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UPDATE MODELS OF CONSTRUCTION ORGANIZATION IN THE CONTEXT OF THEIR ADAPTOGENICITY TO MODERN MANAGEMENT AND DIGITAL TECHNOLOGIES

The lack of clear and accessible information sources, services, platforms, applications or portals on digital business transformation slows down the speed of innovation in domestic entrepreneurship. In turn, this does not allow businesses to integrate with global trends, which complicates access and work in the international economic arena. The identified problems necessitate the development of a methodological approach to the study of digital transformation processes at the enterprise level; polystructural methodological approach to determining the index of digital transformation of business structures on the basis of relevant indicators; design and implementation of a digital platform for small and medium-sized businesses, which would automatically determine the Digital Transformation Index and provide an individual "road map" to improve the digital development of the enterprise.

The article presents recent innovative technology for modeling business processes of enterprises based on process management. The paper considers the creation and justification of the updated methodological and analytical tools for assessing, selecting and regulating the production system of administration of an enterprise project portfolio in a single operating management system. The application of the process approach is based on a comprehensive, systematic review of the enterprise as a set of processes, the development of a process management system using the principles of ISO 9000: 2000. The new process approach is proposed that

allows excluding routine operations from the actions of employees, increasing the speed of employee interaction, effectively optimizing existing business processes, and quickly rebuilding the enterprise's business processes in response to significant changes in business conditions. The work identifies executable business processes, proposes a new approach to modeling the business processes of an enterprise, gives examples of problems associated with the new approach, and suggests possible ways to solve them. Criteria for the results of simulated business processes are defined that allow linking the target indicators of a balanced scorecard of the enterprise with the established results of business processes. It is proved that the use of this recent innovative technology for solving scientific and practical problems of enterprise management significantly expands and deepens the possibilities of economic analysis in the process of solving problematic situations and makes management decisions more grounded and effective.

Keywords: business process, management systems, process approach to modeling, technology modeling business processes

Statement of the problem. The urgency of the issue of cognitive research is determined by the peculiarities of modern society. A characteristic feature of today is the availability of unified information technology (IT) in almost all spheres of life. IT allows you to share information in global dimensions, collect huge data sets and integrate them from dispersed and diverse sources. The data sets collected in this way are used to predict and generate new knowledge.

Recent research on cognitive mechanisms has focused on analyzing the knowledge management processes, models, and practices of an individual organization, and only a small amount of research has focused on evaluating and optimizing the processes involved in integrating knowledge into a project.

The practical relevance of the study is due to the following. Modern construction projects are complex. Their complexity increases as more and more interdisciplinary participants are involved, which in turn leads to the need to process a significant amount of information and generate knowledge.

The key problems in knowledge management that are characteristic of the construction project include: the complexity of building an effective knowledge and information management system; significant fragmentation of the construction project; inefficient communication system, low level of quality of information exchange in teams and tools that serve these processes; uneven degree of information technology saturation of different construction disciplines; paper form of transmission, storage and sharing of information.

Analysis of recent studies and publications. These problems lead to negative consequences: knowledge is not used where it is generated; knowledge is lost and

needs to be re-generated; inability to conduct analysis or synthesis based on already acquired knowledge about the project.

A significant contribution to the formation and development of the theory of portfolio-oriented management made A.O. Biloshchytsky [1], S.D. Bushuyev, P.M. Kulikov [3], G.M. Ryzhakova [4-5], Yu.M. Tesla, , S.W. Tsyutsyura, R.V. Trach [2], T.T. Aalto, K. Arto, R. Archibald, M. Aubry, J. Turner, L. Crawford, X. Dai, J. Hobbs, H. Jamieson, P. Morris, D. Norton, M. Martinsuo , W. Wells and a number of other researchers.

The paper [1] describes the peculiarities of management of associations with public-private partnership forms, in particular identifying the risks arising in the decision-making process of management of these associations. In [2 to 6], key recommendations for the implementation of strategic management in dynamic conditions of the transformation of economic systems, in particular, in the conditions of creation and management of integration associations in conditions of uncertainty of the type of construction cluster. In [7], methods of quality evaluation in the activities of companies are considered, but not so much attention is dedicated to the evaluation of the effectiveness of decision-making activities of the associations of companies. The paper [8] describes the principles of managing the stability of structures in business and the investment process in general. In work [3] the mechanisms of management and modeling of the development of integration associations are presented, which may be useful in modeling the development of associations with state participation of the building cluster (BC) type.

