontractors, company departments, customers, sponsors, project team.

Accordingly, the benefits of resource management are as follows:

1. Avoiding unforeseen complications: by knowing the initial state of resources and planning their use, one can avoid their shortages and prevent possible difficulties.
2. Preventing burnout: effective resource management allow avoiding overburdening employees or resource “dependencies” by collecting information about the workload of team members.
3. Safety net: for example, if the project failed due to lack of resources. Resource planning and management ensures that the best was made.
4. Transparency of information: other teams are informed about the amount of work that can be done by the definite team and make plans based on its ability to take on new projects.
5. Performance indicators: By having an accurate understanding of what is needed to manage and execute a future project, one will be able to effectively plan and measure financial results.

Research shows that the following misconception is very common: “The sooner we launch a project, the sooner we finish” [41]. This is true in the only case: if there is no other job. If a team can devote all its time solely to one task, then, of course, the sooner it starts it, the sooner it finishes it. However, this is not true if there are multiple projects or multiple tasks in a project for one resource at the same time. Too many tasks performed in parallel will simply increase the project execution time.

This paradigm drives the rule/policy created by top management [43]:

a. Launch projects as soon as they are "received and assigned."

Of course, it can be understood that launching a project internal or the one for a client is a complex process that itself is subject to delays in decision-making and approvals. Once the 'signal' to start is given, there is tremendous pressure to start immediately and show some progress [32, 34, 37, 49]. Any suggestion to delay launch seems unacceptable and so the project starts up, causing harmful multitasking with projects already running. This practice never ends, and, in fact, wasted lead time is enormous and capacity is idle.

The intuitive answer is to reduce the load and only then launch projects into the system at a speed so that they have time to execute [21, 22, 31]. The first step to this is to "freeze" temporarily the work on some projects. This means that unfrozen projects will start moving faster, and in a short period of time, all projects will be completed earlier than if the organization had not managed their launch.

b. If to miss the due date for one or more tasks, it is necessary to start them immediately, as soon as possible.

The same pressure to show progress is caused by the aforementioned behavior on resources, where, as is known in advance, due to the high level of uncertainty, numerous changes occur, and there is a high chance of need for rework [36, 46, 48, 53]. The same phenomenon is observed in the production of physical products and "intellectual" products.

A solution exists and can be achieved in projects by adopting a "full set" of policies where no significant task can be started until the full set of inputs is available. This allows avoiding wasted effort by increasing resource efficiency and speeding up projects.

Also, it is necessary to distinguish the difference between multitasking and "harmful multitasking". We all intuitively understand that pressure on people is rarely justified and really undesirable if a permanent team in a multi-project environment is needed. People are supposed to multitask and this leads to the assumption/paradigm that multitasking is effective [17, 20, 23]. This is true only if there is no harmful multitasking, which we define as "switching to another task even when the current task might have been completed". This practice simply delays the completion of most tasks and, therefore, projects.

It is possible to increase the efficiency of project resource management, for example, using the Simple Business CRM system, which also allows managing personnel, accounting, communications, customer base, document flow, website, etc. The program is universal for any area of business, new versions of the product are regularly released.

4 Discussion

While in the 1980s the main focus in companies was on quality, in the 1990s on globalization, then in the 2000s the speed of implementation of initiatives came to the fore. To stay ahead of the competition, organizations are constantly faced with the need to develop complex products under very tight deadlines. To solve this problem, nothing has yet been invented more efficiently than project management, which is becoming increasingly more popular day by day.

The formation of the main features of a post-industrial society and the related globalization of social life have had a significant impact on the system of social practices. Traditional social practices based on the long-term relationship of the employee with the corporation, providing status growth depending on the length of service and transmitted as a family professional tradition, were eroded at the end of the 20th century and were replaced by the mobility and personal creative significance characteristic of the postmodern consciousness of the new

society. A person as a social subject considers his personal strategy in the conditions of the ever-increasing dynamism of social life and is oriented towards finding not a permanent job, but the most effective niches for personal growth and the associated mobile retraining, as well as the ability to work in changing collectives-teams.

A fundamentally new social professional consciousness is being formed project consciousness. The subject enters as a member of the project executing team, successfully implements the project and moves on to a new project, carried out with another team. The value of personal experience and creative skills, the ability to work in a new team, a higher degree of personal responsibility and the independent formation of a personal portfolio are increasing.

This social process also affects the structure of the professional activities of corporations. Corporations built on functional principle cope with the challenges of innovative development that require synergy and networking. All over the world, since the second half of the 20th century, a new institution of project management has been actively developing as a new social practice of management.

A new social practice project management is gaining wider application. The introduction of the principles and mechanisms of project management has become one of the key conditions for the competitiveness of companies in many sectors of the economy and the national economy as a whole, the most important factor in increasing the efficiency of government and management bodies at all levels from municipal to national, the basis for new methods of management of non-profit, public, and social-political organizations.

