Business process models for value-oriented strategic communications of a construction project with key stakeholders

Sergiy Bushuyev[1,†] and Oleksii Vedmiediev[1,*,†]

[1] *Kyiv National University of Construction and Architecture, 31 Povitryanih Syl avenue, Kyiv, 03037, Ukraine*

Abstract

This article analyzes scientific sources on stakeholder engagement in projects. A scientific problem is identified. New features of the classification of business processes and models of stakeholder relationships are proposed. 5 new features are formulated in each of the industries, and types of models within each of the features of the classification are indicated. For the first time, a structure of processes for involving key stakeholders in a construction project is proposed. This structure is characterized, in particular, the name of the process, the average duration of the process in a construction project, and responsible for implementing the process are defined. To formulate a thesaurus of value-oriented management of key stakeholders in a construction project, several definitions are proposed: tailoring the process of involving stakeholders in a construction project, tailoring the process of developing a strategy for interacting with each key stakeholder in a construction project, tailoring the process of creating a strategic communications system with the entire pool of key stakeholders in a construction project. Process model "Tailoring the strategic communications system with the entire pool of key stakeholders" is proposed in BPMN 2.0 notation. The function of optimizing strategic communications is formulated, which consists in formulating the coefficient of the corresponding efficiency with financial constraints. A SWOT analysis of the proposed approach to involving key stakeholders in a construction project is conducted. Areas of further research in the chosen direction are formulated.

Keywords

Project management, digitalization, business process models, key stakeholders, values

1. Introduction

Modern project management is developing in the difficult conditions of many challenges, in a harsh project environment. The high turbulence of the project environment, its characteristics as a BANI environment, when the project environment has become Brittle, Anxious, Nonlinear and Incomprehensible, urgently require the development, testing and application of new approaches, models and methods of project management. The peculiarities of modern standards are that they mostly provide generalized models and methods of project management regardless of the field of application – with the exception of the IT industry, which has become dominant not only in project management, but also in the world as a whole. In contrast, most industries are characterized by a certain specificity of project management. The answer to this contradiction can be considered the presence in modern standards and methodologies of an approach to adapting universal models to the conditions of project-oriented organizations, where faults are introduced – the so-called tailoring. It is the combination of modern project management standards, new scientific developments in this direction, and tailoring that is able to respond to the challenges faced by modern projects in the aggressive and turbulent BANI environment.

The construction industry is facing challenges related to the need to restore buildings and structures that were damaged as a result of the war. As a result, construction organizations, along with the challenges of the general high turbulence of the project environment, are faced with

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* Corresponding author.

† These authors contributed equally.

SBushuyev@gmail.com (S. Bushuyev); vedmiediev_ov-2024@knuba.edu.ua (O. Vedmiediev)

0000-0002-7815-8129 (S. Bushuyev); 0009-0004-5420-9851 (O. Vedmiediev)

requirements for faster and more effective implementation of construction projects in such conditions. One of the important aspects that, in particular, determines the speed of implementation of a construction project is fast and effective interaction with stakeholders. The development of new approaches in this direction in modern conditions, its formalization and digitalization are urgent scientific tasks.

The property of project management as an integral science and practice has allowed to combine the scientific directions of dynamic leadership, environmental sustainability, value-oriented approach, elements of artificial intelligence, models inherent in start-up projects - in a single complex (hybrid). Such a hybrid can become the basis of the corporate methodology of construction companies that solve the problem of survival and success in modern turbulent conditions. This article is devoted to the development of elements of the corporate methodology of construction project management, which are based on improving interaction among stakeholders. The research perspective is aimed at identifying, among all stakeholders, those of them that are key for the construction organization, and formalizing the relevant business processes for building strategic communications with them in order to provide a basis for the success of construction projects in modern conditions.

2. Statement of the problem and the objective of the study

As a scientific problem that exists and is relevant, one can identify the insufficient effectiveness and insufficient formalization of interaction with stakeholders in construction projects. The purpose of this article is to develop an approach to involving key stakeholders in a construction project in the context of identifying a key stakeholder pool, developing strategic communication processes with them, and formalizing such processes.

3. Literature review

In project management, there is a constant search for new approaches, a new understanding of the methodology of project and program management, in the direction of creating models and methods adequate to modern challenges [1]. Such research is based on a solid basis created by the science of project management and embodied in the standards and methodologies developed by industry practitioners. Let us analyze the relevant developments in the context of the topic under study.

