

Scientific and Applied Tools for Project Management in a Turbulent Economy with the Use of Digital Technologies

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Abstract

The modern transformation of the world economy is associated with a change in the technological structure, which is associated with the development of a digital ecosystem, which defines project activities as the only way for the survival of enterprises, regardless of the form of ownership and the scope of their activities in terms of technologies and labor products, at all stages of the life cycles of organizations. Technological challenges and threats based on the use of artificial intelligence, cognitive computing, robotics and other modern technologies oblige companies to protect themselves from reputational, financial, regulatory and strategic risks, and for these purposes effective timely project management in the digital environment is necessary. Thus, the main task of the study is to analyze the tools for project management in a turbulent economy with the use of digital technologies were investigated. As a result of the study, scientific and applied tools for project management in a turbulent economy with the use of digital technologies were investigated.

Keywords:

digital technologies, digitalization, project management, turbulent economy, digital management, digital environment

1. Introduction

The historical trend in the development of the modern world economy has become a structural transformation associated with the introduction of digital and cloud technologies with the transition to a new technological order, which greatly reduces the resource intensity of production.

The introduction of digital technologies leads to qualitative changes in global value chains. High-tech jobs for qualified specialists are being created. The global trend of business digital transformation makes us take a fresh look at many traditional disciplines and methodologies, in particular at project management. This transformation, unlike routine digitalization (automation), as a rule, relies on some

innovative business ideas and is carried out within the framework of a certain strategy. But no matter how promising the strategy is, the ability of the company to implement it is crucial. Here, great hopes are placed on project management methods backed up by vast experience. The complexity of the problem is evidenced by the data of some surveys, according to which only a third of projects fit into the planned timeframes and budgets, and even one out of ten in digital transformation projects. To discuss how modern project management methods and the project approach itself are applicable to solving the problems of digital transformation of business and public administration, we turned to experts from leading companies and organizations [1].

At first, information technology was a game of efficiency. Then came social networks, smartphones and cloud solutions. It has radically changed the way we do business, forcing every business to go digital. However, not everyone has completely switched to digitalization, many are still in the process of the so-called "digital transformation".

Simply put, digital transformation includes digital tools that are applied in all areas of activity and can fundamentally change business processes and the way companies interact with customers.

This shift is changing not only how firms build relationships with customers, but also how they create products; it affects every aspect of management, including project management. Specialized project management software allows you to solve such tasks as budget planning, project implementation deadlines based on available resources, planning payments and receipts for the project, control the project implementation deadlines,

make a forecast whether the contractor is within the deadlines and budget approved by the project customer, and much more. In MS Excel, for example, these tasks are labor-intensive. Thus, the results of the survey suggest that companies involved in project management automation still have a lot of work to do [2].

The use of artificial intelligence for project management in the modern world is becoming commonplace. Thus, according to a 2020 survey by the International Association for Project Management, 23% of respondents noted that they had experience in applying artificial intelligence methods in project management. Interaction with artificial intelligence in project management can be divided into two types: virtual assistants to the project manager and artificial intelligence in management systems. Virtual assistants save the manager's time by reporting, for example, risks, stages of the task, they can recognize speech, text, independently set new tasks after the performer completes the previous one, assign or change performers, etc.

In project management systems, artificial intelligence can automatically adjust project task completion dates if, among other things, some other work gets a higher priority or resources are redirected to other projects. This saves the manager time and reduces the possibility of error. By analyzing the data accumulated in the database of completed projects, as well as taking into account other factors, artificial intelligence is able to predict when the project is most likely to be completed [3].

In today's world, project office leaders must constantly think about how to give the business more value. And at the same time reduce project management costs through project management automation and the use of artificial intelligence technologies. The impact of digital transformation on project management has led to the fact that, due to the almost complete digitization of work processes, the project can be monitored in real time, the transparency of project data is ensured at all its stages, and the flexibility and speed of making managerial decisions are significantly increased.

Project management forms a system of motivation aimed at obtaining the final result. This is especially important in relation to state and municipal administration, where many managers and specialists are characterized by the thinking of an employee who bears greater responsibility for current processes, and

not for the final result, since the specifics of project management in government bodies are different [4]. The impact of digital transformation on project management has led to the fact that, due to the almost complete digitization of work processes, the project can be monitored in real time, the transparency of project data is ensured at all its stages, and the flexibility and speed of making managerial decisions are significantly increased.

2. Methodology

As a main task of the study - to analyze scientific and applied tools for project management in a turbulent economy with the use of digital technologies, the article has a significant number of methods. Methods were applied: induction and deduction, comparison and systematization to characterize the modern understanding of the essence of the research problem; synthesis and analysis - to determine the content of the main aspects of research issues; abstract-logical - for theoretical generalizations and conclusions of the study.

