

PROCESS MODELS OF SELF-MANAGED ORGANIZATIONS IN THE CONTEXT OF SYNCRETIC MANAGEMENT OF INFRASTRUCTURE RESTORATION PROJECTS

Ivko A.V., Ph.D. in Technical Science, State Agency for Restoration and Development of Infrastructure of Ukraine, Kyiv, Ukraine, adrii.ivko.science@gmail.com, orcid.org/0000-0002-3388-8355

ПРОЦЕСНІ МОДЕЛІ САМОКЕРОВАНИХ ОРГАНІЗАЦІЙ В КОНТЕКСТІ СИНКРЕТИЧНОГО УПРАВЛІННЯ ПРОЄКТАМИ ВІДНОВЛЕННЯ ІНФРАСТРУКТУРИ

Івко А.В., кандидат технічних наук, Державне агентство відновлення та розвитку інфраструктури України, м. Київ, Україна, adrii.ivko.science@gmail.com, orcid.org/0000-0002-3388-8355

Formulation of the problem.

A war is ongoing in Ukraine, which has already led to significant destruction of infrastructure, including housing, road, social, medical, etc. At the same time, restoration issues [1], which, in particular, are taken care of by the State Agency for Infrastructure Restoration of Ukraine (SARDI) [2], are becoming particularly relevant. In accordance with the priorities determined by the authorized bodies and working groups, the management of SARDI initiated the creation of a portfolio of restoration projects. This top-level portfolio combines more than ten lower-level portfolios and several dozen recovery projects. Among such projects, in particular, projects for the restoration of roads, artificial structures (bridge construction), restoration of social and medical infrastructure facilities, projects for the development of checkpoints on the borders of Ukraine with European countries, etc.

One of the distinctive features of restoration projects is the practice in which each such project can be implemented by several different participants, each of whom represents a separate country and, therefore, a separate management culture and, therefore, its own project management methodology established in an organization or company that participates in the restoration project. At the same time, it is important that each participant of the restoration project can retain the opportunity to use the methodology that is familiar to him, while all such methodologies are not mixed at the level of management of this project. The same applies to restoration project portfolios, where each restoration project included in the portfolio (even if it is represented by a single performer) could implement the best practices of its usual and proven methodological approaches.

Another distinctive feature of modern projects (from the point of view of the application of organizational management models) is the increasing use of self-management models, in particular self-managed teams and/or self-managed organizations. Compliance with this modern trend is ensured through the minimization of hierarchy in management, collegiality of decision-making, acceptance by each member of the team of full responsibility for initiation, organization and execution of tasks within the project. Due to greater predictive efficiency, self-managed teams are a promising model for use in project management in Ukraine.

In the context of the two identified essential features, it can be stated that consideration of the possibility of their application to infrastructure restoration projects is an urgent scientific and practical task. Increasing the efficiency of restoration projects (reducing the implementation time, reducing the cost of projects while maintaining the requirements for the quality of the project product, optimizing labor costs) is a critically important practical task facing the infrastructure industry of Ukraine. Provided that efficiency increases and is successfully implemented, reconstruction projects will provide Ukraine with a powerful economic growth impulse even during the war, as well as after Ukraine's victory in the war. Therefore, it can be stated that the topic of research of process models of self-managed organizations in the context of syncretic management of infrastructure restoration projects is relevant.

Analysis of recent research and publications.

The development of project management methodologies has led to the emergence of complex and multi-level corporate management systems. From classic project management methodologies to flexible methodologies and further hybrid project management systems have been improved and this process continues. In modern versions of classic project management standards, there are models of using flexibility. For example, the latest version of the classic PMBOK standard of the American Institute of Project Management PMI has separate frameworks for such adaptation, such as tailoring [3], and similar elements are contained in the latest edition of the classic PRINCE2 standard [4], which is currently being developed

by the PeopleCert corporation. At the same time, one of the common standards for the integrated development of P2M (Program and Project Management for Enterprise Innovation), which considers a set of projects and programs of the organization as tools for achieving its mission, is also focused on adaptability to the internal and external project environment [5].

Agile management methodologies began their development with the appearance of the Agile Development Manifesto [6]. The Agile methodology, the emergence of which is marked by the mentioned Manifesto, is represented by many methods and frameworks [7] and its use has spread beyond the IT industry. Agile approaches, methods and frameworks are now actively used in projects of most industries.

At the same time, when choosing a corporate project management methodology [8], questions arise regarding the use of individual elements of different methodologies within the corporate methodology. The modern context of the methodological mix is realized in a combination of different methods of flexible Agile methodology, or methods of flexible Agile methodology and classic project management methodologies. In this context, a hybrid approach emerged and is actively used in IT [9], as well as in project management in general [10].