The aim of the study is to develop a methodology that contains cognitive mechanisms, models, methods that allow step-by-step analysis, selection, optimization and evaluation of the effectiveness of modern concepts of information modeling and integrated implementation of construction projects.

The object of research is the process of knowledge formation and management of communication networks and information connections of the participants of the construction project.

The subject of the research is the methodology, which contains cognitive mechanisms, models, methods that allow to analyze, select, optimize and evaluate the effectiveness of the introduction of modern concepts of information modeling and integrated implementation of the construction project.

The main hypothesis of the research is the assumption that improving the effectiveness of project management depends on the effectiveness of cognitive mechanisms and is associated with the application of modern concepts of information modeling and integrated implementation of the construction project.

Relevance and novelty. The process of transformation of the economic system depends on the choice of methods and timing for identifying the factors that influence

transformation. To date, there is practically no solid research on the methods of assessing the effectiveness of management of associations with the participation of the state, taking into account the share of state influence. There are also insufficient studies to identify alternatives and change scenarios for their development. For a detailed study of these problems, the study proposes a new organizational structure of the association of construction holdings, the so-called building cluster (BC). The BC structure is based on public-private partnership, accumulates modern trends in the transformation of production and organizational structures, investment activity and combines a number of characteristics of such organizations as a development company, investment company, financial company and design company. BC is an association of enterprises and organizations on the initiative and under the chairmanship of the state to solve the problem of the construction of certain objects that are important sectoral significance within the framework of regional programs and projects under the condition of state procurement, financing, subsidization, regulation and provision of state guarantors of implementation these projects and programs.

All structures, including economic ones, are in the development of such key stages: origin, growth, maturity, regressive transformation (crisis) and disappearance or disintegration. At the origin and growth, the process of transformation of systemic qualities occurs through the birth of a new structure or as a result of a conflict with conservative established trends in management. Maturity expresses the stationary state of the organization's structure. In regression, there is a disorganization transformation, as a result of which the old structure gives way to a new one.

Structural changes in the economy manifest themselves in changing the values of elements, parts and proportions, as well as qualitative characteristics of the system, and this often leads to a change in the overall quantitative and subsequently qualitative characteristics of the economic system. For example, in the post-socialist system, the transformation of the economy and its structural changes have their own special laws. Today it is already cess of transformation, as well as to reflect the special features that are inherent to each individual state that went through this path. The main features are the availability of private property, healthy competition, the introduction of freedoms, etc.

The processes of change in general have certain regularities. In the case of the creation of BC on the basis of public-private partnership principles, the peculiarities of the process of transformation and change of scenarios of development are:

- organizational structures are unstable in a transition economy, because the economy is unstable and inadequate;
- availability of many options or alternatives for development;
- the existence of contradictions between traditional economic structures and new market structures;

With the strengthening of the economic system, transitional structural structures are volatile and rapidly changing.

In different countries, the processes of transformation differ primarily in the differences in the economic situation: the measure of the implementation of economic reforms, the level of balance of the state economy, etc. The transition from a centralized economic system to a market economy is determined by national peculiarities, the starting level of economic system development and the factors that arise as a result of the transition period.

The model assumes the delimitation of three levels of maturity of a single project management process: starting from the absence of process as a subject of project manager management, moving to non-standardized process management according to individually defined procedures and project team experience at the first level of maturity. procedures at the second level and ending with the level of continuous development and improvement of the individual process on the basis of the experience of the project.

To collect primary information on the development of project management processes, the author proposed a special form of the questionnaire, which indicates the characteristics of individual project management processes at the appropriate levels of maturity, established in accordance with the maturity model. Assessment of the maturity of such processes was provided at a formally defined level (fixed order of decision-makers on the necessary nature of project management procedures) and at the level of practical use (actual level of maturity of the project management process, which is observed in normal project implementation).

