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CREATING VALUE FROM THE IMPLEMENTATION OF PROJECT PORTFOLIOS FOR THE DEVELOPMENT OF TERRITORIAL SECURITY SYSTEMS

Abstract

The article proposes a system-value approach to managing portfolios of projects for the development of territorial security systems. The author analyses modern approaches to project portfolio management, develops a methodology for determining the integral value of projects, and identifies key items for reconciling stakeholder interests. For the first time, the paper proposes an approach to defining and structuring the values of portfolios of projects for the development of territorial security systems, taking into account the multidimensional impact of projects on various

stakeholders. The article proposes measures to increase the level of stakeholders' interest in the creation of territorial security systems based on multi-criteria analysis and scenario planning. The practical significance of the work lies in the creation of a methodological framework for the development of models and methods that allow taking into account the value for public authorities, businesses, and NGOs when managing security project portfolios.

Keywords

project portfolio, territorial security systems, system-value approach, management, value, stakeholders, coordination of interests.

Introduction

Given the growing level of threats associated with man-made accidents, natural disasters, and social challenges, the relevance of our study is the need to improve approaches to managing security project portfolios [1-3]. This is especially true in the context of modern Ukraine, which is facing the consequences of hostilities that require urgent and comprehensive solutions to restore the territory and ensure the protection of the population. Justifying the structure of values created through the implementation of project portfolios not only contributes to a better understanding of their impact on society but also allows for transparency and efficiency in resource allocation [4]. Identifying the main subjects of stakeholder alignment helps to reduce conflicts that often arise due to different preferences and limited resources.

The purpose of the article is to substantiate the structure of values created in the process of implementing portfolios of projects for the development of territorial security systems, and also to identify the main subjects of reconciliation of stakeholders' interests to improve the efficiency of such portfolios.

To achieve this goal, the following tasks are to be performed: to analyze current approaches to managing security project portfolios; to develop a methodology for determining the values that are formed as a result of project implementation; to identify the key subjects of stakeholder interests at different stages of project implementation.

The paper proposes for the first time an approach to defining and structuring the values of portfolios of projects for the development of territorial security systems, which takes into account the multidimensional impact of projects on different stakeholders. The article also proposes measures to increase the level of stakeholders' interest in the creation of territorial security systems based on multi-criteria analysis and scenario planning.

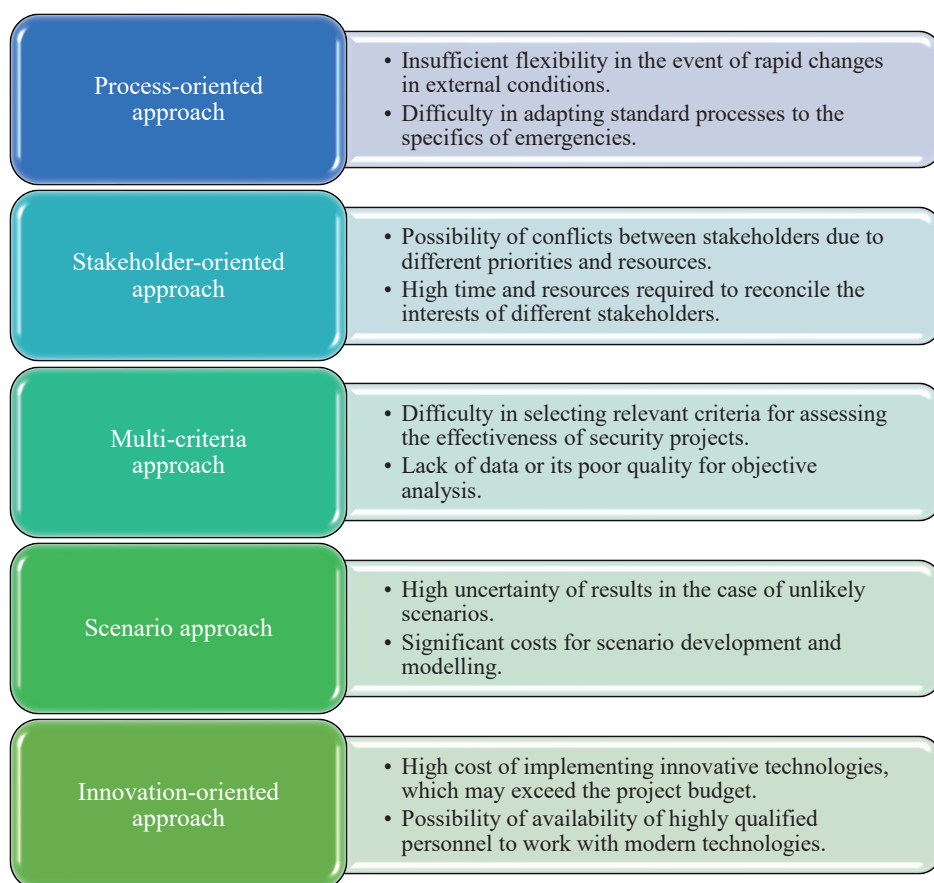
The practical significance of the work lies in the creation of a methodological framework for the development of models and methods that allow taking into account the value for public authorities, businesses, and NGOs when managing security project