Infrastructure restoration projects, following the trend of using self-organized teams, should take into account developments in the field of spiral dynamics [11], which were further developed into the concept and methods of holacracy [12]. Indeed, self-organization of project teams and project-oriented organizations is a promising direction of development both in Ukraine and (especially) among international participants in infrastructure restoration projects. The main features of such teams are non-hierarchical, collegial decision-making and high responsibility of team members, who not only choose the ways of performing project tasks, but also such tasks themselves. Of course, this approach assumes a high awareness and motivation of the participants of self-organized teams and organizations, as well as a high level of maturity of companies in the field of project management (possible compliance with the Project management maturity model).

The study of approaches to the application of methodological mixes in relation to infrastructure restoration projects was carried out in work [13], where the approach of syncretic management was considered. The essence of such management is to ensure that individual parts of the project (or individual projects in the portfolio of restoration projects) are guided by their own project management methodology. Moreover, such methodologies are not mixed at the level of the central management system, which is achieved through the use of specific methodologies interfaces. This approach is especially relevant for those restoration projects in which several participants participate, in particular international ones, which implement projects within the framework of the project management system established for them and the corresponding methodology, which has been tested in many previous projects. The application of the syncretic approach was also investigated in self-managed organizations that may be involved in the implementation of infrastructure restoration projects [14].

However, the problems of describing the processes of self-managed organizations that implement projects in the context of syncretic methodology have not been studied enough. As in general, process models of self-managed organizations as such are insufficiently formalized.

The description, formalization and optimization of business processes (regardless of the name, such processes often include not only those that are directly related to obtaining the financial result of the enterprise) was formed into a separate scientific and practical direction [15]. In particular, the issue of modeling processes using standards for their description (so-called "notations") and relevant IT applications [16] is undergoing development. The purpose of modeling business processes is usually their reengineering [18], that is, reviewing the company's activities (through the analysis of its processes) in order to eliminate duplication of functions, find and eliminate gaps in functions, and optimize the expenditure of time, finances and human resources for their implementation.

Therefore, it can be concluded that the task of researching models of processes of self-managed organizations in the context of syncretic management of infrastructure restoration projects is relevant, and the results of such research are such that they can potentially contain scientific novelty and have practical value.

Forming the goals of the article.

Taking into account the above, the purpose of the article is to study the models of the main processes of self-managed organizations in the context of the implementation of syncretic management by such organizations during the implementation of infrastructure restoration projects, the formalization of such models using the BPMN 2.0 notation.

The object of the study is the management system of infrastructure restoration projects, which (projects) are jointly implemented by several participants within the syncretic project management methodology, and such participants, or at least some of them, implement the principle of self-management in management or involve self-managed teams in the implementation of projects.

The subject of the research is models of the main processes of self-managed organizations in the context of implementation of syncretic management by such organizations during the implementation of infrastructure restoration projects.

Research methods - to achieve the goal of the work, the following methods were used: analysis, synthesis, systematization, generalization, methods of describing business processes, methods of set theory, formulation of conclusions.

Presentation of the main research material.

According to the well-known classifications of organizational processes (taking into account the project-oriented nature of the activities of organizations), the following groups of the most common (generalizable) processes are usually distinguished:

- main processes (related to the main activity of production of products/provision of services);
- auxiliary processes (document flow processes, financial processes, etc.);
- support processes (logistics processes, personnel support, etc.);
- communication processes with stakeholders;
- marketing processes (processes of advertising, promotion, sales, image formation, etc.);
- IT processes (including cyber security processes);
- project implementation processes.

Taking into account the nature of the activity under investigation, within the framework of the implementation of infrastructure restoration projects by self-managed organizations based on syncretic methodology, we propose to include the following groups of processes in the further development of the process classification system of project-oriented organizations:

- processes of implementation of syncretic management;
- self-managed processes;
- processes of formation of values of self-managed organizations within the value approach.

As for the last group of processes, it should cover the value formation of both the products of the self-managed organization and its processes, projects, and the organization as a whole. Therefore, the study of such processes should be separated into a separate study, which will shape the prospects for further research in the chosen direction.

Formalization of activities of self-managed organizations as such may seem debatable. However, within the framework of such discussions, it is proposed to consider the approach of not rigid formalization of processes, but their constant crystallization and the use of process models not for rigid control, but rather for observation and careful actions regarding optimization. At the same time, the principle of self-management should be preserved. Such monitoring and careful optimization can be carried out, for example, by the company's supervisory board, if the legal structure of a self-managed project-oriented organization provides for such an institution. Or a separate branch of executive management - project office, deputy executive director for development or similar organizational institutions.

According to the research results, we will single out the main self-managed processes of self-managed organizations for the purpose of their further analysis:

- decision-making process;
- the process of motivating team members;
- the process of monitoring the performance of tasks and reporting on such performance.

The number of self-managed processes in a self-managed organization may increase during the gradual transition of the organization to self-management, but we consider the above-mentioned processes to be the main ones. It is from these processes, in our opinion, that the evolution of project-oriented companies on the way to self-management should begin. Of course, if the organization does not declare itself as self-managed from the moment of its creation and does not cover most of its processes from the beginning of its activities with the corresponding principle.

