ANNOTATION

to the dissertation of the doctoral candidate of Satbayev University, Nursulu Mukhanbetovna Alashbayeva, titled «Methods of Managing Investment Projects for Resource Development of a Company (Case study of JSC «NC «KTZ»)». submitted for the degree of Doctor of Philosophy (PhD) in the specialties 6D051800 "Project Management".

Relevance of the Dissertation Research Topic. In the context of limited resources, increasing competitiveness, and the necessity for sustainable economic growth, the issues of effective management of investment projects are of particular importance for national infrastructure companies. Kazakhstan, as a country with a welldeveloped territorial logistics system and high potential for transit transportation, faces large-scale tasks of modernizing and expanding infrastructure facilities. One of the key organizations implementing major resource development projects is the strategic company JSC NC "KTZ", whose efficiency directly affects the country's transport and economic security.

In practice, the implementation of investment projects in the infrastructure sector is accompanied by numerous challenges, such as a high level of uncertainty, long project durations, risks of budget overruns, complexity in stakeholder coordination, and the need for integration of innovative solutions. Under such conditions, traditional project management methods often prove insufficiently flexible and adaptive.

Flexible methodologies (Agile, Scrum), stochastic modeling algorithms (such as GERT), and knowledge management systems (Knowledge Management) can significantly enhance the adaptability of processes, ensure timely decision-making, and leverage accumulated experience for the continuous improvement of project activities. However, in Kazakhstan's practice, the application of these methods in infrastructure companies—especially in resource-intensive projects aimed at large-scale development of physical and technical assets—remains limited and under-researched.

Thus, the need for theoretical comprehension and practical application of new methods for managing investment projects in Kazakhstan's infrastructure sector, adapted to the specific features of resource development, defines the high relevance of this study. The development of an integrated management model that incorporates process flexibility along with the accumulation and use of organizational knowledge is of particular importance in line with the strategic goals of enhancing the efficiency, innovation, and sustainability of national companies such as JSC NC "KTZ".

The object of the research is the process of managing investment projects in the infrastructure sector implemented under conditions of resource development by large national companies.

The subject of the research is the methods and tools of project management, including flexible methodologies (Agile, Scrum) and knowledge management practices, as applied to the case of JSC NC "KTZ".

The aim of the dissertation is to develop and substantiate an integrated model for managing investment projects under conditions of resource development using the example of JSC NC "KTZ", by applying flexible project management methodologies

(Agile, Scrum) and knowledge management tools to enhance the efficiency of the company's business processes.

To achieve this aim, the following objectives were set in this research:

1. To conduct a theoretical analysis of existing approaches and methodologies for managing investment projects, with particular focus on the application of flexible methods (Agile, Scrum) and knowledge management in infrastructure sectors;
2. To study the current system of investment project management at JSC NC "KTZ", including its structure, tools used, and the level of project management maturity;
3. To develop an integrated model for managing investment projects that combines Agile methods, the GERT algorithm, and Knowledge Management practices;
4. To carry out pilot testing of the proposed model within an investment project of JSC NC "KTZ" and assess its effectiveness through expert and economic analysis;
5. To formulate and justify practical recommendations for the implementation of the integrated model aimed at improving the efficiency and sustainability of investment project execution within the company.

The methods of the research are based on the scientific works of domestic and international scholars in the fields of project management, investment project management, and knowledge management. The following methods were applied in the study: graphical evaluation and analysis, Work Breakdown Structure (WBS), comparative methods, methods of studying and generalizing relevant experience, as well as observation.

Scientific Novelty and Importance of the Obtained Results: The integration of flexible project management methodologies (Agile, Scrum) with knowledge management tools (Knowledge Management), through enhanced communication, process adaptability, and accumulated organizational experience, significantly contributes to increasing the effectiveness of resource-based projects in infrastructure companies such as JSC NC "KTZ".