3. Research Results and Discussions

Analyzing the specifics of using the project approach in managing digitalization projects, two key points should be highlighted [5]:

- 1) the peculiarity of the influence of digitalization on the methodology of project activities in general;
- 2) the specifics of managing the implementation of digitalization projects. Let us consider them in more detail from the point of view of methodological, organizational and financial aspects.

Digitalization provides for the automation of production, management and business processes, as well as the transition of the bulk of work to a digital format [6]. At the same time, digitalization has brought certain changes to the project management itself. From the point of view of the methodological aspect, this was reflected in the blurring of the boundaries between the technologies being introduced and the technologies used for implementation, from the point of view of the organizational aspect, in the emergence of new management tools and the development of communication services, and from the point of view of the financial aspect, in changing approaches to managing financial security digitalization projects [7].

Due to the fact that digital transformation currently affects all spheres of society, and in the context of a pandemic, this process began to develop with rapid acceleration, project management cannot be carried out without the use of modern application software. Project management software must comply with accepted standards, support the project at all stages of its life cycle, and also provide managers with ample opportunities for flexible analysis and visualization of results. Such software solutions are based on the use of mathematical tools in the development and management of projects, which is represented by a wide variety of models. These include, for example, a wide range of network models for describing the structure of the project, its processes, resources and time, the critical path method (CMP - Critical Path Method), the program analysis and evaluation method (PERT - Program Evaluation and Review Technique), simulation method, stochastic models, fuzzy set models, big data models and other implemented algorithms[8].

Formally, from the standpoint of the project management methodology, projects for digitalization and the introduction of digital technologies are not much different from similar projects in other areas. The problematic point is that so far there has not been a consensus in the expert community about what the scope of digitalization is, and from what point the use of digital technologies ceases to be just a use, but becomes a full-fledged digital transformation. If we consider digital technologies as a determining factor, we can propose the following criterion: a digital project is a project that not only changes business processes, but also generates additional value precisely through the use of new algorithms for organizing business processes, and not only by saving time and money through automation. An additional criterion for a digital project can be considered such options as handling large amounts of data, the complete displacement of a person from the production process, the use of a fundamentally new interaction interface (for example, virtual reality, augmented reality, etc.) [9].

At the same time, the main feature of digitalization projects, which is reflected in the project management methodology, is the ultra-fast update of digital technologies. Therefore, each new project is a kind of big experiment, since we actually do not have the opportunity to compare the results with previous experience. Those projects that were

implemented five years ago are based on digital technologies of the previous generation and cannot serve as a full-fledged analogue.

The need for successful implementation of digitalization projects often requires a revision of the existing organizational canons of project management. Although the concept of "canon" in management is rather arbitrary, the introduction of digital technologies brings the greatest changes to the management structure and organizational model.

The implementation of a digital project, unlike the implementation of any other innovative project, has several important features. Firstly, the implementation of a digital project often involves the lack of a clear vision of the final result of the entire process, and making adjustments to the project itself already in the course of its implementation. Medium-term and short-term planning in this case prevail over long-term. This requires the use of various agile methods such as Agile or SCRUM for management economy [10].

Secondly, the specifics of digitalization projects require project managers and executors to have specific knowledge in the field of information and communication technologies, which, as a rule, is not available to specialists in subject areas in which digitalization is carried out [11]. This often requires the creation of unified centers of digital competence within the organization, which would be responsible for the implementation of all projects in all areas of activity. Thirdly, digitalization projects are by no means limited to the development of a new generation of software, digitalization involves the reorganization of the entire management structure, revision of the business model and development strategy of the organization. At the same time, as a rule, there is a need to retrain the entire management team, including its management: functioning in new conditions requires completely different competencies from employees. Moreover, such retraining should take place in parallel with the digitalization itself. The use of the project approach in other areas of activity does not require such a scrupulous approach to the organizational issue [11]. Another problem of implementing a project approach when working with digitalization projects may be that digital technologies, in principle, challenge the existing rules of corporate ethics - a cumbersome system of approvals, as well as the time allotted for making a decision. Many management functions that,