Among the main notations for describing business processes, the BPMN 2.0 notation [20] should be considered the most used at the moment, the most convenient and the one that meets the objectives of this study. We will formalize the specified processes using BPMN 2.0 business process description notation and offer appropriate process models.

Decision making process. A general characteristic of the processes of self-managed organizations is that the initiative for their initiation can come from two sources – both from the project team as a whole (during joint team meetings) and from each of its participants, who during the performance of their work can generate certain content, which is able to initiate a separate process.

This applies in particular to the decision-making process (Figure 1). The beginning of the decision-making process can be considered the identification of a problem (function 1.1) or the emergence of an idea

(function 1.2). The source of functions can be both the team of the self-managed organization (the top track on the process model) and the team member (the middle track on the process model). If the process begins by identifying a problem, it is directly followed by the process of generating an idea to overcome the problem (1.2).

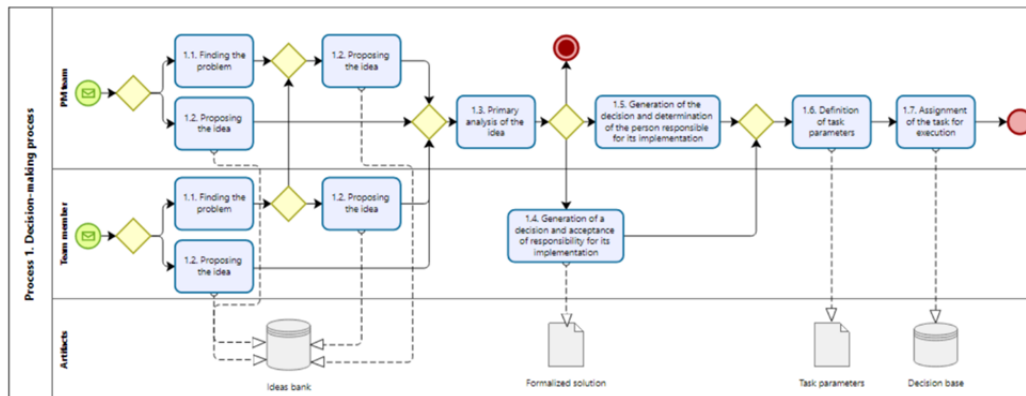


Figure 1 – Model of decision-making process in a self-managed organization according to the BPMN 2.0 notation

Рисунок 1 – Модель процесу прийняття рішень в самокерованій організації, відповідно до нотації BPMN 2.0

The emerging idea should immediately go to the idea bank. The scheme in Figure 1 is built in the ideology of the BPMN 2.0 standard, according to which project or activity (process) artifacts are separated into a separate track (the bottom track on the process model). This type of process model allows you to form an information component (documents, IT tools) based on the results of modeling. And in the end, it allows you to build a logical database structure of the activity of a self-managed organization, and then choose a set of appropriate IT tools for the implementation of process automation.

Next, the team of the self-managed organization conducts an initial review of the idea at a joint meeting. At the same time, various models of implementation of consideration of ideas can be applied - brainstorming, the Delphi method, Edward de Bono's "Six Hats" technology, etc.

According to the results of the review (and this is also a feature of a self-managed organization), two solutions are possible. Either the team makes a joint decision and determines the person responsible for the implementation of the task, or (most often) one of the team members generates the decision and takes responsibility for its implementation. After all, the generation of a solution may be a team, but it is the taking of responsibility by a team member on his own that is inherent in self-managed organizations. For this, as already mentioned, technological maturity is required in the management of both the entire team and each of its members.

Further along the process, the team jointly determines the parameters of the task - qualitative, time, financial, special, informational (function 1.6) and formulates the task to be performed (function 1.7). At the same time, data on the decision made is entered into the database of management decisions.

In general, the artifacts of the decision-making process are represented in the model by two databases (or, rather, two parts of a single database) - the idea base and the decision base, as well as two information entities (in non-digitalized organizations - documents) - the formalized decision and problem parameters.

The process of motivating team members. According to the concept of a self-managed organization, the motivation of team members is most often realized by each participant independently so that he determines his motivation for participating in the project according to his own value system. Thus, his value system should correlate with the values of the self-managed organization and the project in which the participant participates. Of course, the separation of values, and in general, models of spontaneous or purposeful crystallization of values require a separate study.

In the model of the process of motivation of members of a self-managed team, which is proposed (Figure 2), this duality is also reflected. Thus, motivational models can be chosen either by a team member independently (function 2.1) or be formulated based on the results of a joint meeting of the project team (function 2.2). Next, the team analyzes the expediency, sufficiency, and adequacy of the motivation of each team member (function 2.3). After that, the motivation model of the team as a whole is approved and considered to be shared by all team members and the team as a whole (function 2.4).