The scientific novelty of the study is confirmed by the following results:

- An integrated model for managing investment projects has been developed, combining flexible project management methods (Agile, Scrum), the GERT network modeling algorithm, and knowledge management tools (Knowledge Management). This model is adapted to the needs of Kazakhstan's infrastructure sector and aimed at improving the efficiency of resource-based projects.
- For the first time, a methodology for evaluating the effectiveness of flexible investment project management has been proposed, based on expert assessment and statistical analysis. It includes the calculation of an integral performance indicator, a system of criteria, and weight coefficients.
- The role of knowledge management has been substantiated as a key intangible resource in the implementation of investment projects. A mechanism for integrating Knowledge Management has been developed, emphasizing the creation of a corporate knowledge base at each stage of the project life cycle, the formalization of tacit knowledge, and the enhancement of continuity in project activities.
- An algorithm for implementing a project-based approach in corporate practice has been proposed, based on the GERT method, which allows for the consideration of probable scenarios, cyclicality, and alternative management decisions under uncertainty in the implementation of investment projects.

- The effectiveness of the proposed model was confirmed through a pilot project at JSC NC "KTZ", where the model contributed to increased employee engagement, faster decision-making, and improved project performance indicators.

Scientific Propositions for Defense: Based on the results of the research, the following propositions are submitted for defense:

1. The necessity of using flexible project management methodologies and knowledge management tools to enhance the effectiveness of investment projects under resource development conditions has been substantiated.
2. An original integrated model for managing investment projects has been developed, based on the synergy of Agile, GERT, and Knowledge Management methods, adapted to the needs of JSC NC "KTZ".
3. An empirical study was conducted confirming increased project performance (growth in team enthusiasm, implementation speed, and quality of communication) following the introduction of the integrated model.
4. The economic feasibility of implementing the model was evaluated based on calculations of key investment efficiency indicators (NPV, IRR, PI) and its positive impact on the transformation of the management system.
5. Practical recommendations and project documentation templates (project charter, management plan, risk register, etc.) were developed, enabling the scaling and practical application of the model in other infrastructure organizations.

Theoretical and Practical Significance of the Research Results

The theoretical significance of the dissertation lies in the development of scientific ideas concerning effective mechanisms for managing investment projects in infrastructure companies using flexible methodologies and knowledge management systems. The study clarifies the concepts of "flexible investment project management" and "knowledge management in project activities" and identifies their interrelations in the context of enterprise resource development.

The scientific novelty is related to the proposed original integrated model, combining elements of Agile, Knowledge Management, and the GERT algorithm. The developed approach can be used in further research in the areas of strategic management, digital transformation, and innovative development of companies. The obtained results contribute to the theoretical and methodological base of the disciplines “Project Management,” “Investment Management,” and “Knowledge Management,” enhancing their scientific and educational value.

The practical significance lies in the potential for implementing the developed integrated model for managing investment projects in the operations of JSC NC "KTZ" and other enterprises in the infrastructure sector. The proposed algorithms, project documentation templates, and performance evaluation methods may serve as a basis for improving the effectiveness of investment activities.

Pilot testing of the model within the company’s project revealed the following practical advantages:

- Reduction of project implementation timelines;
- Increase in team enthusiasm;
- Preservation and systematization of knowledge;
- Improvement in planning quality and risk management.

The research results and the updates to project management practices can be used in corporate training programs for improving qualifications in investment project management.

Validation of the Research Results and the Doctoral Candidate's Contribution to Each Publication

1scientific papers have been published on the topic of the dissertation:

- 1 article in a journal indexed in the Scopus database;
- 4 articles in journals recommended by the Committee for Quality Assurance in the Field of Science and Higher Education of the Ministry of Science and Higher Education of the Republic of Kazakhstan;
- 1 article in the proceedings of international scientific-practical conferences.

In addition, an implementation act based on the proposed recommendations was received from JSC "NC "Kazakhstan Temir Zholy", and the recommended model was taken into account in the development of managerial and methodological documents for the advancement of investment projects. The conclusions and recommendations of the dissertation research are being used for the further implementation and pilot operation of the integrated model using Agile methods and knowledge management to ensure effective management of the company's investment projects.