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MODELS OF VALUE MEASUREMENT IN A CONSTRUCTION PROJECT IN THE CONTEXT OF STRATEGIC COMMUNICATIONS WITH KEY STAKEHOLDERS

Abstract. The article analyzes research, standards and project management methodologies that can be used to create and develop models and methods for managing stakeholder engagement in a construction project, using a value-based dimension and a strategic communications dimension. Two key features of modern construction companies are highlighted: the use of typical processes with standardization of such processes and long life cycle of project implementation. A model for managing value-based project activities based on strategic communications is proposed – the VSP model. In the context of the development of the model elements, its matrix and corresponding set representation are presented. The matrix representation is based on a matrix, one of the dimensions of which is the types of project values, the other is the processes of strategic communications with stakeholders in the project. A conceptual model of the VSP in the project management system of a construction company is also proposed, for which typical stakeholders are identified, who will mainly play the role of key ones. Among the identified types of stakeholders: regulatory environment; construction organizations and companies; contractors and suppliers; construction associations; clients of the construction company who receive values from the results of the implementation of the construction project (portfolio of construction projects). The inputs of the VSP model are business goals, social responsibility goals and the company's institutional capacity (people, technologies, models and methods, experience). The outputs of the VSP model are achieving the value of key stakeholders, increasing the reputation of the construction company and an improved knowledge base of project activities with AI modules. The methodological basis of the model is a methodological hybrid based on elements of classical project management methodologies (PMBOK, P2M, PRINCE2, etc.) and elements of Agile methodology frameworks (Scrum, Kanban, etc.). A conclusion is drawn regarding the potential effectiveness of the proposed set of models. Areas of further research in the chosen direction are formulated, including: formalization of the process of expert assessment of the values of strategic communications with key stakeholders of a construction project; adaptation of models and methods of expert assessment to ensure the possibility of their implementation using artificial intelligence methods and models; development of models and methods of strategic communications with a key pool of determining stakeholders of a construction project; profiling of the VSP model, its adjustment to different types of construction projects of construction project-oriented organizations (the need to ensure the possibility of adapting the model to restoration projects is emphasized); implementation of the proposed model into the practical activities of a construction enterprise. Conclusions from the conducted research are formulated.

Keywords: project and program management; project-oriented construction company; value-based management; strategic communications; hyper-turbulence; key stakeholders

Introduction

The construction industry is one of the leading industries, the development of which contributes to the development of related industries and the economy as a whole. Its importance only grows both during the war and during the post-war restoration. Project-oriented

construction companies receive new challenges in implementing projects in more difficult conditions and with more stringent requirements. Thus, the practice of implementing construction projects is ahead of the development of models and methods for their implementation. There is a need to create new methodological and theoretical approaches to meet the

needs of practical tasks of implementing construction projects in an increasingly turbulent project environment and with increased requirements for the project product and its implementation processes.

More stringent requirements for construction projects in the current war conditions in Ukraine are put forward by stakeholders - from the state (the main customer of restoration projects) to private customers and investors who are trying to minimize their own risks. Effective involvement of such stakeholders in construction projects, productive interaction with them is one of the factors of success of such projects. Studying the characteristics of stakeholders, changes in their behavior during the war, identification of their respective influences – processes that correspond well with the field of value management in project management. Stakeholder values are changing, and can change turbulently in modern conditions, which must be taken into account when creating an effective construction project management system in the conditions of the modern hyper-turbulent environment.

Research on the interaction with key stakeholders of construction projects implemented in a highly turbulent environment (in particular, caused by war) is insufficiently studied using value-based management and the concept of strategic communications. This determines the relevance and, based on the above, the practical value of the corresponding research.

