

Improvement of the budgeting system of IT projects

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Abstract. Improving the budgeting system for IT projects is a pressing issue in the modern business environment, where high competition and rapid technological changes demand effective management of costs and resources. The purpose of this research is to enhance the budgeting system to ensure efficient project management. To achieve this goal, an analysis of current approaches to IT project budgeting was conducted, identifying problems in existing systems and outlining the main principles for improvement.

One of the key principles for improvement is ensuring transparency and accountability in budgetary processes. This involves clearly defining expenses and controlling their use. Additionally, flexibility and adaptability of the system are crucial, allowing for adjustments in project conditions and quick responses to changes.

For enhancing the budgeting system, it is recommended to implement Agile and Scrum approaches, which enable iterative budget development and involve the team in the planning process. It is also important to consider the risks and uncertainties associated with IT projects and use stochastic modeling methods for their forecasting.

It is anticipated that improving the budgeting system will contribute to more effective IT project management and provide more accurate financial resource planning.

Keywords: Agile, IT projects, Scrum, budgeting, planning, budgeting system.

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INTRODUCTION

The relevance of this work is driven by the continuous development of technologies and the modern business need for effective IT project management. Changes in the industry necessitate constant improvement of budgeting approaches to ensure efficient resource utilization and achievement of set goals. Additionally, financial management in the IT sector is becoming increasingly complex due to rising competition and risks, requiring enhancements in budgeting methods. Such research is crucial for understanding and applying best practices in IT project management and enhancing business efficiency.

The literature review has explored various approaches and methods for IT project budgeting, including traditional methods as well as modern Agile and Scrum approaches. It was found that existing systems have limitations in transparency, flexibility, and the ability to adapt to changes in project requirements.

The purpose of the study is to improve the IT project budgeting system to ensure effective management of project costs and resources. To achieve this goal, the following tasks are outlined:

- Analyze existing methods and approaches to IT project budgeting to identify their advantages and disadvantages.
- Define principles that should be considered when improving the budgeting system.
- Develop methods and approaches to improve the budgeting system, taking into account the identified principles.

RESULTS

Budgeting is considered an important management tool for enterprises, including IT projects, as it fosters the interconnection and alignment of operational and strategic goals. However, practice shows that the evaluation of operational budgets' execution is often insufficient. This is due to the lack of qualified specialists in

financial planning, outdated budgeting methods and techniques, and inadequate ability to promptly utilize information databases for professional managerial decision-making [1, p. 85].

The success of any project is inextricably linked to proper financial management, which includes project budgeting, financial management during its implementation, and preparation of financial reports. Alexander Korob, in his lecture [2], notes that project budgeting is detailed planning of the expenses necessary for its implementation. These expenses include costs for personnel, renting premises, purchasing equipment, and conducting events planned within the project framework. These activities can be carried out by the project team itself or outsourced to external organizations. It is important that the project budget is justified, meaning that the costs for equipment, materials, and work should be truly necessary for the implementation of this specific project, rather than exceeding the overall needs of the organization.

In modern market conditions, the project budgeting system becomes a crucial component of its planning. All project planning should be based on budgeting, meaning that all expenses and outcomes must be clearly reflected in financial indicators. One of the key tasks of financial planning (budgeting) for a project is the development of a balance model. This model allows for the assessment of the dynamics of balance indicators, planned profit and loss, cash flow, as well as other important indicators such as profitability and turnover, both for individual projects and for the enterprise as a whole.

Before starting the project implementation, it is essential to clearly define the scope of work and budget requirements. These factors are critically important as they determine the target plan against which the project's performance is compared [3, pp. 85-86].

There are several methods of budgeting IT projects, each with its own advantages and disadvantages (see Table 1). There is no universal method for budgeting IT projects. The choice of

method depends on the specifics of the project, its size, complexity, and risks. It is recommended to use a combination of different methods to obtain a more accurate budget estimate.

Table 1

Methods of IT Project Budgeting

№	Method	Advantages	Disadvantages
1	Fixed Price Method: involves setting a clear fixed price for the entire project.	- Simple and understandable for all stakeholders; - Helps to clearly plan the budget.	- Does not account for potential changes in the project; - May lead to additional costs.
2	Hourly Rate Method: involves payment for the actual time worked.	- More flexible than the fixed price method; - Allows better control of expenses.	- Harder to plan the budget; - May lead to overspending if the project is delayed.
3	Fixed Price with Incentives Method: combines elements of fixed price and hourly rate methods.	- Can motivate the team to work more efficiently; - Helps to clearly plan the budget.	- More difficult to calculate the fixed price; - May lead to disputes over incentives.
4	Analytical Hierarchy Method: uses mathematical models to evaluate various factors affecting the project budget.	- Allows consideration of all factors influencing the budget; - Provides a more accurate budget estimate.	- Complex and labor-intensive method; - Requires special knowledge and skills.
5	Analogy Method: uses data on budgets of similar projects to estimate the budget of a new project.	- Simple and quick method; - Provides an approximate budget estimate.	- Similar projects may not always be available; - The estimate may be inaccurate.