portfolios. The results of the study contribute to ensuring transparency in decision-making, optimising the use of resources and increasing the level of public protection.

Thus, the study on the value creation from the implementation of project portfolios for the development of territorial security systems is a step towards improving the efficiency of risk management, aligning stakeholder interests and ensuring sustainable regional development.

The article analyses modern approaches to security project portfolio management. Managing security project portfolios is a complex process that involves coordinating resources, aligning stakeholder interests, and monitoring task performance [5-7]. Effective management of such portfolios requires the use of modern tools and techniques that ensure adaptation to a changing environment and an integrated approach to solving problems. This section analyses modern approaches to project portfolio management in the context of security (Fig. 1).

Figure 1. Modern approaches to project portfolio management and their shortcomings in terms of use in the development of territorial security systems



The presented Fig. 1 allows us to structure the main approaches to project portfolio management in the security sector and identify the key limitations necessary to increase their effectiveness in the context of the development of territorial security systems.

The process-oriented approach to project portfolio management focuses on streamlining processes and creating clear regulations for their implementation. In the context of security, this means the formation of successive stages of project implementation, from risk assessment to monitoring and mitigation. As noted by the authors [8-10], the successful application of this approach is possible only if procedures are standardized and modern management information systems are used. One of the key advantages of this approach is its ability to ensure transparency and control over project implementation. In particular, the standardization of management processes reduces the likelihood of errors in project implementation.

In today's environment, security project management is impossible without taking into account the interests of stakeholders. The stakeholder-oriented approach focuses on identifying key stakeholders and taking into account their needs at all stages of the project. Scholars [11-13] note that this approach helps to reduce conflicts between stakeholders and contributes to more efficient attraction of financial and organisational resources. The application of this approach in the security sector includes mechanisms for public participation in decision-making, the use of public feedback and the adaptation of projects to the real needs of the region.

The multi-criteria approach is based on the use of a system of criteria to assess the effectiveness of a project portfolio. In the security sector, this may include the level of risk reduction, economic benefits, improvement of social conditions, etc. According to studies [14-16], this approach allows for an objective assessment of the feasibility and priority of projects, especially in cases of limited resources.

The use of multi-criteria analysis helps to ensure a balance between short-term and long-term goals, as well as to reconcile the economic, social, and environmental aspects of projects.

The scenario approach is one of the most promising in the security sector, as it allows taking into account the dynamics of the environment and uncertainty. As noted in [17-19], this approach involves the development of alternative scenarios and modeling the response of the security system to these scenarios. For example, modeling the consequences of natural disasters or man-made accidents allows for the timely identification of weaknesses in the security system and the preparation of effective response measures. The scenario-based approach also provides management flexibility, allowing projects to be adapted to changes in the external environment without significantly reducing their effectiveness.

An innovation-oriented approach is also noteworthy, as it plays a key role in modern security project portfolio management. The introduction of new technologies, such as artificial intelligence, big data, and the Internet of Things, improves the quality of risk forecasting and coordination. As the authors of [20-22] emphasize,

innovations can significantly increase the effectiveness of emergency response through the use of automation processes and intelligent monitoring systems.

The analysis shows that modern approaches to managing security project portfolios are based on integration processes, technologies, and stakeholder interests. Each approach has its advantages and limitations, and their effectiveness differs depending on the specific conditions of project implementation. In practice, project management uses a combination of different approaches to ensure a comprehensive approach to solving security problems. However, when it comes to managing security project portfolios, a systemic and value-based approach should be used, which requires substantiation of the value structure from the implementation of these portfolios and the main subjects of reconciliation of their stakeholders' interests.