within the framework of corporate logic, are assigned to managers in the overall structure, can simply be automated. New digital technologies erase the differences not only between different levels of the hierarchy in management, but also spatial restrictions. An example of such digital projects, in particular, can be the introduction of an electronic signature [12]. The fuzziness of the boundaries of the digitalization project mentioned above introduces significant complexity into the system of its financing. The classical approach underlying budgeting systems requires that all activities be funded strictly according to predetermined plans. However, digitalization projects are characterized by significant changes in the course of implementation, which will certainly require greater flexibility in decision-making from financiers. In addition, the rapid development of digital technologies leads to the fact that in practice one digital transformation project often smoothly transitions into another, eventually becoming infinite (and requiring infinite financial resources). To prevent this from happening, it is necessary to outline the boundaries of each project as clearly as possible, as well as to determine the rules and principles for coordinating changes to approved financial plans. Separately, the specifics of financing digitalization projects in the public sector should be discussed [13]. The impact of digitalization and economic turbulence on key aspects of project management is shown in Table 1.

Table 1: The impact of digitalization and economic turbulence on key aspects of project management

<i>Aspect of project management</i>	<i>Aspect of project management</i>
Methodological	<ul style="list-style-type: none"> - project management in conditions of uncertainty and high dynamics of the business environment; - The need for constant monitoring of the market for new products and technologies; - High speed of response to changes in the external and internal environment, flexibility of the goals and objectives of the project during its implementation; - Project risks cannot be accurately assessed

Organizational	<ul style="list-style-type: none"> - preferential use of medium-term and short-term planning; - Possibility of flexible selection of project team members (including those working remotely); - Improving communication and speed of information exchange; - Increased requirements for the formation of project documentation
Financial	<ul style="list-style-type: none"> -difficulty in preliminary assessment of the final cost of the project and the formation of the project budget; - the need for increased flexibility in the search and selection of the necessary resources; - frequent revision of plans and project financing schemes

Thus, unlike the private sector, the sector of state and municipal government is under strict legal regulation, which it has no right to circumvent. In addition to the fact that such regulation contains a number of features that are not very compatible with dynamic digitalization processes, it changes quite often, to which all participants must also respond promptly. Thus, public sector projects are characterized by stricter financial control (frequent checks to prevent misuse), as well as a specific schedule for the allocation of financial resources (tied to the budget process) [14]. The cumbersomeness of the public administration system often leads to a situation where several information-related digitalization projects are implemented by various unrelated departments. To ensure success, it is necessary to develop a financing scheme that would ensure the synchronism of the implementation of these projects. At the same time, it should be taken into account that the allocation of funds for the implementation of digital projects in state and municipal institutions often requires competitive procedures, which creates additional difficulties. All this requires a separate approach to the organization of financial planning and control of project implementation [15].

In general, we can say that the project approach is one of the main ones in the case of the implementation of the digitalization policy. In many ways, this demand is the result of the universality of the project approach as such. It can be stated that in the foreseeable future, it is the project approach that

will remain the most in demand not only in the private sector, but also in the sphere of state and municipal government.

However, the specifics of digital technologies, their rapid progress, high dynamics of change, almost ubiquitous distribution and impact on all spheres of life require the use of special project management models that reflect the new digital methodology and organization, as well as new approaches to financing. Within the framework of digital project management today, there are several different models at the same time. In each specific case, the choice of a particular model is determined by the actual tasks and the area of practical activity in which digital technologies are being introduced.

4. Conclusions

The digitalization of the economy is a large-scale and intensive process, the significance of which is obvious not only in professional and scientific circles, but also noted at the state level. The digital economy has given rise to a new type of management based on the interaction of people in the virtual space through the technological infrastructure, and has created conditions for the automation of most routine operations. At the same time, the concepts of "digital economy" and "digitalization of the economy" should be separated. The first is a complete new economic environment, the second is through the creation of this environment through technical and methodological transformations in all areas of management.

At the moment, the market is experiencing a massive introduction of digital technologies in both the public and private sectors. At the same time, a characteristic feature of the introduction of digital projects into practice is the fact that after the completion of this process, the subject of implementation (company or state structure) becomes highly dependent on new digital technologies. The implementation of a digital project often entails an irreversible change not only in individual business processes, but also in the entire business model of the organization. This requires a careful and balanced approach to managing the implementation of digital projects in order to ensure the required level of quality of digital transformation. The project approach has become widespread in the management of the implementation of various information systems both in the private sector and in

the state and municipal service. This approach is quite universal, has a rich theoretical base, and its practical provisions are well tested. However, when it comes to the implementation of large-scale digitalization projects, the previously proven project management tools are not so effective. So, as practice shows, a significant number of digitalization projects are implemented with violation of deadlines, budget overruns or deviations from the originally planned quality criteria. This makes it necessary to use a scientific approach to analyze the existing practice of project management in order to assess its effectiveness and determine the main areas for improvement.

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