Then, the motivation models are adjusted and clarified based on the results of the implementation of individual project tasks. Thus, during regular operational meetings for the restoration project, a team member

can independently take responsibility for the performance of a certain project task. At the same time, the team member is guided by his motivation model, which was adopted based on the results of the previous steps of the process. After that, the project task implementation process takes place. This process is external to the motivation process, it is (for simplicity) designated here as function 2.6, but when developing a business process map of a self-managed organization, it should be singled out, formalized in the form of a separate model, and numbered accordingly.

Based on the results of the project task, team members are motivated (function 2.8). After that, the team jointly analyzes the use of the adopted motivation models, their adequacy, expediency and effectiveness (function 2.9). At the same time, appropriate changes are made to the database of motivational models.

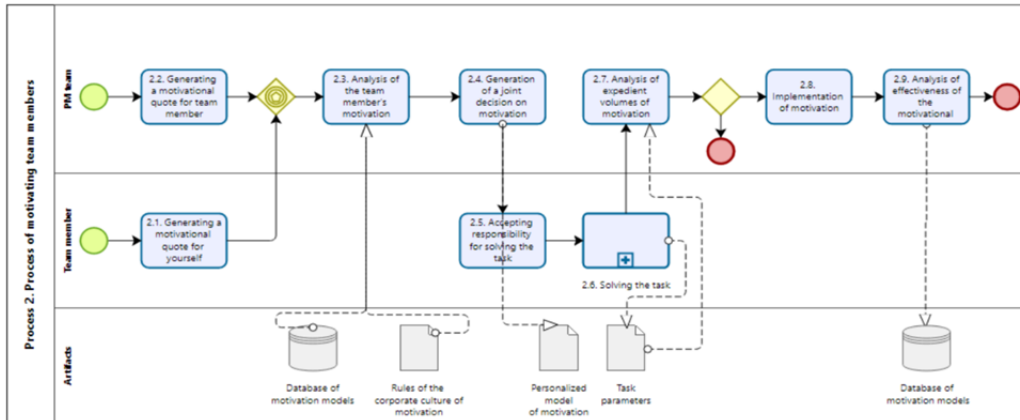


Figure 2 – Motivation model process in a self-managed organization according to the BPMN 2.0 notation
Рисунок 2 – Процес моделі мотивації в самокерованій організації відповідно до нотації BPMN 2.0

The artifacts of this process, in addition to the specified database, are also the rules of corporate culture regarding the motivation of project team members (and employees in general), personalized motivation models (as an information entity or a document) and the parameters of the task to be performed by the team member, and the analysis of their reach (in terms of time, finances, quality, labor costs, etc.) is the basis for determining the amount of motivation.

The process of monitoring the performance of tasks and reporting on such performance. Regardless of the self-management of the project team, the rules of the management system should provide for the implementation of control over the implementation of project tasks and the corresponding reporting. This ensures the controllability of the process and the ability of the management system to respond to deviations in a timely manner, to direct the project to successful completion within the project limitations defined by the customer regarding the implementation time, project budget, requirements for the quality of project products, management transparency, prevention of corruption, management flexibility, risk minimization, etc.

In the proposed model of the monitoring and reporting process (Figure 3), as is usual in self-managed organizations, the beginning of the process can be initiated either by the project team in accordance with a separate need or in accordance with the reporting regulations (external function 2.6), or by the project participant himself (function 3.1). At the same time, the form of such reporting should be determined by the corporate rules of the organization implementing the restoration project. Reporting can be informal, but most often in this type of project it requires at least minimal (at the level of operational reporting within the team) or medium or even significant formalization (at the level of regular reporting to customers).

Thus, the team member promptly informs the team about the progress of the task for which he is responsible (function 3.2). The team together accumulates the results of completed tasks for a certain period or in a spontaneous period of time determined by the team situationally (function 3.3). After that, the results of tasks are compared with predefined KPIs (Key Performance Indicators). The team jointly determines the time for extraordinary reporting (function 3.5). Or a team member prepares a report at his own discretion (in accordance with the operational necessity determined by the participant). The reporting requirement (function 3.7) can thus be formed on the basis of either the timing of regular reporting, or on the basis of a situational need for reporting, which (need) can be initiated both by the team together and by each of its members independently.

Next, reports are prepared (function 3.8), and such reports are analyzed for compliance with the required performance indicators (function 3.9). Artifacts of the monitoring and reporting process according to the model are: a database of task performance, a set of KPIs and reporting forms. Corresponding artifacts should be contained in the information system of the self-managed organization.

