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EFFICIENCY OF FINANCIAL CONTROL IN PROJECT MANAGEMENT: A COMPARATIVE ANALYSIS OF TRADITIONAL AND AGILITY METHODOLOGIES

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Abstract
The article is devoted to the study of the role of financial control in project management, with an emphasis on its implementation within the framework of traditional (Waterfall, PRINCE2) and flexible (Agile, Scrum, Kanban) methodologies. A comparative analysis of financial monitoring tools, supported by empirical data and visual representations, is conducted. The conditions that contribute to achieving an optimal compromise between budget transparency and adaptability of project management when choosing the appropriate methodology are determined.

Keywords: Financial control, project management, Waterfall, Agile, Scrum, budgeting, cost control.

Introduction

The scientific novelty of the study is manifested in the creation of a comprehensive system that combines financial management tools and project management methodology. Of particular value is the developed algorithm for assessing economic efficiency based on adaptive risk indicators, as well as the introduction of Agile principles into the financial planning process. This approach helps to increase the flexibility and effectiveness of project activities.
Successful project management that achieves goals on time and within budget is directly dependent on effective financial control. In today's competitive and rapidly evolving technology world, transparent, efficient and flexible financial management is becoming essential [1].

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Financial control in the classical sense is a systematic process that includes:
- Budget planning. Determining all financial needs of the project throughout its life cycle.
- Monitoring of execution. Constant monitoring of actual expenses and their compliance with planned limits.
- Analysis and regulation. Identification of causes of deviations and taking measures to optimize costs and prevent overspending.

Modern project management methodologies offer different approaches to financial control. Traditional methods (Waterfall, PRINCE2), based on a linear sequence and fixed budgeting, provide high predictability, but are limited in flexibility in the event of changes [2]. Flexible methodologies (Agile, Scrum, Kanban), on the contrary, are focused on adaptation and repetition. Here, financial control is more dynamic, often with the ability to revise the budget at each stage. This allows for a quick response to changes, but requires automated cost monitoring systems [3]. By comparing these approaches, it is possible to determine which financial control system is most effective for specific projects and conditions. Thus, the relevance of the topic lies in the need to find balanced solutions for the effective management of project finances in conditions of high variability.

Financial control within the framework of project management is a set of measures aimed at the optimal distribution and use of funds, prevention of unjustified expenses and achievement of planned economic results. It is an integral part of the project management system and is inextricably linked with the processes of planning, organization and monitoring of its implementation [4].

The essence of financial control lies in the constant monitoring and analysis of the movement of funds within a project, their comparison with established plans and decision-making to eliminate identified discrepancies.

The main tasks of financial control include: compliance with the approved budget; timely identification and analysis of deviations; rational use of funds; reduction of financial risks.

Modern approaches to project management use a variety of financial control tools:

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1. Earned Value Management (EVM). This is a method of assessing the cost of work actually performed, which allows for simultaneous analysis of deviations in terms of time and costs.
2. Cost Performance Index (CPI). An indicator reflecting the efficiency of budget use.
3. Budget at Completion (BAC) - An estimate of the total cost of a project based on the current rate of completion.
4. Burn Rate. The rate at which a budget is spent over a given period of time, often used in agile methodologies [5].

The choice and application of these tools largely depends on the project management methodology used. Traditional approaches emphasize formal reporting and regular reviews, while agile methodologies integrate metrics into the iterative planning process.

The project management methodology determines the frequency, depth and methods of financial control:

- traditional methodologies (e.g. Waterfall, PRINCE2). Here, financial control is mainly tied to the completion of project stages, and the budget is fixed at the initial stage. This ensures high predictability, but limits flexibility.
- flexible methodologies (e.g. Agile, Scrum, Kanban). Here, control is integrated into each sprint or iteration, which allows for prompt response to changes. However, this requires constant updating of forecasts and more complex monitoring systems [6].

Project management has a direct impact on how financial control is organized, starting with budget planning and ending with ways of responding to financial deviations. In world practice, as we found out above, two main types of methodologies are distinguished: traditional and flexible, and each of them organizes the financial monitoring process in its own way.

Budget planning in traditional methodologies (Waterfall, PRINCE2) is formed at the very beginning of the project, defining the total amount of funding, detailing expense items, setting financial milestones and agreeing on a payment schedule. This approach is well suited for projects with clear requirements and a low probability of changes, for example, in construction or when implementing standard IT solutions. When using flexible methodologies (Agile, Scrum,

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Kanban), the budget is planned iteratively, with forecasting costs for the next sprint or release and subsequent revision as requirements are clarified. This ensures flexibility and allows for quick reallocation of funds, but requires strict accounting and constant interaction with the customer.