Analysis of latest research

The issue of creating new innovative approaches in project management has been considered by many researchers. In particular, in [1], models of innovative thinking are proposed for creating such approaches in the unique context of projects, in [2], infrastructure projects are considered as an applied field, the management system for which is proposed to be implemented through hybridization of methodologies - such an approach to creating a corporate project management system that effectively combines elements (models, methods, tools) of the classical project management methodology and elements of the Agile methodology in such a system [3]. Models of combining (hybridization) of methodologies are studied in [4] with a description of the advantages and risks of such hybridization, a conclusion is formulated regarding the prospects of such a direction for both scientific research and practical implementation.

Regarding the value aspect in project management, which is one of the elements of this study, it is worth (for example, in the context of the Agile methodology mentioned above) referring to the work [5], in which models and methods of value-oriented project management are presented, which are guided by the Agile methodology. Regarding the approach to value management itself, it is worth noting that it was first presented in the P2M (Program and Project Management

for enterprise innovation) standard of the Project Management Association of Japan (PMAJ). The current version of this standard [6] expands the areas of application of value-oriented management, adds new domains in project and program management, in particular regarding the use of knowledge bases. Ukrainian scientists also study the value-oriented approach to project management, in particular construction projects, which corresponds to the direction of our study. In particular, in the work [7], models and methods of developing the organizational structure of a project-oriented construction enterprise based on the application of the value approach are studied.

In response to the changes and hyper-turbulence of the project environment, leading standards and research in the field of project management are also undergoing changes. For example, Harold Kerzner notes the need for greater attention to the risk management system in projects against the background of a significant increase in the level of uncertainty in the project environment [8]. The latest edition of the PMBOK (Project Management Body of Knowledge) standard of the American Project Management Institute (PMI), which is one of the leading standards in the field of project management, defines eight project implementation areas: It is noted that the project implementation area "Stakeholders" covers activities and functions related to project stakeholders and their involvement in project implementation or advocacy [9].

The standard provides a conceptual model of project stakeholders, which is a generalization of many years of practical experience in project management. The model is universal to a certain extent, but a stakeholder model of a specific project or type of project can be built on its basis. The process of stakeholder engagement is described in the standard as a cyclical process that should occur throughout the entire project life cycle. The specified process includes identifying stakeholders, achieving an understanding of their interests and appropriate analysis, determining priorities for both stakeholders in relation to the project and the project in relation to stakeholders, developing models, methods and tools for stakeholder engagement, and monitoring such engagement. The methods for identifying stakeholders in this case can be the method of expert groups, the method of analysis of similar projects, the method of analysis of prepared relevant information by a neural network.

The field of effective stakeholder engagement is actively explored by all relevant modern project management standards. In particular, the PMI program management standard defines models and methods for involving stakeholders in program implementation and describes the concept of business value created by the program, two separate sections of the standard are devoted to this. The portfolio management standard has similar sections, an addition to the previous standard here

is the methodological connection of the process between the stakeholder engagement management process, the project portfolio value creation process, and the portfolio risk management process.

The development of stakeholder engagement as one of the determinants of project success has led to the inclusion of relevant processes in the International Organization for Standardization standards for project management [10], as well as in the standards for program and portfolio management. The approach to stakeholder management is complemented by the British PRINCE2 standard [11], which identifies the following groups of stakeholders:

- Project team;
- Organizational staff, colleagues and their families (this is a unique and first-time inclusion of families as stakeholders);
 - Customers and clients;
 - Suppliers and contractors;
 - A wide range of other stakeholders.

The standard concludes that how well you execute your project, implement change and therefore how well you deliver benefits and value depends on the motivation, commitment and capabilities of your project team. People are the key to project success. And now, finally, they are officially integrated into the PRINCE2 approach.

Ultimately, the results of the study suggest that the dominant methods of stakeholder management of projects (both identification and assessment, and development of interaction models) are assessment by expert groups. As a rule, it is used on the basis of an analysis of analogue projects, or is based on the previous experience of experts. The development of innovative methods of stakeholder identification, in particular based on the use of the scientific direction of strategic communications and appropriate methods of artificial intelligence, appears to be an urgent scientific task that has not been sufficiently researched. This allows us to make assumptions about the relevance and practical value of the scientific task investigated in this article – on the creation of value models and methods of value management in a construction project in the context of strategic communications with key stakeholders.