Materials and Methods

In our research on value creation from the implementation of portfolios of projects for the development of territorial security systems, we apply an interdisciplinary approach that combines methods of analysis, modeling, expert evaluation and scenario planning. The main attention is paid to identifying the factors that influence the creation of added value, as well as mechanisms for reconciling the interests of stakeholders.

The study uses a system-value approach, which allows the integrating various aspects of project portfolio management for the development of territorial security systems. This approach is based on the principles of system analysis, which provides a targeted perception of the object under study, and the value approach, which focuses on the creation and evaluation of values formed as a result of project implementation.

The system-value approach involves the study of territorial security systems as a multidimensional system that includes technical, social, economic, environmental, and infrastructural components. In the framework of the study, this allowed for a comprehensive analysis of the value of project portfolios, taking into account their impact on all key aspects of regional development. The main stages of applying this approach are identifying the values that ensure the results of project implementation, determining the relationships between them, and integrating these aspects into management mechanisms.

The study was based on the following sources of information. Data on implemented security project portfolios, including reports on initiatives in Ukraine and abroad. Expert opinions were obtained through a survey of security, project management, and regional development professionals. Scientific works and standards, such as PMBoK, PRINCE2, and ISO 21500, are used to analyze modern approaches to project management.

To achieve the research goal, the following methods of system analysis were used to identify the main components of territorial security systems and to identify the

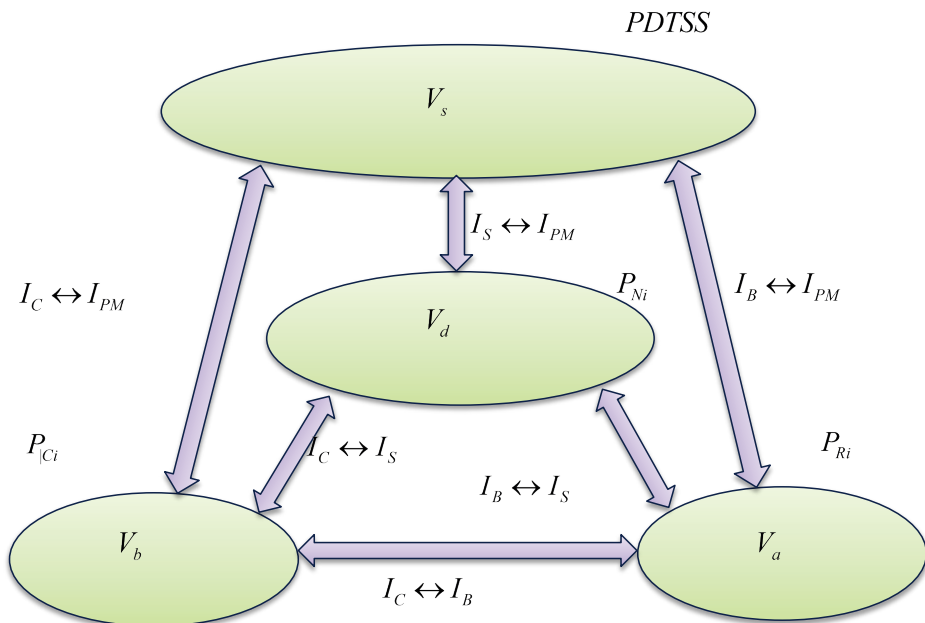
links between projects in the portfolio and their impact on the main components of value. Value analysis made it possible to develop a structure of values that are formed in the process of project implementation. The decomposition method was used to divide values into social, economic, environmental, and infrastructure components. Stakeholder mapping was carried out to identify the main groups of stakeholders (government, business, public, and international partners).

The application of the systemic-value approach allowed not only to take into account the multidimensionality of the projects, but also to provide a systematic understanding of their impact on the development of territorial security systems. This approach ensures the integration of various methods and tools, such as multi-criteria analysis, stakeholder mapping and scenario planning, creating a platform for the development of practical recommendations. Thus, the system-value approach in this paper is a methodological basis for comprehensive analysis, evaluation, and management of security project portfolios.

