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Controlling and monitoring of projects based on geo-information system technology

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Abstract. Full control and monitoring of the developed project is a great practical importance for its successful and timely implementation. The article describes the main directions and features of control and monitoring of the implementation of the projects based on GAT-technologies. In addition, the study provides the necessary conclusions on the procedure for making the necessary changes to the initially designed projects, the principles of project implementation, the process of project implementation and carried out scientific directions.

Introduction

In recent years, the rapid penetration of GIS technologies in various sectors of the economy, including industrial production, agriculture has led to a sharp increase in the number of various projects developed and implemented by using these technologies, i.e. GIS projects. It follows that the timely implementation of projects based on the use of GIS technologies is also very important and necessary to strengthen their control and periodic monitoring in order to increase their efficiency. Therefore, research on the control and monitoring of GAT-based projects is particularly relevant.

Problem statement

Geo-information system technology is rapidly entering for all aspects of human society. Today, it remains difficult to find an area where these technologies have not penetrated. Its rapid penetration allows us to find the simplest and most effective ways to positively address the existing problems in this area. Therefore, the development and implementation of various projects based on or using such technologies is a great practical importance for sectors of the economy. Thus, the theoretical study and research of control and monitoring of GIS-based projects and the necessity for these measures form the basis of the following issue.

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Research methodology

The aim of the GIS projects monitoring is to increase the timely implementation of the work in this project and the overall efficiency of the project [1,p 95]. It is clear from the outset that the control of the project is, first of all, in assessing the actual indicators of the main works, documenting them and determining the results of activities by comparing them with the planned indicators.

Special attention should be paid to the control system in the implementation of control work, as it is "part of the overall project management system, which has an inverse relationship between the elements and the ability to change the previously given indicators." [1, p 96].

Any changes during the development of GIS projects will form a response aimed at minimizing differences in the plan due to changes in the environment. The results of the control over the implementation of most GIS projects show that the initial environmental indicators of the project do not correspond to today's indicators due to the environmental and unexpected circumstances. For example, in the development of a future plan for the organization of the use of GIS-technologies in the territory of the district shows that after 3-4 years the plan indicators does not correspond to the current situation. This is natural, because during this past period, many factors have influenced the process of organizing the use of the territory of the district. Studies show that only 5-6% of GIS projects are being implemented in line with initially planned targets. It should be noted that more the project is complex it needs more be reconsidered during the implementation process. This, in turn, leads to some changes in the project management system, as the revision of the project, change the project requirements, disruption of the relationship between the types of work, delays in the issuance of working documents, the occurrence of unforeseen technical failures.

Despite the above shortcomings, the main parts and elements of GIS projects should be supervised by their managers. Requirements for the control system play an important role in the implementation of such control [2, p98]. Such requirements will be generally developed with the direct participation of all interested people until the project is implemented. In order to create an effective control system, we need the followings:

- precise planning of all work required to complete the project;
- accurate estimate of time, resources and costs;
- calculation of actual costs and work performed for a certain period of time;
- periodic revaluation of time and costs required to complete the remaining work;
- multiple comparison of actual work performed and costs with the schedule and budget.

The project management system needs to ensure that the impact is corrected exactly where, when and what is necessary. For example, in a land allocation project for a large hydraulic structure (reservoir) or railway, if land allocation is delayed and some separate work on its economic, social and environmental justification is delayed, it can be accelerated through redistribution of labour resources and facilities. If the delivery of project documents is delayed, the project plan will need to be reconsidered. In most cases, the use of analytical analysis or general analysis methods to determine these gives a great positive result. The title is set in bold 16-point Arial, justified. The first letter of the title should be capitalised with the rest in lower case. You should leave 22 mm of space above the title and 6 mm after the title.

Research results and their discussion

Particular attention will be paid to the principles of creating an effective control system to ensure the timely implementation of projects based on GIS-technologies without any

changes. Such principles apply to the operational (fast) management of the project. The creation and application of a well-organized control system is necessary to achieve direct feedback. With the help of such communication, the actual use of the project resources can be compared with the planned work. In our opinion, the introduction of the following principles of effective organization of control will give good results in the timely implementation of the project:

The presence of a clear and obvious plan. Plans for the implementation of GIS-based projects must be clearly structured and recorded. If these plans change and are updated frequently, then control over project implementation may be lost. Therefore, first of all, the plan should be clear and obvious; taking into account all the conditions also should be developed. There are a number of factors should be considered when developing such a plan. Therefore, it would be expedient to create such plans based on economic mathematical methods.