Purpose of the article

The aim of the article is, based on an analysis of modern research on project management, value-based management, and strategic communications, to develop models for effectively engaging key stakeholders in a construction project in the conditions of today's hyperturbulent project environment, and to identify future research directions in this context.

The main material of the article

Value management in project-oriented construction companies should be based on a symbiosis (hybrid) of

approaches used in the implementation of value-oriented management in project management.

Construction companies are characterized by the use of typical processes and standardization of such processes, their second significant feature is a long life cycle of project implementation. Obviously, it can be assumed that in the symbiosis of approaches to value-oriented project management in construction companies, elements of classical project management methodologies with the Waterfall life cycle model will prevail.

However, it is worth noting that the accelerated digitalization of society and business, which has been taking place in recent years, brings to the practice of construction companies IT systems and IT tools that are used for accounting, management, and administration of projects. Projects for the implementation of such systems and tools in the IT system of a construction company better correspond to the Agile methodology.

In this case, interpenetration of methodological elements (principles, models, methods, and tools) may occur, and as a result, a symbiosis (hybrid) may be formed, which can be universalized, fixed in the corporate project management methodology of the construction company. Then the project management processes that will be described in the corresponding corporate standard will be based on the hybrid and applied to both construction and IT projects. The specifics of each type of project can be separately indicated and reflected in each type of management processes.

This approach should be supplemented with essential methodological elements that are able to create added value in the project management system, and therefore contribute to increasing the efficiency of managing each project. Among such elements, the approaches of value-based management and strategic communications are proposed.

In the context of developing elements of a model of value-based project management based on strategic communications, hereinafter referred to as the VSP (Value, Strategic, Project) model, we propose an appropriate matrix representation (Table).

Next, we can propose a multiple representation of the VSP model in the form of a formal seven:

$$V^{s} = \langle M, P, V, H, S, R, S \rangle,$$
 (1)

where V^s – the VSP model; M – the set of methodological elements (principles, models, methods and tools) that make up the methodological hybrid used in the management system, indicating the origin of each element and the relationships between them; P – the set of projects of a construction company, taking into account the hierarchy of such projects and their combination in a portfolio or program; V – the set of values of a construction project in the context of its strategic communications with key stakeholders (Table).

№	Types of values Strategic communications processes	Unique asset value	The value of innovation	Value for the owner and stakeholders	The value of an intellectual asset
1	Defining the object of strategic communications	v_1^o	v_2^o	v_3^o	v_4^o
2	Defining the subject of strategic communications	v_1^s	v_2^s	v_3^s	v_4^s
3	Defining the "business philosophy" of a construction company: vision, mission, goals and strategic communications strategy	v_1^f	v_2^f	v_3^f	v_4^f
4	Engineering the strategic communications process and ensuring its tailoring with the project management system of a construction company	v_1^i	v_2^i	v_3^i	v_4^i
5	Monitoring strategic communications and making necessary adjustments	v_1^m	v_2^m	v_3^m	v_4^m

H — the set of project participants (project participants, project team members, project management team members); S — the set of project stakeholders (internal and external, including representatives of the regulatory environment); R — the set of construction project risks, including those originating from key stakeholders, with prioritization of such risks; S — a set of project actions (part of the project plan) related to the strategic communication of a construction project with key stakeholders, including risk responses (risk countermeasures) to avoid, eliminate, minimize, or mitigate risks.