Results and discussion

The creation of each of the separate types of territorial disaster management units provides value for stakeholders and society. Value is the benefits from project products that relate to individual stakeholders and society for fulfilling the requirements specified in the mission of the project portfolios for the development of territorial security systems [23-24]. Therefore, in order to create value from the implementation of projects belonging to the portfolios of projects for the development of territorial security systems, it is necessary to satisfy stakeholders and society with their product, i.e. to receive benefits from it and to implement the project portfolio in accordance with the justified mission. Stakeholders of the projects belonging to the portfolios of territorial security system development projects are the state, the community, and business. At the same time, the values from the implementation of projects belonging to the portfolios of projects for the development of territorial security systems can be divided into basic (V_b), additional (V_a), added (V_d) and systemic ones (V_s) according to the peculiarities of their formation (Fig. 2).

Figure 2 – Structure of values from the implementation of project portfolios for the development of territorial security systems: *PDTSS* – portfolio of projects for the development of territorial security systems; P_{Ci} , P_{Ri} , P_{Ni} – community, regional and national level projects, respectively; V_b , V_a , V_d , V_s – respectively, basic, added, incremental and systemic value from project implementation; I_C , I_B , I_S , I_{PM} – the interests of the community, business, government and project managers, respectively



Basic values V_b are received by project stakeholders (P_{Ci}) at the community level, additional values V_a are received by project stakeholders (P_{Ri}) at the regional level, added values V_d are received by project stakeholders (P_{Ni}) at the state level, and systemic values V_s are formed by the office for managing the portfolios of projects for the development of territorial security systems.

The maximum systemic value V_s from the effective implementation of the portfolios of projects for the development of territorial security systems is obtained by all their stakeholders due to the systematic coordination of their interests (I_i) in individual projects, which ensures the growth of the basic (V_{bi}), additional (V_{ai}) and added (V_{di}) values of these portfolios:

$$V_s = (\{V_{bi}\} + \{V_{ai}\} + \{V_{di}\} + S_i) \rightarrow \max. \quad (1)$$

Successful selection of projects for the development of territorial security systems portfolios, as well as coordination of the order of their implementation in a given administrative-territorial unit of the state, makes it possible to obtain synergy (S_i), i.e. an additional effect that significantly exceeds the sum of the effects of separately implemented projects. Systemic values (V_s) are received by all stakeholders in the portfolios of projects for the development of territorial security systems on the principle of emergence. That is, there are special benefits from the systematic implementation of projects in the portfolios of territorial security systems development that cannot be obtained without coordinated management decisions on a set of projects in a given administrative-territorial unit from a single centre, which is the project portfolio management office.

All i -th projects (P_{ji}) of j -th types belonging to the portfolios of territorial security system development projects are implemented on the basis of taking into account the interests of different stakeholders (I_i), which are agreed between them. The main stakeholders interested in the implementation of the TSS development projects P_{Ci} on the territory of communities are their residents or communities. Their main interest is to protect lives and material assets of the population on the territory of communities from the negative impact of disasters. These communities, through their local authorities, initiate projects (P_{Ci}) of TSS development on the territory of their communities by creating their own SFEs. The types and configuration of these formations are coordinated with the territorial departments of the SES representing the interests of the state (I_s) and comply with the current legislation on their establishment. These projects are part of the portfolios of projects for the development of territorial security systems. Accordingly, the interests of the community (I_C) should be aligned with the interests of project managers (I_{PM}), who ensure the formation of effective project portfolios and the creation of maximum value for all their stakeholders. At the same time, there are some business structures operating in communities that are interested in preserving material assets. At the same time, the interests of communities (I_C) and business structures (I_B) should be reconciled when implementing TSS development projects P_{Ci} in the territory of communities.

At the same time, there are business structures on the territory of certain communities that have a significant scale of activity or use various kinds of hazardous substances. At the same time, the SFSCPs of certain communities do not ensure full protection of their property, which, in the event of a disaster on their territory, requires the involvement of the regional level FRU. At the same time, the interests of business entities (I_B) and the state (I_s), which are represented by the territorial departments of the SES and the FRUs under their control, should be reconciled. At the same time, the implementation of the i -th TSS development projects in the region, which are also part of the portfolios of territorial security system development projects, requires coordination of the interests of business structures (I_B) and the state (I_s) with the interests of project managers (I_{PM}).