The most informative for the purposes of such a study are indicators of the generalized actual level of maturity of processes, the level of maturity of the project management process system, the generalized system development potential and the level of balance of the project management process system (Fig. 1).

Factors of communication and exchange of information flows are very important in the implementation of construction projects. Traditionally, this was done in the form of two-dimensional drawings and paper documentation. The concept of BIM involves the use of information models not only as a design tool, but also as an interface for the exchange of information between different participants at all stages of the project. The fragmented nature of the construction industry has led to the need to use different design and construction management tools. Each project participant prefers tools that specialize and adapt to his individual roles.

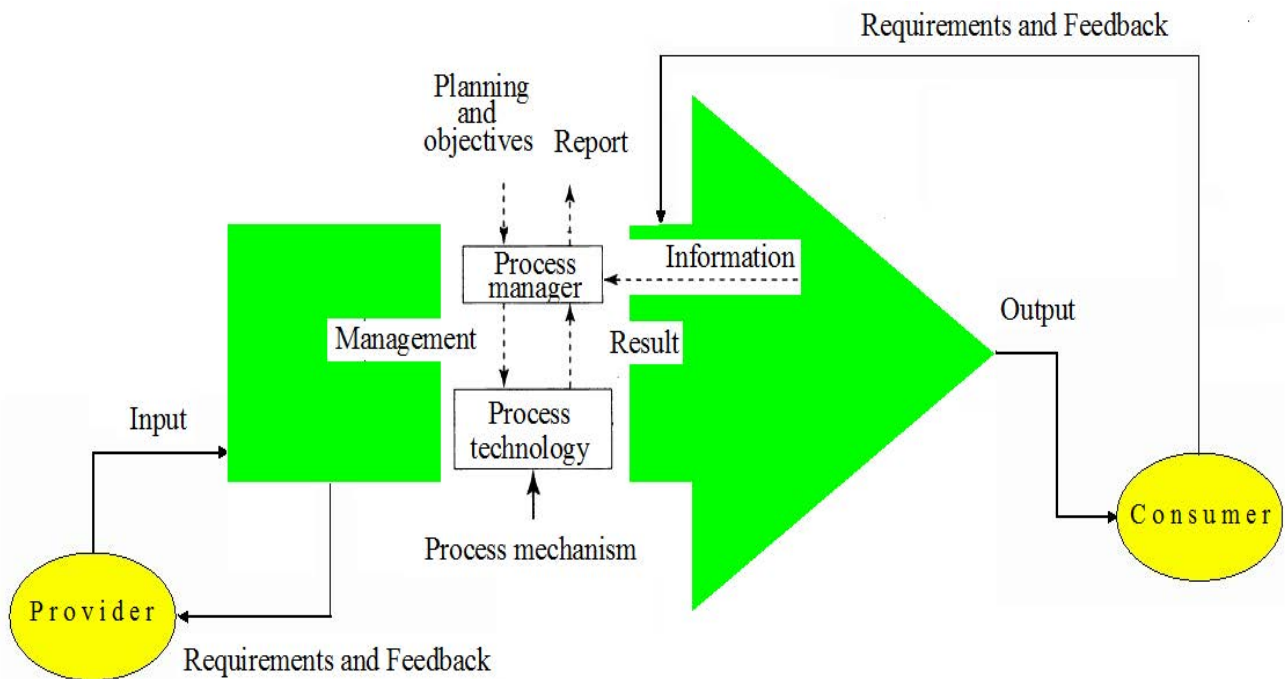


Fig.1. The proposed technology for modeling of business processes [7].

The same situation was with the development of BIM tools, when each of the project participants used software that interacted poorly with each other.

- an open specification data format that is not controlled by any company or group of companies. The file format was developed by building SMART (International Alliance for Interoperability, IAI) to facilitate interaction in the construction industry. Used as a format for Building Information Modeling. This has led to the introduction of the Industry Foundation Classes (IFC), an open source international standard. The file format was developed by building SMART (International Alliance for Interoperability, IAI) to facilitate interoperability when using BIM.