On this basis, we propose a conceptual model of VSP in building company project management system (Figure). An important element of the model is the types of key stakeholders taken into account, including:

- regulatory environment (represented by central and local authorities, tax authorities, organizations that provide licenses for activities, etc.);
- construction organizations and companies, among which competitors should be given the leading place, however, business partners, as well as companies that are not directly dependent on this company (implementing the VSP model), can also be recognized as key stakeholders, depending on their influence and level of interest in the current construction project or in long-term strategic cooperation;
- contractors and suppliers (generally counterparties with whom the construction company cooperates within the framework of its own projects);

- consultants in project management, strategic
 communications and other management and
 technological fields related to construction projects;
- construction associations (public and social organizational entities that contribute to the development of the construction industry);
- local community (local authorities, organizations, enterprises and associations, citizens);
- clients of a construction company that receive values from the results of the implementation of a construction project (portfolio of construction projects).

To determine personalization in the list of key stakeholders, it is worth identifying the key person(s) with whom the construction company should carry out strategic communications. Such identification should occur for each stakeholder identified as key. It is also worth noting that the conceptual model identifies the proposed types of key stakeholders, but not the stakeholders themselves. Each construction company that will use the VSP model should specify the list of stakeholders within each of the proposed types, moreover, the list of types itself can be supplemented. Therefore, the VSP model has the ability to scale and adjust.

We will conduct a study of the obtained results in the form of a SWOT analysis with the determination of the strengths of the proposed model, its weaknesses, as well as the threats that are associated with its implementation, and the opportunities that may open up due to its implementation.

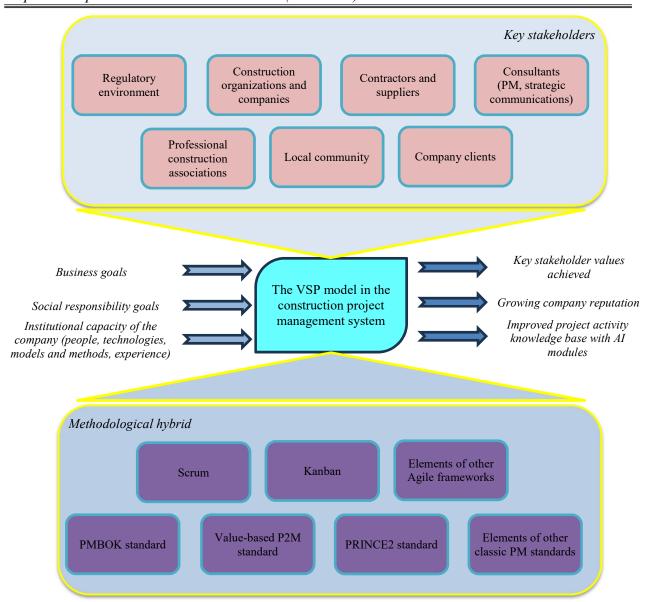


Figure – Conceptual model of VSP in building company project management system

Strengths.

- systematicity, thanks to which the proposed model can be integrated into the existing management system of a construction company;
- scalability and customization, thanks to which the proposed model can be adapted to the conditions of the construction company that will implement it;
- taking into account the strategic aspect of communications with stakeholders, in particular with representatives of the key stakeholder pool, thanks to which the construction company lays the foundation for effective long-term interaction with the main elements of the environment, enlists its support and achieves its assistance in the implementation of its own projects.

Weaknesses.

- the implementation of the model requires a professional, mature, well-coordinated team that is

- mission-oriented (in the language of the P2M standard), the absence of which can critically affect the success of the implementation;
- the assessment of values should be carried out by experts, and therefore the accuracy of the assessments depends on their qualifications and impartiality; the same may apply to AI models that will be trained by experts – even in this case, the influence of the human factor cannot be excluded, as well as the negative consequences of its presence;
- significant formalization of the sensitive and delicate field of stakeholder communication management may be excessive; finding a balance between the level of formalization and ease of use and configuration of the model is a complex optimization problem that may not be solved by formalized methods, but require intuitive thinking of the implementation project manager.

Opportunities.