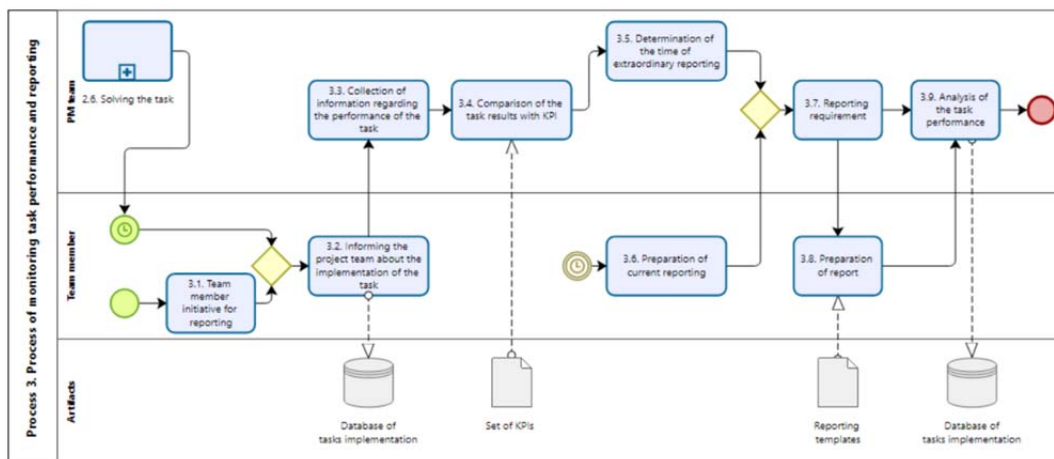


Figure 3 – Model of process of monitoring the performance of tasks and reporting on such performance according to the BPMN 2.0 notation

Рисунок 3 – Модель процесу моніторингу виконання завдань та звітування про таке виконання згідно нотації BPMN 2.0

We will conduct a SWOT analysis of processes model of self-managed organizations in an expanded form (Table 1). This form involves not only the formulation of the strengths and weaknesses, opportunities and threats of the object of analysis, but also the proposed SO (Strengths-Opportunity), ST (Strengths-Threats), WO (Weakness-Opportunity), WT (Weakness-Threats) strategies at the intersection of the corresponding characteristics.

Based on the results of the research, the *strengths* of modeling the processes of self-managed organizations that will implement infrastructure restoration projects have been determined:

- systematization of activity, systematic management as a result of it;
- formalization of processes, which makes it possible to review and improve them;
- scalability of the system, which will allow to scale both processes and business.

Weaknesses of process modeling of self-managed organizations can be identified:

- vagueness of process parameters due to self-management, which can vary both the time of execution of functions and the moment of their implementation (in particular, but not limited to);
- loss of process flexibility due to formalization;
- immaturity of teams to use formalized tools within self-directed management approaches (probably, such immaturity will be characteristic of most participants of restoration projects implementing project activities within the country).

The *opportunities* that open up as a result of the formalization of the processes of self-managed organizations should be defined as follows:

- the possibility of optimizing processes in terms of time, cost, labor resources, quality, etc.;
- the possibility of automating processes using IT tools that implement business processes that are easily integrated with the organization's IT management system;
- the possibility of improving the implementation of projects, ensuring that the projects comply with the restrictions set by the customer regarding time, budget, quality, etc.

The *threats* that may arise as a result of process modeling are the following:

- the threat of excessive bureaucratization due to the formalization of processes, the need for their compliance, monitoring of such compliance, which may require separate roles in the project team and redundant reporting;
- the threat of loss of self-management due to failure to achieve a balance between formalization and creativity and democratic management;
- unpredictable impact of the environment, which can change the requirements for processes, including radically, which can be associated with military actions, changes in legislation and other unpredictable factors and force majeure.

At the intersection of the relevant elements of the SWOT analysis, relevant strategies are formulated and presented in Table 1 (four relevant strategies – SO, ST, WO, WT).

Let's offer a mathematical description of the system of self-managed organization process models using set theory in the following form:

$$Y = \langle R, O, P, F, C, M, A, I, S \rangle, \quad (1)$$

where R – the set of corporate culture rules of a self-managed organization;
 O – the set of processes of a self-managed organization;
 P – the set of projects of a self-managed organization;
 F – the set of functions of self-managed organization processes;
 C – the set of connections between the functions of processes of a self-managed organization;
 M – the set of participants in the processes of a self-managed organization;
 A – the set of artifacts of self-managed organization processes;
 I – the set of information resources (systems) for ensuring the processes of a self-managed organization;
 S – the set of stakeholders of self-managed organization processes.

Table 1 – Advanced form of SWOT analysis of processes model of self-managed organizations
 Таблиця 1 – Розширена форма SWOT аналізу моделі процесів самокерованих організацій

SO, ST, WO, WT strategies		Opportunity	Threats
		- possibility of automation - possibility of process optimization - the possibility of improving project implementation	- the threat of excessive bureaucratization - the threat of loss of self-managed status - unpredictable environmental impact
Strengths	- systematicity - formalization - scalability	SO: Strategy for the implementation of targeted development and scaling of the organization thanks to systematization and optimization	ST: Strategy of constant reflection of a self-managed team, self-improvement, collection and processing of feedback from the team
Weakness	- vagueness of process parameters - loss of process flexibility - immaturity of teams	WO: Strategy for flexible optimization of processes, taking into account the possibility of setting individual parameters and the possibility of rapid scaling (changing, increasing) of process functions	WT: Strategy of balanced management and preservation of flexibility of processes through their constant review and comparison with corporate principles of self-management