Source: summarized by the author

Modern systems for budgeting IT projects face a number of problems that lead to inefficient use of resources, project delays, and budget overruns. Budgets are often based on incomplete or inaccurate data, resulting in their underestimation or overestimation. Predicting costs for IT projects is challenging, as they vary depending on many factors, such as changes in project scope, technologies, and resource availability. Budgets are often rigidly fixed, making it difficult to adapt them to changes in the project. This can

result in the project being underfunded or funds being spent inefficiently. Budgets are often complex and difficult to understand, complicating control over their execution. Inadequate communication between project stakeholders leads to the budget not being clearly understood by all, causing issues with its execution [4, pp. 4-6].

Improving the budgeting system for IT projects is based on several key principles (see Table 2), aimed at increasing the efficiency and accuracy of financial planning.

Table 2

Principles for Improving IT Project Budgeting Systems

№	Principle	Description
1	Defining Project Goals and	- Define clear and measurable project goals to ensure the budget aligns with set objectives; - Break the project into smaller phases with specific budgets for each phase; - Identify risks and allocate

	Objectives	funds to cover them.
2	Realistic Cost Forecasting	- Estimate labor and task costs based on information from similar projects; - Engage experts to assess complex tasks; - Account for expenses including equipment, software, licenses, personnel, training, and others.
3	Flexibility and Adaptability	- Regularly review and update the budget according to project changes; - Use Agile budgeting methods to adapt to changing priorities and needs; - Use a contingency fund for unforeseen expenses.
4	Transparency and Communication	- Create a clear and understandable budget document accessible to all project participants; - Inform the team about the budget status and any changes; - Involve the team in the budgeting process.
5	Effective Control and Monitoring	- Establish a system for tracking expenses and comparing them with the budget; - Conduct budget audits to identify any issues; - Implement measures to adjust the budget in case of deviations from the plan.

Source: summarized by the author based on [5, pp. 4-56]

In the current environment, the scale and complexity of IT projects are continuously increasing, necessitating improvements in their management to ensure timely completion. Many IT projects may undergo changes during their implementation, making it essential to have a flexible approach and be prepared to adapt to new circumstances. In some cases, technological changes may arise, requiring the readiness to restart the project from the beginning. Many companies do not utilize project management in their operations: they lack described processes, cannot control and modify project statuses, and do not collaborate with project participants to jointly resolve emerging issues. IT project managers often encounter these problems during the planning and implementation of projects [6, p. 43].

Practice shows that many of the best ideas come to mind only when the project is too far along. For such tasks, the Agile methodology often comes to the rescue. Prioritization is the most critical part of flexible management methods. Tasks in Agile are performed continuously or in small cycles called sprints [7, p. 5].

Agile is implemented using various methods, with Scrum and Kanban being the most popular. Scrum is considered more of

a "structured approach." This method involves collaboration between specialists, the product owner, and the Scrum master. Specialists work on the product, the owner monitors the process and makes adjustments, and the Scrum master implements Agile, motivates, and supports the team. Kanban is viewed as a "balancing approach." This method aims to balance the workload on employees. In Kanban, there are no roles for moderators and owners, only specialists [8, p. 63].

Agile and Scrum are project management methodologies that are becoming increasingly popular in various fields, including budgeting. They are based on principles of iterative development, flexibility, and constant adaptation to changes. It is important to note that these are not just methodologies but also a change in mindset. For successful implementation of these approaches, it is crucial that all stakeholders are ready for changes and collaborate with each other.

Agile and Scrum allow for quick responses to changes in economic conditions, organizational needs, or project priorities. These methodologies encourage active communication and collaboration among all stakeholders, leading to a better understanding of budgeting processes. Agile and Scrum make the budgeting

process more transparent for all participants and encourage the active involvement of all stakeholders in the budgeting process, resulting in better understanding and decision-making. Agile and Scrum help shorten the budget cycle time and save resources through more efficient planning and execution.

However, the key difference between Agile and Scrum lies in the fact that Agile is a broad philosophy based on core values and principles. Scrum, on the other hand, is a specific Agile methodology used to facilitate project work. Here are a few more key differences [9]:

- Scrum breaks down into shorter sprints and smaller deliverables, whereas Agile leads to a single deliverable at the end of the project.

- Agile involves members of different cross-functional teams, while Scrum includes team members with specific roles, such as Scrum Master and Product Owner.

- In Agile, the product is reviewed and updated on a regular basis, whereas Scrum focuses on one activity at a time, moving to the next step after completing each sprint.

The implementation of Agile and Scrum approaches in IT project budgeting occurs in the following sequence:

- Before starting work, it is important to clearly define the goals and priorities of budgeting.