Modern project management as a management paradigm and a system of social practices is the result of centuries of development of management practices. In a single process of development of traditions and management technologies, the stages of dominance of "functional" and "project" tendencies alternated [18, 24-30]. The purpose of this process is not purely project management (this would be a return to 'childhood' of human civilization), but such a system for managing the organization's activities, which, in an optimal way combining elements of functional and project management and using specially developed effective techniques and tools, serving the implementation of such a combination, to the maximum extent meets the requirements of the time.

Thus, the true product of the post-industrial era is not project management as such, but a modern project management system, in which both the technical component using modern information technologies and the humanitarian component, which embodied the recognition of the high importance of the human factor, characteristic of the post-industrial era, are of equal importance.

The socio-historical prerequisites for the formation of this management system are associated with the transition from industrial capitalism, first to industrial, and then to post-industrial society. These include such phenomena as globalization, the acceleration of the innovation process; informatization and the formation of the information society; the overgrowth of the culture of modernity into the culture of postmodernity with its characteristic individualism, pluralism of values, the predominance of synergetic ties over systemic and structural ones.

Today, project management is one of the most effective management technologies based on planning, motivation, flexible organizational structure, and optimal communications within the project. However, one of the most important features of project management should be noted separately the desire for the most efficient resource management.

The effective use of a project management system depends on many factors that need to be given special attention, in

particular, the process of project development, implementation, and only after that scaling the solution to assess and analyze the effectiveness of the project.

To accurately assess and effectively use a project management system, a broad aspect of the criteria must be considered. There are many approaches and methods for evaluating the effectiveness of the project management system (Project Management Value), which are based on the experience and methodology of different organizations, collected for use in various sectors of the economy [19].

Evaluation of effectiveness is considered according to certain qualities, which in turn are based on the definition and selection of criteria. The definition and selection of criteria depend on the scope of the organization, the composition of the system and the characteristics of the applied project.

When assessing the effectiveness of project management, it is necessary to consider an extensive set of aspects-criteria. Evaluation of effectiveness is based on the definition, selection of criteria for reviewing and evaluating the system for these qualities. The set of criteria may depend on the scope of the organization, the characteristics of the projects and the composition of the system. Criteria, indicators and assessments can be roughly divided into two groups: qualitative and quantitative [4, 13-15]. Quantitative assessments provide an easily tangible indicator of performance, but they do not always give a complete picture of the full benefits of using a project management system. When assessing efficiency, it is necessary to consider a set of indicators for various aspects of project activities, such as financial, time, methodological, organizational, etc. One of the methodologies for the qualitative assessment of efficiency is based on expert assessment of the Critical Success Factors, the implementation of which is necessary for the successful implementation of the project [43].

The consistent development and implementation of project management systems in organizations allows different teams and structures of the organization to work together to define plans and implement projects to bring products to market, synchronizing their schedules, coordinating resources and efforts to implement the organization's strategy [33, 35, 38, 44]. The corporate project management system (CPMS) allows project teams to create and exchange information on projects in real time, fully realizing the potential of the organization. With the help of such systems, it is possible to provide access to information about the project anywhere in the world for project teams, employees of supporting departments, partners and clients – with the aim of ensuring the quick and efficient implementation of projects.

At the macro level, organizations are motivated to introduce project management tools to effectively implement their initiatives of any scale. At the micro level, the corporate project management system, among other things, solves the following tasks [52]:

- Reducing the costs of implementing initiatives
- Creation of conditions in the organization for the work of the project team
- Informing top management about the status of strategically important projects of the organization
- Ensuring sufficient and effective project workflow
- Compliance with project deadlines.
- There is no doubt that competition between companies is much fiercer today than ever, and the uncertainty and turbulence of the environment is extremely high. This creates a need to improve the stability and efficiency of organizations in all sectors of the economy.

This can be achieved through the implementation of best practices to optimize the management process and resource allocation. However, it has been proven that operational and project management require completely different approaches to management, and when implementing practices, it is necessary to clearly understand the needs of the organization [42, 47].

Project management has two key benefits. First, project management, in contrast to operational management, is aimed at achieving goals, and not at ensuring the process. Secondly, project management focuses on communicating and managing stakeholder expectations to improve stakeholder satisfaction.

A study by Roberts and Furlonger showed that the use of a detailed and formalized project management methodology can improve project implementation efficiency by an average of 20-30%. Moreover, the use of a formalized design structure allows [55]:

- Define the content of the project more clearly;
- Define and agree on the goals and objectives of the project;
- Facilitate the identification of the resources required to successfully complete a project;
- More transparent and clear distribution of responsibilities between project roles;
- Focus the team's efforts on achieving the ultimate benefits from the project.