As a function of optimizing a separate process of a self-managed organization, we offer the following function, which takes into account the value of each function of the process. The optimization is proposed in terms of time, but its interpretation can be used for other parameters of the restoration project (finances, quality, etc.), but this requires separate studies:

$$\left(\sum_{n=1}^N (\mu_n \cdot t_n) + \sum_{k=1}^K (\mu_k \cdot t_m) + \sum_{l=1}^L (\mu_l \cdot t_l) \right) \rightarrow \min \quad (2)$$

where μ – weight coefficients of the value function of the self-managed organization process, and $\mu_n < 1, \mu_k \approx 1, \mu_l > 1$ (determined by experts);

t – time of implementation of the function of the self-managed organization process;

N – the number of process functions that have a value less than the average;

L – the number of process functions that have a value greater than the average;

N – the number of process functions having an average value.

The optimization problem obviously does not have a solution in general, so it is proposed to be solved in each case using dynamic programming models and methods.

The members of the project team of the self-managed organization should act as experts who should evaluate the relevant weighting factors related to each function of the processes. However, it is worth noting in general that optimization by execution time alone will not cover the entire process. Further research in the chosen direction is required to develop a complex optimization function.

Conclusions and prospects for further research.

Increasing the efficiency of infrastructure restoration projects is one of the important tasks of both the post-war reconstruction of Ukraine and the reconstruction during the war period. Accelerating the implementation of such projects, taking into account the minimization of finances for their implementation while maintaining the quality of project products, will not only improve the condition of the restored infrastructure, but will also ensure the strengthening of the reputation of restoration activities, which, in turn, will be able to more actively and successfully attract international funding from donors and sponsors.

Therefore, the development of a scientific toolkit for management systems of restoration projects, its approval and adaptation to the implementation of real projects will contribute to the development of the economy, overcoming the post-war crisis and laying the foundation for sustainable economic development of Ukraine in the coming years.

For this purpose, this study analyzed the latest research related to project management methodologies, approaches to the application of methodological mixes, features of self-managed organizations and prospects for their involvement in infrastructure restoration projects. An expansion of the organization's process classification was also proposed, models of three processes in the BPMN 2.0 notation were proposed, namely the decision-making process, the process of motivating team members, and the process of monitoring the performance of tasks and reporting on such performance. A SWOT analysis was also conducted on modeling the processes of self-managed organizations, its weaknesses, strengths, opportunities and threats were identified. Strategies for the development of a self-managed organization at the intersection of the essences of SWOT analysis are also defined. A mathematical description of the system of self-managed organization process models using set theory and a model for optimizing the time of self-managed organization process implementation are proposed.

The developed and tested scientific product in the researched direction should contribute to the rapid and effective restoration of Ukraine's infrastructure, simplifying the implementation of multi-vector restoration tasks facing Ukraine, strengthening Ukraine's image among international partners, and bringing victory in the war closer.

REFERENCES

1. Decree of the President of Ukraine dated April 21, 2022 No. 266/2022 "Questions of the National Council for the Recovery of Ukraine from the Consequences of the War". Access mode: <https://www.president.gov.ua/documents/2662022-42225>.
2. The Standard for Project Management and a Guide to the Project Management Body of Knowledge (PMBOK® Guide) – Seventh Edition (2021), USA, Project Management Institute (PMI), 250 p.
3. PRINCE2® 7 (2023). Managing Successful Projects. Global Best Practice. PeopleCert, 347 p. ISBN 978-9925344604.
4. A Guidebook of Program & Project Management for Enterprise Innovation (Third Edition P2M) (2016). Access mode: [https://www.pmaj.or.jp/ENG/p2m/p2m_guide/P2M_Bibelot\(All\)_R3.pdf](https://www.pmaj.or.jp/ENG/p2m/p2m_guide/P2M_Bibelot(All)_R3.pdf).
5. Frederic Laloux (2014) Reinventing Organisations: A Guide to Creating Organisations Inspired by the Next Stage of Human Consciousness. Nelson Parker. February 9, 382 p.
6. Ivko A.V. (2022) Approaches of syncretic management in road infrastructure restoration projects. Visnyk National Transport University. Series «Technical sciences». Scientific journal. Kyiv, National Transport University, Issue 3 (53), pp.433-442.
7. Andii Ivko. Models of the project management system for the development of self-managed organizations in the portfolios of infrastructure renewal projects of Ukraine. Dorogi i mosti [Roads and bridges]. Kyiv, 2023. Iss. 28. pp. 28–37.
8. Smith, H., Fingar. P. (2002) Business Process Management: The Third Wave. Tampa, FL, USA, Meghan-Kiffer Press, 312 p.
9. Havey, M. (2005) Essential Business Process Modeling. USA, O'Reilly Media, 354 p.
10. Hammer, M., Champy. J. (2006) Reengineering the Corporation: A Manifesto for Business Revolution. New York, Harper Business, 272 p.
11. Business process modeling [Electronic resource]. URL: https://en.wikipedia.org/wiki/Business_process_modeling.
12. About the business process model and notation specification version 2.0 / Official site of The Object Management Group Standards Development Organization (OMG® SDO) [Electronic resource]. URL: <https://www.omg.org/spec/BPMN/2.0/>