- Create a backlog (a list of all projects that require funding).

- Break the project into short iterations (usually 2-4 weeks).

- At the beginning of each iteration, planning should be conducted to define the tasks to be completed and the resources needed.

- Conduct daily stand-up meetings – these are short meetings (15-30 minutes) where team members report on their progress, challenges, and plans for the day.

- At the end of each iteration, a retrospective should be held where the

team discusses what went well, what can be improved, and makes appropriate changes to the process.

For predicting costs, stochastic modeling methods are used. Stochastic modeling is a method of cost forecasting that accounts for the uncertainty inherent in IT projects. It uses computer simulations to generate multiple possible project outcomes. Stochastic modeling provides more accurate cost predictions than traditional methods and helps better understand the risks associated with the project and their impact on the budget. Risks are an integral part of any IT project. It is important to consider risks in budgeting to minimize their impact on the project.

CONCLUSIONS

Improving the budgeting system for IT projects has proven to be a crucial task in the context of modern business, as the dynamic development of technologies and increased competition require effective management of project costs and resources. Analysis of current approaches to IT project budgeting has shown that existing systems have some drawbacks, such as insufficient transparency and flexibility.

The study indicates that the implementation of Agile and Scrum approaches in budgeting can significantly improve project management efficiency, allowing for quick adaptation to changes in project requirements and conditions. Additionally, the use of stochastic modeling methods for cost forecasting helps reduce risks and uncertainties associated with IT projects.

Therefore, improving the IT project budgeting system is a relevant and promising direction for development, which will enable enterprises to enhance project management efficiency and ensure more accurate financial resource planning.

References

1. Topilo V., Petruk O. Formation of an Individual Budgeting Model in Enterprises // Finance and Taxation. 2021. No. 92. Pp. 85-94. DOI: 10.33146/2307-9878-2021-2(92)-85-94.
2. Lecture 1. Introduction. Project Budgeting // European Space: [Website]. URL: <https://euprostir.org.ua/courses/lecture/139409>
3. Kuzminykh V. O., Koval O. V., Taranenko R. A. Models and Tools for IT Project Management: Textbook / edited by Gavrylko Y. V. Kyiv: Igor Sikorsky KPI, 2023. 222 p. URL: <https://ela.kpi.ua/handle/123456789/57303>.
4. Ptashchenko L. O., Velykozhon A. O. Problems of Organizing the Budgeting Process in the Financial Management System of an Enterprise // Effective Economy. 2018. No. 12. Pp. 1-7. DOI: 10.32702/2307-2105-2018.12.1.
5. Kuzminykh V. O., Taranenko R. A. Fundamentals of IT Project Management: Textbook. Kyiv: Igor Sikorsky KPI, 2019. 75 p. URL: <https://ela.kpi.ua/handle/123456789/34480>.
6. Network Planning in IT Project Management / Rodashchuk H. Y. et al. // Tavriya Scientific Bulletin. Series: Technical Sciences. 2023. No. 1. Pp. 42-56. DOI: 10.32851/tnv-tech.2023.1.5.
7. Application of Agile Principles in the Organization of Service Units of Higher Education Institutions. Part 1 / Olshevska O. V. et al. // Automation of Technological and Business Processes. 2023. No. 3 Vol. 15. Pp. 4-9. DOI: 10.15673/atbp.v15i3.2619.
8. Luchyk P. O. Implementation of Agile and Scrum Methodologies in Modern Management // Actual Problems of Economics, Accounting, Finance, and Law in Ukraine and the World: Collection of Abstracts of the International Scientific and Practical Conference / TSFENDE. Poltava, 2020. No. 5. Pp. 62-63. URL: https://www.researchgate.net/profile/Yashar-Damirov/publication/348002426_MIZNARODNA_NAUKOVO-PRAKTICNA_KONFERENCIA_INTERNATIONAL_SCIENTIFIC-PRACTICAL_CONFERENCE_AKTUALNI_PROBLEMI_EKONOMIKI_OBLIKU_FINANSIV_TA_PRAVA_V_UKRAINI_TA_SVITI_ACTUAL_PROBLEMS_OF_ECONOMICS_ACCOUNTING_F/links/5fec7b9d299bf140885a6dec/MIZNARODNA-NAUKOVO-PRAKTICNA-KONFERENCIA-INTERNATIONAL-SCIENTIFIC-PRACTICAL-CONFERENCE-AKTUALNI-PROBLEMI-EKONOMIKI-OBLIKU-FINANSIV-TA-PRAVA-V-U_KRAINI-TA-SVITI-ACTUAL-PROBLEMS-OF-ECONOMICS-ACCOUNTIN.pdf.
9. What's the Difference Between Agile and Scrum? // CR-T: [Website]. 2021. URL: <https://www.cr-t.com/blog/whats-the-difference-between-agile-and-scrum/>