In the classic project management standard PMBOK, stakeholder management is given considerable attention. In the current, seventh edition of the standard, which is significantly different from the previous ones in terms of conceptual structure, stakeholder engagement is defined as one of the 12 guiding principles of project management. In addition, one of the eight domains (branches of knowledge) of project management remains the domain of stakeholder engagement management. It is noted that this domain involves working with stakeholders to maintain consistency and interaction with them in order to promote positive relationships and satisfaction of interests. In addition, the standard suggests prioritizing stakeholders. Regarding the value dimension, the standard has a whole section dedicated to the value delivery system, where the components of value delivery, the corresponding information flow, etc. are highlighted [2]. The importance of aligning stakeholder expectations is also emphasized by the ISO standard dedicated to project, program and portfolio management [3]. In the current version of the PRINCE2 standard, in the formulation of the benefits of applying the standard, the need for effective interaction with stakeholders is formulated, although neither among the principles nor among the knowledge areas of the standard is a corresponding domain for this. The relevant domain can be considered the project risk management domain. A distinctive feature of the standard is the declaration of the principle “tailor to suit the project” [4], which is consonant with the corresponding tailoring domain of the PMBOK and may include value-oriented interaction with stakeholders regarding the project. The P2M standard [5] in general is one that introduced a value dimension to project

management, and therefore the use of models and methods of this standard is appropriate within the scope of the research topic.

The Agile methodology [6] has added a new dimension to project management, enriched it with new models and methods of bright, fast and effective project management (initially IT projects, later generalized) in close interaction with the main stakeholder – the customer. It is important that the developments of Agile have also spread to the use of a value-oriented approach [7], it is also noteworthy to use data work models, which is especially valuable in the modern information world, in which the IT dimension of projects in any industry is rapidly increasing. In parallel with Agile, the value dimension of projects is also studied by researchers of classical project management [8]. In connection with the emergence and confirmation of the Agile methodology effectiveness, in recent years, the direction of mixing (hybridization) of standards for the creation (or use) of a corporate project management methodology in a company has been studied [9]. Moreover, research on such hybridization is also being conducted for the construction industry [10], which also concerns the value-oriented approach for use in construction companies [11], and in general the search for new modern approaches to effective project management in the construction and infrastructure industries [12].

In parallel and together with project management, the direction of business process analysis and optimization is developing and penetrating it. From the classic for this direction management on business process reengineering [13], which reflects the accumulated experience in this context, to the concepts of the so-called "third wave" of business process management [14], the revolution in management, which was facilitated by the development of business process reengineering [15], and to the concept of X-reengineering [16] - in all these works the basis was laid for the implementation of projects to increase the efficiency of enterprises and projects through the review and optimization of processes. The reengineering methodology involves the construction of process models, their structuring, determination of the interrelationships of processes and their parameters, as well as further optimization in terms of time, cost and other parameters [17]. This approach is also being explored in construction projects, in particular in the context of value-based management of construction companies [18], in the context of models of the required IT subsystem [19], project content and risk management in reengineering projects [20], adaptive models that can be applied in reengineering projects [21]. Particularly interesting, from the point of view of our study, should be considered scientific research on the reengineering of the system of organizational and economic management of construction participants on the basis of digitalization [22] and on the implementation of value-based reengineering in the construction industry of one of the countries [23], which can be a basis for comparison and, in a certain way, a rethought example for the further development of relevant models. Recent reengineering research suggests rethinking business processes themselves [24], applying BPMN notation to process description [25], in particular the advanced version of this notation BPMN 2.0 [26], which we plan to apply to describe business processes within the framework of this article.

In general, it is worth emphasizing that although some aspects of the researched topic have been studied and developed by scientists, the topic of business process models for value-oriented strategic communications of a construction project with key stakeholders is insufficiently researched. This confirms the relevance of the topic under consideration. The basis for its development is laid in the authors' previous works, in particular in [27].

4. Main part

To consider the topic under study, it is worth expanding the classification features of both business processes and stakeholder relationship models.

In developing existing business process classification models, we will propose additional classification features and types of processes within such features.