ПЕРЕЛІК ПОСИЛАНЬ

1. Указ Президента України від 21 квітня 2022 р. №266/2022 «Питання Національної ради з відновлення України від наслідків війни». Київ, 2022. URL: <https://www.president.gov.ua/documents/2662022-42225> (дата звернення: 25.11.2023).
2. The Standard for Project Management and a Guide to the Project Management Body of Knowledge (PMBOK® Guide) – Seventh Edition [Текст] / USA. – Project Management Institute, 2021. – 250 с.
3. PRINCE2® 7. Managing Successful Projects. Global Best Practice / PeopleCert. – 2023. – 347 p. ISBN 978-9925344604.

4. A Guidebook of Program & Project Management for Enterprise Innovation (Third Edition P2M) [Електронний ресурс] / Сайт Японської асоціації управління проектами PMAJ. – 2016. – Режим доступу: [https://www.pmaj.or.jp/ENG/p2m/p2m_guide/P2M_Bibelot\(All\)_R3.pdf](https://www.pmaj.or.jp/ENG/p2m/p2m_guide/P2M_Bibelot(All)_R3.pdf).
5. Laloux, Frederic. Reinventing Organisations: A Guide to Creating Organisations Inspired by the Next Stage of Human Consciousness [Текст] / Frederic Laloux. – Nelson Parker. – 2014. – 382 p.
6. Івко, А. В. Підходи синкретичного управління в проектах відновлення дорожньої інфраструктури [Текст] // Вісник Національного транспортного університету. Серія «Технічні науки». Науковий журнал. – Випуск 3(53), 2022. – С. 433-442.
7. Andii Ivko. Models of the project management system for the development of self-managed organizations in the portfolios of infrastructure renewal projects of Ukraine [Текст] / Збірник наукових праць «Дороги і мости». – Київ, ДП «ДерждорНДІ», 2023. – Вип. 28. – pp. 28–37.
8. Smith, H. Business Process Management: The Third Wave [Текст] / Howard Smith, Peteringar. – Tampa, FL, USA: Meghan-Kiffer Press, 2002. – 312 p.
9. Havey, M. Essential Business Process Modeling [Текст] / Mike Havey. – USA. – O'Reilly Media, 2005. – 354 p.
10. Hammer, M. Reengineering the Corporation: A Manifesto for Business Revolution [Текст] / Michael Hammer, James Champy. – New York. – NY: Harper Business, 2006. – 272 p.
11. Business process modeling [Електронний ресурс]. – Режим доступу: https://en.wikipedia.org/wiki/Business_process_modeling.
12. About the business process model and notation specification version 2.0 / Офіційний сайт The Object Management Group Standards Development Organization (OMG® SDO) [Електронний ресурс]. – Режим доступу: <https://www.omg.org/spec/BPMN/2.0/>

ABSTRACT

Ivko A.V. Process models of self-managed organizations in the context of syncretic management of infrastructure restoration projects. Visnyk National Transport University. Series «Technical sciences». Scientific, scientific and industrial journal. – Kyiv: National Transport University, 2023. – Issue 3 (57).

The article sets the task of formalizing process models of self-managed organizations in the context of syncretic management of infrastructure restoration projects and proposes models of three separate processes - decision-making, motivation of team members, task monitoring.

The object of the study is the management system of infrastructure restoration projects, which (projects) are jointly implemented by several participants within the syncretic project management methodology, and such participants, or at least some of them, implement the principle of self-management in management or involve self-managed teams in the implementation of projects.

The purpose of the work is to study models of the main processes of self-managed organizations in the context of implementation of syncretic management by such organizations during the implementation of infrastructure restoration projects, formalization of such models using BPMN 2.0 notation.

Research methods - to achieve the goal of the work, the following methods were used: analysis, synthesis, systematization, generalization, methods of describing business processes, methods of set theory, formulation of conclusions.

The paper analyzes models and methodologies that can be components of a syncretic methodology for managing infrastructure restoration projects implemented by self-managed organizations. The classification of the processes of project-oriented organizations has been expanded, three groups of processes have been added - the processes of implementing syncretic management; self-managed processes; processes of formation of values of self-managed organizations. Models of three processes of self-managed organizations in the BPMN 2.0 notation are proposed: the decision-making process, the process of motivating team members, the process of monitoring the performance of tasks and reporting on such performance. A SWOT analysis was also conducted on modeling the processes of self-managed organizations, strategies for the development of a self-managed organization at the intersection of the essences of the SWOT analysis were determined. A mathematical description of the system of self-managed organization process models using set theory and a model for optimizing the time of self-managed organization process implementation are proposed. Directions for further research are determined.