Traditional approaches control costs at pre-defined milestones, with monthly or milestone reporting. This reduces the administrative burden, but increases the risk of late detection of cost overruns. Agile methodologies integrate control into each iteration, with real-time tracking of financial metrics (e.g., Burn Rate, CPI) and integration into the task management system. This reduces the likelihood of unnoticed cost overruns accumulating, but requires constant access to up-to-date data.

In traditional methodologies, budget changes require renegotiating the plan and often lead to delays, which is suitable for stable projects but not for dynamic environments. Agile methodologies allow you to adjust the budget and scope of work in each sprint, which is especially useful when working with innovative products or in startups. However, if not controlled, this can lead to uncontrolled expansion of functionality and increased costs.

Traditional approaches provide high transparency through clear documentation and regular reporting, especially when requirements are stable. In agile methodologies, the level of transparency depends on the quality of the automated accounting tools (e.g. Jira, Trello, Asana with a financial monitoring module).

The risk of overruns with traditional approaches is minimal under stable conditions, but increases with frequent changes in the technical specifications. With agile approaches, the risk is higher, but is offset by the team's ability to quickly adapt and adjust the project's direction. Table 1 shows a comparative analysis of traditional and agile approaches.

Table 1 - Comparison Summary Table

Criterion	Traditional methodologies (Waterfall, PRINCE2)	Flexible methodologies (Agile, Scrum, Kanban)
Budget planning	Complete at the start of the project	Iterative, revision in sprints
Cost control	Periodic, in stages	Constant, built into the process
Flexibility of response	Low	Tall
Financial transparency	High under stable conditions	Depends on automation
Risk of overspending	Low with constant requirements	Average, compensated by adaptation

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To visually assess how financial control affects project success, we analyzed three real examples from global practice. These cases will help us understand how traditional and flexible approaches to project management differ in their effectiveness, and how the choice of methodology affects the budget, deadlines, and quality of the final product.

1. Case 1 (traditional approach). The Boeing 737 MAX upgrade in the early 2010s was carried out using the classic Waterfall model. Financial control was strictly focused on planning and phased reporting. Despite full budget transparency, lengthy approvals led to production delays and an increase in costs by 12% above the original plan [7]. Figure 1 shows these budget deviations by project stages.

2. Case 2 (Agile methodology). Spotify actively uses Scrum and Kanban in software development. In the project to create a new recommendation system (2018–2019), financial control was built into each iteration. This allowed for the prompt redistribution of funds and kept budget overruns at only 3% [8]. Chart 2 illustrates the dynamics of costs by sprints.

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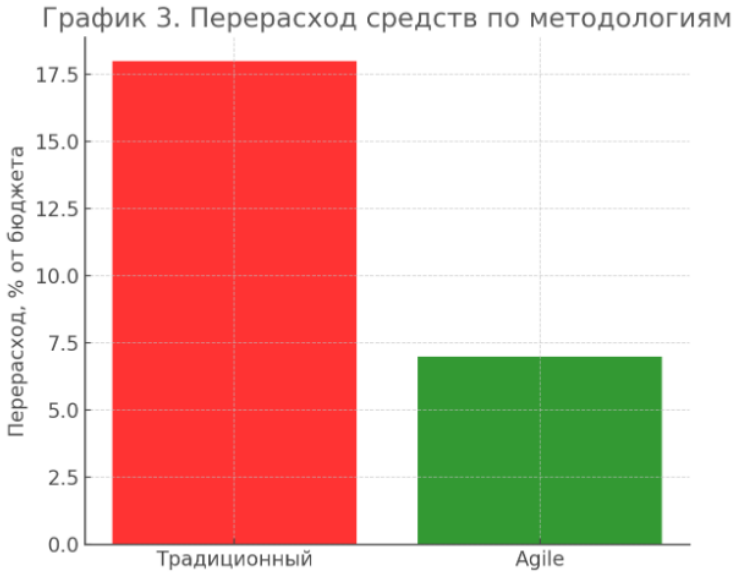
3. Case 3 (Hybrid approach). For the Mars 2020 mission, NASA used a hybrid approach, combining Waterfall and Agile. Design and preparation followed a waterfall model, while testing and optimization of systems were performed iteratively. This hybrid method allowed us to limit budget overruns to 5% while simultaneously ensuring adaptation to changing technological requirements [9]. Figure 3 shows the distribution of costs across project phases.



A study of three project management cases found a direct link between the effectiveness of financial control and the chosen methodology. Traditional methods, like Boeing, guarantee budget transparency, but their rigidity and lengthy approvals can lead to cost overruns and missed deadlines. Agile approaches, like Spotify, build financial control into every stage of work, allowing for rapid response to changes and cost reduction. Hybrid models, like NASA, combine the predictability of waterfall systems with the adaptability of Agile, achieving a balance between control and flexibility.

Therefore, for projects with high uncertainty, the integration of flexible practices into financial control is optimal, and for strictly regulated ones, combined or traditional approaches are optimal.

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