Availability of reporting information system. Project implementation reports should cover the status of the project implementation on the basis of a unified approach to the initial plan. To do this, it is necessary to simplify their preparation, as well as to establish a clear time interval for all reports. The information obtained as a result of the report should always be thoroughly and deeply discussed. Some misunderstandings and deficiencies that arise during such discussions need to be taken into account and addressed at a later stage of project implementation.

Existence of an effective system of attention. The final part of the control process will be an action taken by management during the project implementation period to address any differences that may be accepted and that may arise. These actions can be aimed at overcoming identified shortcomings and prevented potential negative trends.

As a rule, GIS projects controlled by three quantitative characteristics - time, labour, and value. Therefore, the control process can be mainly divided into primary and auxiliary types (figure 1).

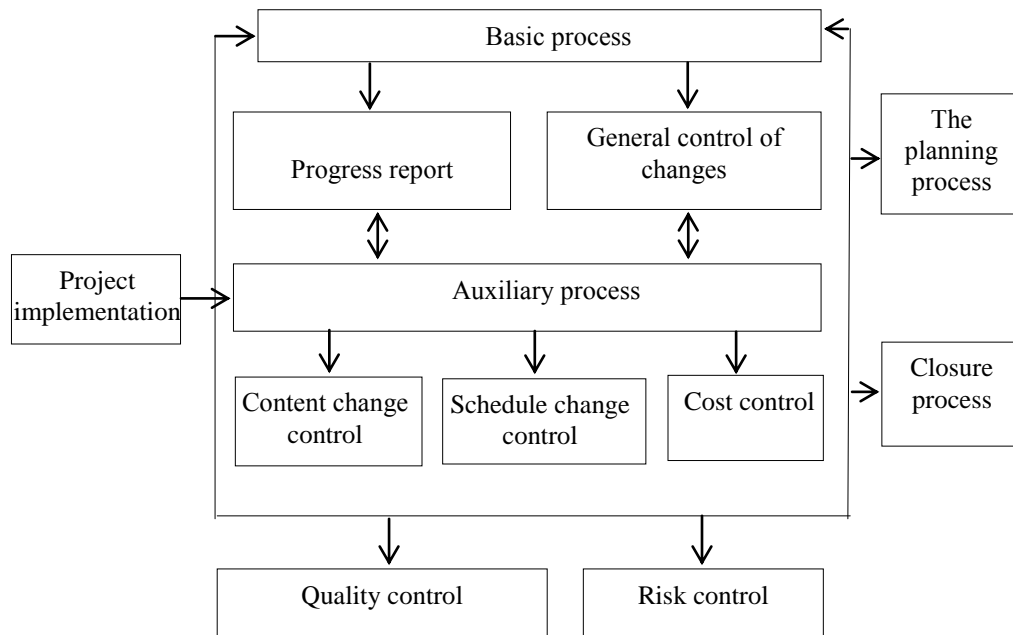


Fig. 1. Project control process

According to the above scheme (Figure 1), the general control process includes:

- general control of changes - coordination of possible changes in the project on the basis of GIS;
- report on the implementation of the project;
- collection and transmission of reporting information, taking into account planned changes, existing results;

The auxiliary control process includes:

- control over the changes in the content of the project;
- control of changes in the project schedule;
- control of expenses and changes in the project budget in general;
- quality control;
- monitoring the actual results of the project to determine compliance with the studied standards and taking the necessary measures to eliminate the causes of changes in the project;
- risk control - to pay attention to changes in the level of risk during the project implementation.

As can be seen from the above, it is recommended that project authors and all interested bodies pay close attention to the issues mentioned in the implementation of complex projects based on GIS-technologies.

In addition to monitoring the implementation of work in the management of projects developed on the basis of GIS technologies, it is also important to monitor the work on the project. "Monitoring is the process of controlling, observing, accounting and reporting on the actual implementation of a project according to a predetermined plan" [3, p.103]. Timely monitoring of the project implementation will ensure that these project elements are fully relocated and implemented. Calculations on the implementation of the project based on GIS technology for the allocation of land for the construction of complex engineering facilities, in particular, large hydraulic structures, show that the monitoring of the implementation of projects will increase costs by 12.0-13.0% creates the basis for the reduction. From this data, it can be seen that it is really effective to constantly monitor the implementation of the project.

Conclusion

Thus, the establishment and constant monitoring of the timely implementation of projects ensures the timely implementation of projects developed on the basis of GIS technologies, improves their quality, save project costs. Therefore:

* all the proposed processes, in particular, the general and ancillary processes and the work performed on them, should be fully taken into account in the control of projects created using the technology of geographic information systems.

* periodic monitoring of project implementation along with control ensures timely and full implementation of projects.

The acknowledgement

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