The results of the article can be used during the development of effective management systems for infrastructure restoration projects. Also, the results of the work can be implemented in the educational process during the teaching of educational disciplines of the cycle of professional training of future specialists in the transport industry.

KEY WORDS: INFRASTRUCTURE RENEWAL PROJECTS, PROJECT MANAGEMENT, SYNCRETIC METHODOLOGY, SELF-MANAGED ORGANIZATIONS, MANAGEMENT PROCESSES.

РЕФЕРАТ

Івко А.В. Процесні моделі самокерованих організацій в контексті синкретичного управління проектами відновлення інфраструктури / А.В. Івко // Вісник Національного транспортного університету. Серія «Технічні науки». Науковий, науково-виробничий журнал. – К. : НТУ, 2023. – Вип. 3 (57).

У статті поставлено задачу формалізації моделей процесів самокерованих організацій в контексті синкретичного управління проектами відновлення інфраструктури та запропоновано моделі трьох окремих процесів – прийняття рішень, мотивації учасників команди, моніторингу завдань.

Об'єкт дослідження – система управління проектами відновлення інфраструктури, які (проекти) спільно реалізуються декількома учасниками в межах синкретичної методології управління проектами, причому такі учасники, або принаймні деякі з них, реалізують принцип самокерованості в управлінні або залучають до реалізації проектів самокеровані команди.

Мета роботи – дослідження моделей основних процесів самокерованих організацій в контексті реалізації такими організаціями синкретичного управління при здійсненні проектів відновлення інфраструктури, формалізація таких моделей з використанням нотації BPMN 2.0.

Методи дослідження – для досягнення мети роботи використовувалися наступні методи: аналіз, синтез, систематизація, узагальнення, методи опису бізнес процесів, методи теорії множин, формулювання висновків.

У роботі проведено аналіз моделей і методологій, що можуть бути складовими частинами синкретичної методології управління проектами відновлення інфраструктури, які реалізують самокеровані організації. Розширено класифікацію процесів проектно-орієнтованих організацій, додано три групи процесів – процеси здійснення синкретичного управління; самокеровані процеси; процеси формування цінностей самокерованих організацій. Запропоновано моделі трьох процесів самокерованих організацій в нотації BPMN 2.0: процесу прийняття рішень, процесу мотивації учасників команди, процесу моніторингу виконання завдань і звітності щодо такого виконання. Також був проведений SWOT аналіз щодо моделювання процесів самокерованих організацій, визначені стратегії розвитку самокерованої організації на перетині сутностей SWOT аналізу. Запропоновано математичний опис системи моделей процесів самокерованої організації з використанням теорії множин та модель оптимізації часу реалізації процесів самокерованої організації. Визначено напрямки подальших досліджень.

Результати статті можуть бути використані під час розробки ефективних систем управління проектами відновлення інфраструктури. Також результати роботи можуть бути впроваджені в освітній процес під час викладання навчальних дисциплін циклу професійної підготовки майбутніх фахівців транспортної галузі.

КЛЮЧОВІ СЛОВА: ПРОЕКТИ ВІДНОВЛЕННЯ ІНФРАСТРУКТУРИ, УПРАВЛІННЯ ПРОЕКТАМИ, СИНКРЕТИЧНА МЕТОДОЛОГІЯ, САМОКЕРОВАНІ ОРГАНІЗАЦІЇ, ПРОЦЕСИ УПРАВЛІННЯ.

АВТОР:

Івко Андрій Володимирович, кандидат технічних наук, Державне агентство відновлення та розвитку інфраструктури України, перший заступник Голови, e-mail: andrii.ivko.science@gmail.com, тел. +380442875727, Україна, 03150, м. Київ, вул. Фізкультури, 9, orcid.org/0000-0002-3388-8355.

AUTHOR:

Ivko Andrii V. Candidate of Technical Sciences (PhD), State Agency for Restoration and Development of Infrastructure of Ukraine, first deputy Head, e-mail: adrii.ivko.science@gmail.com, tel. +380442875727, Ukraine, 03150, Kyiv, st. Fizkul'tury, 9. orcid.org/0000-0002-3388-8355

РЕЦЕНЗЕНТИ:

Бубела Андрій Володимирович, доктор технічних наук, професор, Національний транспортний університет, декан факультету транспортного будівництва, Київ, Україна.

Харута Віталій Сергійович, кандидат технічних наук, доцент, Національний транспортний університет, професор кафедри транспортного права та логістики, Київ, Україна.

REVIEWER:

Bubela A.V., doctor of technical sciences, professor, National Transport University, dean of faculty of transport construction, Kyiv, Ukraine.

Kharuta V.S., candidate of technical sciences, associate professor, National Transport University, professor of the department of transport law and logistics, Kyiv, Ukraine.