It should be noted that the interests of the state (I_s) are to ensure targeted organisational and regulatory impact on disaster prevention and response in certain territories of the state through the implementation of the SES development strategy of Ukraine. This strategy can be implemented through the implementation of project portfolios for the development of territorial security systems with maximum systemic value (V_s) for stakeholders. The main tasks facing the SES territorial offices and project managers are to ensure mission profiling and justification of an effective strategy and architecture of the territorial security system development project portfolios.

The effectiveness of the implementation of certain types of projects belonging to the portfolios of territorial security system development projects is determined by the quality of management decisions made at each level, taking into account the interests of stakeholders. It can be noted that each individual decision (U_{ji}) on the implementation of the i -th project (P_{ji}) of TSS development at the j -th level depends on the coordination of the interests of their stakeholders:

$$\begin{aligned} U_{ji}^{CB} &= f(I_C \leftrightarrow I_B), U_{ji}^{CS} = f(I_C \leftrightarrow I_S), U_{ji}^{BS} = f(I_B \leftrightarrow I_S), \\ U_{ji}^{CPM} &= f(I_C \leftrightarrow I_{PM}), U_{ji}^{BPM} = f(I_B \leftrightarrow I_{PM}), U_{ji}^{SPM} = f(I_S \leftrightarrow I_{PM}). \end{aligned} \quad (2)$$

U_{ji}^{CB} , U_{ji}^{CS} , U_{ji}^{BS} – respectively, managerial decisions on the implementation of i -th TSS development projects at the j -th level due to the coordination of interests of the community and business structures, community and state, business structures and state; U_{ji}^{CPM} , U_{ji}^{BPM} , U_{ji}^{SPM} – management decisions on the implementation of the i -th TSS development project at the j -th level due to the coordination of interests of project managers with the interests of the community, business structures and the state; I_C , I_B , I_S , I_{PM} – the interests of the community, business, government and project managers, respectively.

At the same time, the systemic value of implementing portfolios of projects for the development of territorial security systems (V_s) depends on the respective sets of mutually agreed management decisions between their stakeholders:

$$V_s = f(\{U_{ji}^{CB}\}, \{U_{ji}^{CS}\}, \{U_{ji}^{BS}\}, \{U_{ji}^{CPM}\}, \{U_{ji}^{BPM}\}, \{U_{ji}^{SPM}\}). \quad (3)$$

Based on a systematic analysis of the structure of values from the implementation of portfolios of projects for the development of territorial security systems and the interests of their stakeholders, we formulated the main subjects of their coordination in individual portfolios (Table 1).

Table 1 – Main subjects of coordination of interests of stakeholders in portfolios of projects for the development of territorial security systems

Stakeholders	Level of Implementation of i-th Development Projects for Territorial TSS			
	Community	Regional	State	Project Portfolio
Community	Configuration of projects and their products, resource volumes for implementation	Volumes of work execution in communities involving regional FRU	Volumes of work execution in communities involving state FRU	Priority of project implementation in communities
Business Structures	Volumes of community FRU involvement for business structures	Volumes of regional FRU involvement for business structures	Volumes of state FRU involvement for business structures	Funding volumes for i-th development projects for territorial FRU at j-th level
State	Regulatory and legal acts for community development	Regulatory and legal acts for regional development	Regulatory and legal acts for state development	Strategy for developing territorial FRU
	Volumes and sources of project funding in communities	Volumes and sources of project funding in regions	Volumes and sources of project funding for state projects	
Project Managers	Configuration of community-level projects and their products. Contents, timing, and resources. Basic project values.	Configuration of regional-level projects and their products. Contents, timing, and resources. Additional project values.	Configuration of state-level projects and their products. Contents, timing, and resources. Added project values.	Mission and architecture of the development project portfolios for territorial safety systems. Systemic portfolio values.

On the basis of the formulated subjects of reconciliation of interests of stakeholders of the portfolios of projects for the development of territorial security systems, management decisions are made both on the implementation of individual projects and systemic management decisions on the implementation of their portfolios. At the same time, the change in the quantitative value of the objects of coordination of stakeholders' interests at certain levels of implementation of TSS development projects changes the systemic value of the portfolios of territorial security system development projects and the quantitative value of synergy, which can take on positive and negative values. The variability of the direction of the synergy of the territorial security system development project portfolios is mainly caused by changes in the configurations of the project environment, the i-th territorial security system development projects, and their products.