EU countries started implementing BIM technologies in 2013. In July 2018, the EU Working Group on BIM issued a "Guide to the implementation of technology for European public customers." Experts estimate that the design, construction and operation of BIM facilities are more efficient. In particular, in the EU countries, the expected annual savings from the use of BIM technologies at the design and construction stage is more than 20%. In the UK, thanks to the use of BIM by 2025 it is planned to reduce project implementation time by 50%.

Since integration is a process in which two or more participants can be involved, the assessment of the effect should be given from the standpoint of the overall result, the embodiment of which is a synergistic effect.

Synergy can be defined as a concept that describes the system processes in which business units of different, complex organizations will benefit more from working as

one system than from working as separate entities. synergistic effect and their values (table 1).

Table 1.

Synergetic effect that can be obtained from the use of a common BIM / IPD model

Factors that affect the synergistic effect	Synergetic effect, in% of the project cost
Reducing the number of errors and, accordingly, the number of changes in the construction project (S_1)	8,78
Reduction of project implementation time due to higher coordination of actions (S_2)	1,74
Reduce transaction costs (S_3)	5,52
Reduce costs during the operation of the building (S_4)	2,67
Total	18,70

As an example, we give the method of calculating the indicator S_1 "Reducing the number of errors and, accordingly, the number of changes in the construction project." It was based on one of the benefits that project participants receive from the implementation of the joint BIM / IPD model, namely the preparation of project documentation of the highest quality and the avoidance of additional work and alterations in the future. Additional work and alterations, in turn, lead to additional costs. In fig. 2 shows an example of an error in the design documentation for the placement of stairs and columns. This error was detected at the stage of construction works and led to construction alterations and, accordingly, additional costs (processing costs).

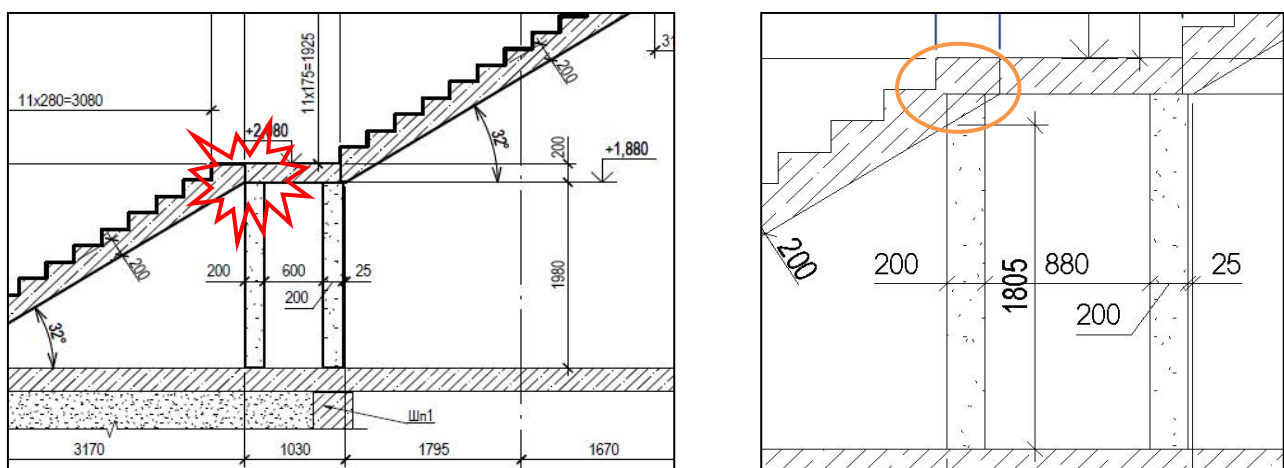


Fig. 2. Example of an error in the design documentation for the placement of stairs and columns.