1. By using strategic communications in processes:

   a. Process models do not use strategic communications.
   b. Process models use elements of strategic communications.
   c. Process models are built entirely on strategic communications.
2. By differentiating participants from the process implementation environment:
   a. Process models contain only process executors.
   b. Process models contain process executors and stakeholders.
   c. Process models contain executors, stakeholders, from which key stakeholders are separately identified.
3. Based on the possibility of taking into account construction specifics in standard process models:
   a. Process models that are universal across industries and can be applied to construction projects without modification.
   b. Process models that can be modified slightly for use in construction projects.
   c. Process models that require significant modification for use in construction projects.
   d. Process models that cannot be applied to construction projects due to significant process differences in such projects.
4. According to the methodological basis of strategic communications processes:
   a. Process models based on the strategic communications methodology.
   b. Process models based on the project management methodology.
   c. Process models based on a value-based approach.
   d. Process models based on a combination of methodologies (methodological hybrid).
5. By cross-culturality of key stakeholders in construction project processes:
   a. Monocultural environment – all key stakeholders are representatives of one culture and one approach to project management.
   b. b. Bicultural environment – key stakeholders are representatives of two cultures and two different approaches to project management.
   c. c. Cross-cultural environment – key stakeholders are representatives of many cultures and many approaches to project management.

In developing existing models of stakeholder engagement in a project, we will propose additional classification features and varieties of models within such features.

1. According to the model of engagement of key stakeholders – engagement of stakeholders based on the partnership model (mutual benefit), engagement of stakeholders based on the analysis of their expectations and values, engagement of stakeholders based on strategic communications with them.
2. According to the degree of influence of stakeholder types on the project, the progress of its implementation and/or its results – low, medium and high influence from key stakeholders and low, medium and high influence from other stakeholders.
3. According to the types of engagement of key stakeholders in the project – involvement as observers, involvement as consultants, involvement in decision-making.
4. According to the degree of formalization of the process of involving key stakeholders in the project – non-formalized processes, verbalized processes, simulated processes, measured processes and optimized processes.
5. According to the type of construction project in which key stakeholders are involved through strategic communications – residential construction project, commercial construction project, construction production development project, restoration project.

Next, we will propose a structure of processes for involving key stakeholders in a construction project, in which we will define the name of the process, the average duration of the process in a construction project, and those responsible for implementing the process (Table 1).

Table 1
Processes for engaging key stakeholders in a construction project

	Process	Duration, week	Responsibility
1	Identification of key stakeholders	1 to 2	Project team
2	Rating of key stakeholders	1	Project analyst
3	Tailoring the interaction strategy with each key stakeholder	1 to 3	Project manager
4	Tailoring a strategic communications system with the entire pool of key stakeholders	2 to 4	Sponsor of project, Project manager
5	Implementing strategic communications with each key stakeholder	Till the end of project	Project team
6	Monitoring triggers for changing stakeholder expectations	Till the end of project	Project risk manager
7	Delivering value to key stakeholders	Till the end of project	Project team
8	Adjusting strategic communications with a stakeholder	Till the end of project	Project manager
9	Adjusting the strategic communications system with the entire pool of key stakeholders	Till the end of project	Sponsor of project, Project manager
10	Finalization of stakeholder engagement	1 to 2	Sponsor of project

To formulate a thesaurus of value-based management of key stakeholders in a construction project, we offer several definitions.

- **Definition 1.** *Tailoring the stakeholder engagement process in a construction project* – adaptation of the stakeholder engagement process model to the conditions of the construction project implementation, in particular to the organizational structure, corporate culture and other artifacts of a construction project-oriented organization. Includes changes to the parameters of the process model, both to individual characteristics and to content elements.
- **Definition 2.** *Tailoring the process of developing a strategy for interacting with each key stakeholder in a construction project* – adaptation of the model of the process of developing a strategy for interacting with each key stakeholder in a construction project to the conditions of the construction project implementation. It is determined by the possible existing features of key stakeholders in individual construction projects, as a result of which the parameters of the process model may change, both individual characteristics and content elements – process steps (subprocesses).
- **Definition 3.** *Tailoring the process of creating a strategic communications system with the entire pool of key stakeholders in a construction project* – adaptation of the model of the process of creating a strategic communications system with the entire pool of key stakeholders in a construction project to the conditions of the construction project implementation. Contains changes to the parameters of the process model, both to individual characteristics and to content elements. It is determined by the possible existing significant specifics of the pool of stakeholders of the construction organization.

As an example of describing process models (from the system of processes for involving key stakeholders in a construction project), we present the developed process model 4 “Tailoring the strategic communications system with the entire pool of key stakeholders” (Fig. 1). The modeling was performed using the BPMN 2.0 business process description notation.