- improving relationships with key stakeholders of the construction project and partners of the construction company, which will allow creating and implementing a successful development strategy;
- strengthening the reputation of the construction company among partners, the local community and the state, which will contribute to an increase in the number of projects of the construction company, and therefore its scaling and development;
- increasing the level of institutional security and stability of the construction company as a result of the implementation of the VSP model, which contributes to strengthening strategic trust and developing strategic partnerships with key stakeholders.

Threats.

- war and war risks can reduce the relevance of innovative scientific developments and practical innovations, as a result of which their implementation can be slowed down or even stopped;
- a decrease in the effectiveness of the model due to the lack of maturity of the environment, its unwillingness (for one reason or another) to build a longterm strategic partnership;
- the human factor present in any communications (and this is especially critical for strategic communications) can in an uncertain way affect both the implementation and the operation of the model, which can cause both distortion in its application and obtaining the opposite effect from it.

Based on the results of the SWOT analysis, we conclude that the potential strengths of the proposed approach can overcome its weaknesses, and the use of opportunities can overcome threats.

Let us formulate the prospects for further research in the chosen direction based on the results of the research:

- 1. Formalization of the process of expert assessment of the values of strategic communications with key stakeholders of the construction project. Such formalization aims to describe both the value models (and their components) in the context defined by the conceptual model, and the description of the assessment process itself, possibly in the form of an appropriate method.
- 2. Adaptation of models and methods of expert assessment to ensure their implementation by artificial intelligence methods and models. Preparation of appropriate datasets, development of a neural network model, training of such a network, testing of the network, its final tuning. The development of such actions will bring the project management system of a construction company closer to modern tools (AI), the use of which will in the near future be not just optional, but also

mandatory for effective project and enterprise management systems.

- 3. Development of models and methods of strategic communications with a key pool of defining stakeholders of a construction project. In the context of the proposed conceptual model, 5 main processes of strategic communications are described, however, this list can be expanded. In addition, each process must have appropriate formalization, it is necessary at least for the automation of the strategic communications support system, for the implementation of the appropriate business process in the IT system of the construction company (ERP, CRM, document management system or similar).
- 4. Profiling the VSP model, adjusting it to different types of construction projects of construction project-oriented organizations. It is worth noting that due to the war and the destruction caused by the war, not only residential and commercial real estate construction projects, but also restoration projects are relevant for construction companies. The typology of modern construction projects can be even deeper, in particular, among restoration projects many different types can be distinguished, their additional classification may be required. This can be taken into account when tailoring the VSP model to construction projects according to their types, as well as when formalizing such tailoring, which can also be one of the directions of further research.
- 5. Implementation of the proposed model in the practical activities of a construction company. Based on the results of such implementation, it is useful to collect statistics and accumulate experience regarding the implementation itself for further use. This will enrich the knowledge base of project activities in a construction company, increase the probability of success of future projects and ensure a higher level of sustainability in the modern project environment.

Conclusion

The practical tasks of increasing the efficiency of construction projects and the corresponding scientific tasks of developing the appropriate principles, models, methods and tools do not lose their relevance even in times of war caused by the aggression of the russian federation. Moreover, in the context of the urgency of reconstruction projects, such tasks become even more relevant. In this context, the issue of establishing effective interaction with stakeholders of a construction project in modern complex turbulent conditions, in particular with a key pool of such stakeholders, is insufficiently studied.

This article proposes a solution to this problem using strategic communications models. The article also analyzes research on project management, as well as known standards and methodologies in the context of their possible use for the development of the specified approach. Two key features of modern construction companies are highlighted. A model of value-oriented project management based on strategic communications is proposed – the VSP model. In the context of developing the elements of the model, its matrix and corresponding multiple representation are given. A conceptual model of VSP in building company project management system is also proposed, for which typical stakeholders are identified, who will mainly play the role of key ones.

A SWOT analysis of the proposed models was conducted, their strengths and weaknesses were identified, as well as the opportunities and threats that

may arise when using them. Based on the results of the analysis, a conclusion can be drawn regarding their potential effectiveness. Areas for further research in the selected direction were formulated.