The basis of the design of the model is an advanced type of network construction models. The element "robot-numbers" in the form of a sphere visualizes digital space

for a separate set of works, which the organization-subcontractor performs as part of a development project. The diameter of the sphere in comparative units reflect the developer's semantic measure of confidence because his requirements will be met by this performer. Realization factors of organizational and technological parameters in the element of the network model for type "robot-numbers" provides autonomy for the formation of model variants cycle and the convenience of their further organization in the overall project model

organization of construction and project of works. Special ordering ("Digitization") of parameters provides through the initial and final "events" proper reference to the budget agreed between the customer and the developer project and investment schedule. Fullness of the integrated element-work (in relative units of the confidence index), based on comprehensive weighing competitiveness of performers by factors, formally reflects for a separate complex of BIS, the level of preservation (deviation) of organizational technological and other parameters of work from the planned level. It gives the developer has reasonable grounds to leave (remove) such an organization in composition of performers.

Conclusion

Given the goals, there is a need to adapt construction models to their implementation on a mutually agreed basis of digitization and development - from project concept to the stage of operation of the construction site the completion of development contracts with a clearly defined risk of decision by the head of the management company. Implementation of these requirements for contract construction and the need for substantial renewal of sub-approaches to organizational and technological modeling of construction projects - through the improvement and digitalization of the content and typological structure of models of such content on the basis of development. Information systems are playing an increasing role in achieving the strategic goals of organizations, as they not only provide information processing for departments and end users in the internal environment, but also directly generate products and services based on information and provide competitive advantage in the market. Given the importance of information management infrastructure of the organization for its operation and development, a model of its construction is proposed. Theoretical and methodological approaches to modeling management informatization are substantiated, which cover problems to consistent description of each aspect of the organization management system in coordination with all others based on the implementation of information management information infrastructure and the formation of digital strategy.

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ООНОВЛЕННЯ МОДЕЛЕЙ ОРГАНІЗАЦІЇ БУДІВНИЦТВА В КОНТЕКСТІ ЇХ АДАПТОГЕННОСТІ ДО СУЧАСНИХ УПРАВЛІНСЬКИХ ТА ЦИФРОВИХ ТЕХНОЛОГІЙ

Відсутність зрозумілих і доступних джерел інформації, сервісів, платформ, додатків чи порталів з трансформації цифрового бізнесу уповільнює швидкість інновацій у вітчизняному підприємстві. У свою чергу, це не дозволяє бізнесу інтегруватися у світові тенденції, що ускладнює вихід і роботу на міжнародній економічній арені. Виявлені проблеми зумовлюють необхідність розробки методичного підходу до дослідження процесів цифрової трансформації на рівні підприємства; поліструктурний методологічний підхід до визначення індексу цифрової трансформації бізнес-структур на основі відповідних показників; розробку та впровадження цифрової платформи для будівельного бізнесу, яка б автоматично визначала Індекс цифрової трансформації та забезпечувала індивідуальну «дорожню карту» покращення цифрового розвитку підприємства.

У статті представлено новітні інноваційні технології моделювання бізнес-процесів підприємств на основі управління процесами. У роботі розглядається створення та обґрунтування оновленого методологічного та аналітичного інструментарію оцінки, вибору та регулювання виробничої системи адміністрування портфеля проектів підприємства в єдиній операційній системі управління. Застосування процесного підходу базується на комплексному, систематичному огляді підприємства як сукупності процесів, розробці системи управління процесами з використанням принципів ISO 9000: 2000. Запропоновано новий процесний підхід, що дозволяє виключити рутинні операції від дій співробітників, підвищення швидкості взаємодії співробітників, ефективна оптимізація існуючих бізнес-процесів, швидка перебудова бізнес-процесів підприємства у відповідь на значні зміни умов ведення бізнесу. У роботі визначено виконувані бізнес-процеси, запропоновано новий підхід до моделювання бізнес-процесів підприємства, наведено приклади проблем, пов'язаних із новим підходом, і запропоновано можливі шляхи їх вирішення. Визначено критерії результатів моделювання бізнес-процесів, які дозволяють зв'язати цільові показники збалансованої системи показників підприємства з встановленими результатами бізнес-процесів. Доведено, що використання цієї новітньої інноваційної технології для вирішення науково-практичних завдань управління підприємством значно розширює та поглиблює можливості

економічного аналізу в процесі вирішення проблемних ситуацій, робить управлінські рішення більш обґрунтованими та ефективними.

Ключові слова: бізнес-процес, системи управління, процесний підхід до моделювання, технологія моделювання бізнес-процесів.

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