Considering the life cycle of project portfolios for the development of territorial security systems, it can be noted that during this cycle, the processes of controlling systemic value should be carried out. This will allow timely changes in the structure of the portfolios of projects for the development of territorial security systems due to the inclusion of such projects at each level of implementation of these portfolios, which will ensure that the projected changing configuration of the project environment will provide maximum systemic value.

This is done on the basis of effective system management decisions made by project managers. The main specificity of these management decisions is that their justification should take into account the changing behavior of the project environment, which causes both value risks and risks of implementation of individual stages and projects of TSS development at certain levels of their portfolios.

Conclusions

The analysis of modern approaches to managing security project portfolios has shown that the most effective are integration approaches that combine process-oriented methodologies, consideration of stakeholder interests, use of multi-criminal analysis, and scenario planning. However, their adaptation to the specifics of territorial security systems requires taking into account the uncertainties created by the dynamic nature of the threat and increasing the flexibility of management mechanisms. It has been found that one of the approaches alone is not able to provide comprehensive coverage of security aspects, which emphasizes the need for an integrated approach.

The developed methodology for determining values allowed structuring the social, economic, environmental, and infrastructural types that are formed as a result of project implementation. The application of the system-value approach ensured the identification of an integral value that reflects the project's impact on the development of territorial security systems. The methodology takes into account not only several indicators but also qualitative aspects, which allow for a comprehensive assessment of projects and justify their priority within the portfolio.

The analysis of stakeholder interests showed that the key areas for coordination are resource allocation, determining the optimality of projects, monitoring results, and adapting to changes in the external environment. For each stage of project implementation, specific points of intersection of interests have been identified that need to be agreed upon to reduce conflicts and ensure transparency of management. The use of public participation mechanisms and regular feedback helps to increase the level of trust among all stakeholders.

Further research is needed to improve models and methods for assessing the values that are created in the process of implementing portfolios of territorial security system development projects, taking into account special conditions and constraints. It is also necessary to study the impact of different types of threats (man-made,

natural, social) on the structure of values and the effectiveness of the territorial security system development project portfolios. This is the basis for adapting the developed methodologies to the conditions of constant changes in the external project environment, in particular in the context of military operations, in order to ensure the sustainability of territorial security systems and achieve long-term socio-economic benefits for territorial communities.

Bibliography

- Ratushnyi R., Khmel P., Tryhuba A., Martyn E., Prydatko O., *Substantiating the effectiveness of projects for the construction of dual systems of fire suppression*, "Eastern-European Journal of Enterprise Technologies" 2019, 4(3-100), pp. 46–53.
- Hulida E., Pasnak I., Koval O., Tryhuba A., *Determination of the critical time of fire in the building and ensure successful evacuation of people*, "Periodica Polytechnica Civil Engineering" 2019, 63(1), pp. 308–316.
- Tryhuba A., Ratushny R., Bashynsky O., Shcherbachenko O., *Identification of firefighting system configuration of rural settlements*, MATEC Web of Conferences, 2018, 247, 00035.
- Liu Z., Song X., Wang L., Song R., Lishner I., *Identification of Governance Structures for Private–Public Partnership (PPP) Project Through Social Network Analysis. Research on Project, Programme and Portfolio Management: Projects as an Arena for Self-Organizing*, 2022, pp. 157–173. https://link.springer.com/chapter/10.1007/978-3-030-86248-0_12
- Müller R., Turner J. R., *The impact of principal–agent relationship and contract type on communication between project owner and manager*, "International Journal of Project Management" 2005, Vol. 23, No. 5, pp. 398–403. <https://www.sciencedirect.com/science/article/abs/pii/S026378630500032X>
- Karyne C. s. Ang, Lars Kristian Hansen, Per Svejvig. *Value-Orientated Decision-Making in Agile Project Portfolios. Research on Project, Programme and Portfolio Management: Projects as an Arena for Self-Organizing*, 2022, pp. 49–64. https://link.springer.com/chapter/10.1007/978-3-030-86248-0_5
- Tryhuba A., Ratushnyi A., Lub P., Rudynets M., Visyn O., *The model of the formation of values and the information system of their determination in the projects of the creation of territorial emergency and rescue structures*, "CEUR Workshop Proceedings" 2023, 3453, pp. 59–70.
- Ahlemann F., Bergan P., Karger E., Greulich M., Reining S., *Making Sense of Projects-Developing Project Portfolio Management Capabilities*, "Schmalenbach Journal of Business Research" 2024, Vol. 76, pp. 293–325. <https://link.springer.com/article/10.1007/s41471-023-00178-8>
- Tryhuba A., Ratushny R., Tryhuba I., Koval N., Androshchuk I., *The model of projects creation of the fire extinguishing systems in community territories*, "Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis" 2020, 68(2), pp. 419–431.
- Tryhuba A., Ratushny R., Bashynsky O., Chubyk R., Bordun I., *Planning of territorial location of fire-rescue formations in administrative territory development projects*, "CEUR Workshop Proceedings" 2020, 2565, pp. 93–105.
- PMI, a Guide to the Project Management Body of Knowledge (PMBok® Guide), (5th ed.), Newton Square, PA: Project Management Institute, 2013.