In addition, according to this studies, 85-90% of projects do not meet the deadline, budget or cannot achieve the required content or quality level of the project. The main reasons for this are as follows [11, 51]:

- Poor justification (business case) of the project;
- The goals of the project are not defined or defined not clearly;
- Lack of communication and stakeholder management;
- Benefits and results of the project are insufficiently defined or not measurable;
- Insufficient quality control;
- Unrealistic estimate of the cost and duration of the project;
- Roles in the project are not defined;
- Lack of leadership;
- Lack of resources and inadequate management of them.

Applying a project management methodology based on best practices allows improving the efficiency of project management, avoiding most of these problems (of course if properly implemented and used). In addition, it is important to understand that a project that is overspending or not meeting deadlines is not necessarily a failure. The issue of "success" of the project requires a separate discussion, but here we are only talking about the effectiveness of project management. At the same time, resources affect almost all the main parameters of the project (cost, timing, quality), ultimately determining the possibility or impossibility of its implementation.

There is no perfect project management system for every type of project. Also, there is no system that would fit every leader and be convenient for all team members. However, during the existence of project management, many effective approaches, methods and standards have been created. These methods represent, in fact, concepts, approaches to project management and, accordingly, imply different approaches to measuring performance and managing resources.

Today, the well-proven method of a flexible (Agile) iterative-incremental approach to project and product management is very popular – it focused on the dynamic formation of requirements and ensuring their implementation as a result of constant interaction within self-organizing working groups consisting of specialists of various profiles. There are many methods based on Agile ideas, the most popular of which are Scrum and Kanban.

Agile's greatest strength is its flexibility and adaptability. It can adapt to virtually any organization's environment and processes. This is what determines its current popularity and how many systems for various areas have been created on its basis.

One of the principles of Agile sounds as follows: "Reaction to change is more important than following the plan" [8]. Namely this quick and relatively 'painless' response to change is why many large companies strive to make their processes more

flexible. In addition, Agile is excellent solution for open-end projects such as launching a service [55].

Agile's 'domain' is the development of new, innovative products. There is a high degree of uncertainty in projects for the development of such products, and information about the product is disclosed as the project progresses. In such conditions, it becomes impossible to implement the classical "waterfall" project there is no information for planning.

Unlike PRINCE2 and PMBOK, Agile is neither a methodology nor a standard. Rather, Agile is a set of principles and values. The weak point is that each team will have to independently compose their own management system, guided by the principles of Agile. This is a difficult and time-consuming process that will require changes throughout the organization, from procedures to core values. This is a thorny path and not all organizations can do it [2].

This path will require from the change leader not only knowledge and perseverance, but also serious administrative resources and costs. Fortunately, there are out-of-the-box practice kits that facilitate the Agile transformation of an organization [1, 3, 6, 9, 11]. These sets include the Scrum framework, the Kanban method, and many others Crystal, LeSS, SAFe, Nexus. Modern software tools for project management using the Agile method allow keeping focus on project goals, predict project completion dates based on Agile metrics, recommend changing the project plan based on the critical chain methodology, and automatically calculate the critical chain scheduling with resource constraints [50].

Another popular, but more traditional, approach to "classic" project management is the 6 sigma method. It included more design to save resources, reducing the volume of failures and difficulties, made it possible to improve quality. The customer's delight in the quality of raw, achieved thanks to the smooth operation of all project concepts, created by means of painstaking research of parameters this is the main result of the project.

In classic project management, a Gantt chart indicates the main tasks and the timing of the start and completion of their solution. This approach, at first glance providing resource optimization, lacks flexibility, and in a modern turbulent environment can lead to the failure of the entire project. Suffice it to recall the beginning of the COVID-19 pandemic many companies in the process of implementing projects, especially expensive and large-scale ones, appeared not ready for the sudden need for change.

Whatever the chosen methodology, resource management will conceptually look like this system (Figure 1):



Figure 1 – Resource planning in project management

Resource planning is not the most creative task, and the actualization of the resource plan is perceived by many as an

'inevitable evil', but the optimal use of resources, as one of the main goals of project management, depends on it.

5 Conclusion

Project management is a tool that allows an organization to implement planned initiatives as efficiently as possible. However, the use of project management, the presence of a corporate project management system and the application of best practices does not guarantee that all of the company's projects will be successful. However, a properly selected project management methodology, tailored to the needs of the organization, taking into account the industry and regional characteristics, as well as the corporate culture of the organization, allows avoiding many mistakes during the implementation of projects and increasing significantly the chance of their successful implementation. One of the increasingly popular techniques is flexible project management is Agile, which allows ensuring the optimization of resource management even in the event of unforeseen changes.

A company where resource planning is well established is more likely to be an efficient company, and vice versa if resource planning is 'lame', then the company is constantly experiencing either a deficit or an excess of resources and the cost of a man-hour, compared to a company of the first type, with all other things being equal, is significantly higher, which means that the profit that could be directed to development of the company is lower, with all the ensuing consequences.

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Primary Paper Section: A

Secondary Paper Section: AE, AH