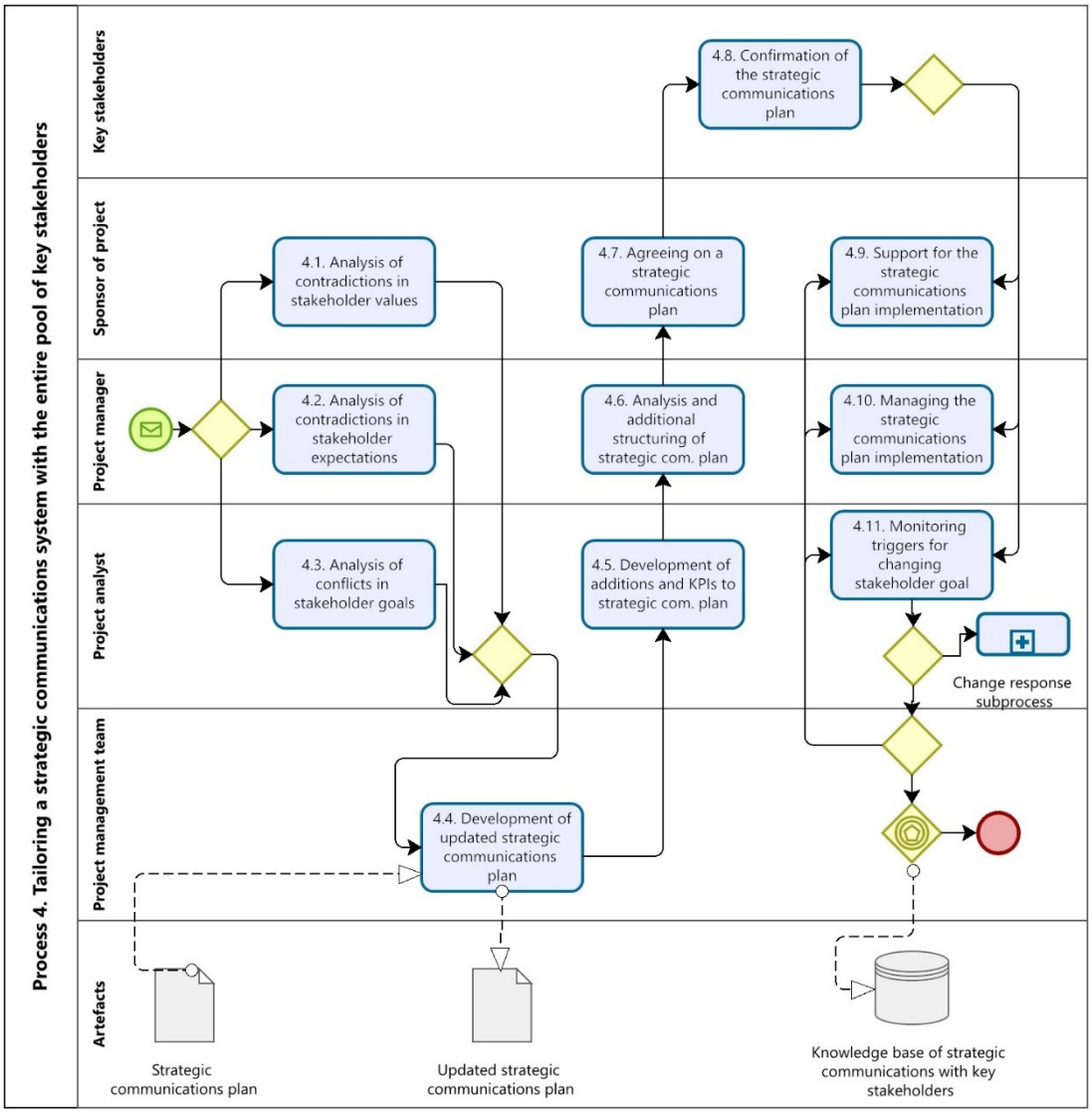

Figure 1: Process model 4 “Tailoring the strategic communications system with the entire pool of key stakeholders” in BPMN 2.0 notation.

In the above model, the process begins after the notification of the completion of the previous process 3 “Tailoring the interaction strategy with each key stakeholder”, when the interaction strategies for each key stakeholder identified in the project have already been adjusted to the project conditions. Process 4 provides for 5 participants – the project team as a whole (its work is carried out in this case within the framework of team meetings), the project analyst, the project manager, the project sponsor (usually one of the deputy heads of the construction company) and key stakeholders.

The first three steps of the process (4.1-4.3) involve analyzing mutual contradictions and conflicts in the values, expectations and goals of individual stakeholders – within the group of key stakeholders. Based on the results of such analysis, the project team adapts the strategic communications strategy (step 4.4). After that, the updated strategic communications plan is supplemented, including with KPI indicators (step 4.5), finally structured (step 4.6), approved by the company (step 4.7) and submitted for approval to key stakeholders – each in its part (step 4.8).