- Marcelino-Sádaba S., Pérez-Ezcurdia A., Echeverría Lazcano A.M., Villanueva P., *Project risk management methodology for small firms*, "Int. J. Proj. Manag." 2014, 32 (2), pp. 327-340.
- Dezhkam M., Xue S., Liu Z., *Project portfolio management system, concepts and approach foundations*, "IOP Conf. Series: Earth and Environmental Science" 2019, No 310.
- Micán C., Fernandes G., Araújo M., *Project portfolio risk management: a structured literature review with future directions for research*, "International Journal of Information Systems and Project Management" 2020, Vol. 8, No. 3, pp. 67-84. <https://www.sciencesphere.org/ijispm/archive/ijispm-080304.pdf>.
- Lappi T., Aaltonen K., Kujala J., *Project governance and portfolio management in government digitalization*, "Transforming Government: People, Process and Policy" 2019, Vol. 13, No. 2, pp. 159-196. <https://www.emerald.com/insight/content/doi/10.1108/tg-11-2018-0068/full/html>.
- Faris R.K., Patterson D., *Managing risk in the project portfolio*, Project Management Institute, 2007. <https://www.pmi.org/learning/library/managing-risk-project-portfolio-7297>.
- Heikkilä M., Hallikas J., Kähkönen T., *Managing project portfolios: balancing control and learning*, "International Journal of Project Management" 2003, Vol. 21, No. 3, pp. 167-174. <https://www.sciencedirect.com/science/article/abs/pii/S0263786302000511>.
- Costa H. R., Barros M. D. O., et al., *Evaluating software project portfolio risk*, "Journal of Systems and Software" 2007, Vol. 80, No. 1, pp. 16-31. <https://www.sciencedirect.com/science/article/abs/pii/S0164121206001680>.
- Figueiredo M. s. M., Oliveira M. D., *Prioritizing Risks Based on Multicriteria Decision Aid Methodology: Development of Methods Applied to ALSTOM Power*, IEEE International Conference on Industrial Engineering and Engineering Management, 2009, pp. 1568-1572. <https://ieeexplore.ieee.org/document/5373210>.
- Tryhuba A., Demchyna V., Ratushnyi A., Koval L., *Identification of priority objects for the implementation of projects to restore the transport infrastructure of settlements in the post-war period*, "CEUR Workshop Proceedings" 2024, 3709, pp. 219-231.
- Tryhuba A., Tryhuba I., Bashynsky O., Koval N., Bondarchuk L., *Conceptual Model of Management of Technologically Integrated Industry Development Projects*, International Scientific and Technical Conference on Computer Sciences and Information Technologies, 2020, 2, pp. 155-158, 9321903.
- Tryhuba A., Bashynsky O., *Coordination of dairy workshops projects on the community territory and their project environment*, International Scientific and Technical Conference on Computer Sciences and Information Technologies, 2019, 3, pp. 51-54, 8929816.
- Tryhuba A., Ratushny R., Horodetsky I., Molchak Y., Grabovets V., *The configurations coordination of the projects products of development of the community fire extinguishing systems with the project environment*, "CEUR Workshop Proceedings" 2021, 2851, pp. 238-248.
- Ratushny R., Tryhuba A., Bashynsky O., Ptashnyk V., *Development and Usage of a Computer Model of Evaluating the Scenarios of Projects for the Creation of Fire Fighting Systems of Rural Communities*, 11th International Scientific and Practical Conference on Electronics and Information Technologies, ELIT 2019 – Proceedings, 2019, pp. 34-39, 8892320.

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