In general, it is worth noting that the proposed approach to combining the field of strategic communications with a refined model of interaction with stakeholders in terms of their key representatives is relevant, and its implementation can potentially bring practical value for the further development of project management models and methods, project teams, and the scientific direction of construction project management in the complex conditions of the modern hyper-turbulent external environment of construction project implementation.

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МОДЕЛІ ЦІННІСНОГО ВИМІРУ У БУДІВЕЛЬНОМУ ПРОЄКТІ В КОНТЕКСТІ СТРАТЕГІЧНИХ КОМУНІКАЦІЙ ІЗ КЛЮЧОВИМИ СТЕЙКХОЛДЕРАМИ

Анотація. Проведено аналіз досліджень, стандартів і методологій проєктного менеджменту, які можна використовувати для створення та розвитку моделей і методів управління залученням стейкхолдерів до будівельного проєкту, з використанням ціннісно-орієнтованого виміру і виміру стратегічних комунікацій. Виділено дві ключові особливості сучасних будівельних компаній: використання типових процесів зі стандартизацією таких процесів та тривалий життєвий цикл реалізації проєктів. Запропонована модель управління ціннісно-орієнтованою проєктною діяльністю на основі стратегічних комунікацій – модель ЦСП. В контексті розробки елементів моделі наведено її матричне і відповідне множинне представлення. Матричне представлення засноване на матриці, одним з вимірів якої є типи цінностей проєкту, іншим – процеси стратегічних комунікацій зі стейкхолдерами у проєкті. Також запропонована концептуальна модель ЦСП в системі управління проєктами будівельної компанії, для якої визначено типових стейкхолдерів, які переважно виконуватимуть роль ключових. Серед ідентифікованих типів стейкхолдерів: регуляторне середовище; будівельні організації і компанії; підрядники і постачальники; будівельні асоціації; клієнти будівельної компанії, що отримують цінності за результатами реалізації будівельного проєкту (портфеля будівельних проєктів). Входами моделі ЦСП ϵ бізнес-цілі, цілі соціальної відповідальності та інституційна спроможність компанії (люди, технології, моделі і методи, досвід). Виходами моделі ЦСП ϵ досягнуті цінності ключових стейкхолдерів, зростання репутації будівельної компанії та вдосконалена база знань проєктної діяльності з модулями ШІ. Методологічним підтрунтям моделі є методологічний гібрид, основу якого складають елементи класичних методологій управління проєктами (PMBOK, P2M, PRINCE2 тощо) та елементи фреймворків методології Agile (Scrum, Kanban тощо). Зроблено висновок щодо потенційної ефективності запропонованої множини моделей. Сформульовано галузі подальших досліджень у обраному напрямі, серед яких: формалізація процесу експертного оцінювання цінностей стратегічних комунікацій з ключовими стейкхолдерами будівельного проєкту; адаптація моделей і методів експертного оцінювання для забезпечення можливостей їх реалізації методами і моделями штучного інтелекту; розробка моделей і методів стратегічних комунікацій з ключовим пулом визначальних стейкхолдерів будівельного проєкту; профілювання моделі ЦСП, налаштування її під різні типи будівельних проєктів будівельних проєктно-орієнтованих організацій (підкреслена необхідність забезпечення можливості адаптації моделі під проєкти відновлення); впровадження запропонованої моделі у практичну діяльність будівельного підприємства. Сформульовано висновки з проведених досліджень.

Ключові слова: управління проєктами та програмами; будівельна проєктно-орієнтована компанія; ціннісноорієнтоване управління; стратегічні комунікації; гіпертурбулентність; ключові стейкхолдери

Link to publication

- APA Bushuyev, S., & Vedmiediev, O. (2025). Models of value measurement in a construction project in the context of strategic communications with key stakeholders. *Management of Development of Complex Systems*, 63, 6–13, dx.doi.org\10.32347/2412-9933.2025.63.6-13.
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