Further, the plan is implemented (step 4.9), its implementation is monitored and supported (step 4.10), and triggers (conditions and events) are monitored, which indicate a change in the goals of key stakeholders regarding the project (step 4.11). In the event of such a trigger, the change response subprocess is implemented. If such changes do not occur during the life cycle of the construction project, steps 4.9-4.11 are performed until its completion. After the construction project is completed, information about the process is transferred to the knowledge base of strategic communications of the construction company with key stakeholders.

Based on the research results, we propose a function for optimizing strategic communications, which consists in formulating a coefficient of appropriate efficiency with financial constraints:

$$K^{sce} = \left(w_c \cdot e_c \cdot f_c + \sum_{i=1}^{I} (w_i^v \cdot e_i^v \cdot f_i^v + w_i^e \cdot e_i^e \cdot f_i^e + w_i^g \cdot e_i^g \cdot f_i^g) \right) \rightarrow min,$$

$$\text{under restrictions } \left(f_c + \sum_{i=1}^{I} (f_i^v + f_i^e + f_i^g) \right) \leq F^{sce} \quad (1)$$

where K^{sce} – strategic communications effectiveness ratio;

e – expert evaluations of relevant indicators, respectively e_c – evaluations of the coherence of interests of all key stakeholders (in balancing their values, expectations and goals), e_i^v – evaluations of the achievement of values by the i-th key stakeholder, e_i^e – evaluations of compliance with expectations, e_i^e – evaluations of goal achievement;

w – the corresponding weights of each component in the overall evaluation, such that the sum of all weights should equal 1;

f – corresponding monetary indicators of each component aimed at its implementation;

I – number of identified key stakeholders of the construction project;

F^{sce} – project budget constraints, the amount in the budget allocated to ensure strategic communications in the project with key stakeholders.

Let's conduct a SWOT analysis of the proposed approach to involving key stakeholders in a construction project, identify its main strengths, weaknesses, opportunities arising from its implementation, and corresponding threats (Table 2).

Table 2
SWOT analysis of the approach to engaging key stakeholders in a construction project

Strengths	Weaknesses
- Adaptive approach to stakeholder engagement - Identification of key stakeholders, prioritizing their interests - Process modeling to improve their quality	- Subjective factor in stakeholder interaction, sensitivity to individuals implementing the approach - Difficult to take into account all factors of subjective interaction - Excessive formalization for small projects
Opportunities	**Threats**
- Gaining greater support from key stakeholders - Strengthening the reputation of the construction company - Expanding the portfolio of construction projects	- Military risks that may hinder both the implementation of the approach and the work of the construction company - Risks of changing conditions - Turnover of personnel who are carriers of knowledge

Based on the results of the SWOT analysis, it can be concluded that the strengths of the approach are able to overcome the threats that arise when using it, and the opportunities that open up can help correct its weaknesses.

5. Conclusions

The significant increase in turbulence in the modern project environment requires the development, application, testing and adaptation of new models and methods of project management, in particular in the construction industry. Given the extreme importance of stakeholders for construction projects, it is proposed to identify a pool of key stakeholders and apply a strategic communications approach to them, manage such communications using formalized business process models, and optimize such models throughout the life cycle of a construction project.

This article proposes new features of the classification of business processes and models of stakeholder relations, proposes 5 new features in each of the industries, indicates the types of models within each of the features of the classification. For the first time, the structure of engagement key stakeholders processes in a construction project is proposed. This structure is characterized, in particular, the name of the process, the average duration of the process in a construction project, and responsible for implementing the process are defined. To formulate a thesaurus of value-based management of key stakeholders in a construction project, several definitions are proposed: tailoring the process of engaging stakeholders in a construction project, tailoring the process of developing a strategy for interacting with each key stakeholder in a construction project, tailoring the process of creating a strategic communications system with the entire pool of key stakeholders in a construction project. Process model 4 “Tailoring the strategic communications system with the entire pool of key stakeholders” in BPMN 2.0 notation is proposed. The function for optimizing strategic communications is formulated, which consists in formulating a coefficient of appropriate efficiency with financial constraints. A SWOT analysis of the proposed approach to involving key stakeholders in a construction project is conducted.

In general, it is worth noting that the proposed set of models within the framework of formalizing the engagement of key stakeholders in a construction project is aimed at increasing the efficiency of digital decision support systems in relevant projects. As areas of further research, it is worth identifying the formalization of the entire set of relevant processes, conducting practical testing of the proposed approach, and making corrections to the above models based on the results of such testing.

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Supervisor: doctor of technical sciences, professor at the project management chair Bushuyev S. D.

Declaration on Generative AI

The authors have not employed any Generative AI tools.

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