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PROJECT MANAGEMENT DIGITALIZATION VALUES MODELS FOR A REAL ESTATE DEVELOPMENT COMPANIES

МОДЕЛІ ЦІННОСТІ ДІДЖИТАЛІЗАЦІЇ В УПРАВЛІННІ ПРОЄКТАМИ ДЛЯ ДЕВЕЛОПЕРСЬКОЇ КОМПАНІЇ

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Abstract. Purpose. The purpose of this article is to study the developments of the value approach in project management and its application to digitalization projects of development companies, to build a model for classifying the values of digitalization projects of development companies, a conceptual model for delivering digitalization values in development companies, and to analyze such models based on this approach.

Methods. The study applied value-based management methods to build value models, project management methods to study the digitalization project, classification methods to develop a value classification model for the digitalization project of development companies, formalization methods to obtain a mathematical model, and SWOT analysis methods for the corresponding study of the developed models.

Results. The objects of digitalization of a development company were identified, a model for classifying the values of digitalization of development companies was proposed, which distinguished four classes of values, within which the types of values were defined. Based on the conducted research, a conceptual model of delivering digitalization values for a development company was proposed in the form of a methodological basis and a chain of values – values of the first, second and third kind. A model of value of the third kind was formalized, taking into account the synergy of the received values.

Scientific novelty. For the first time, based on a combination of project management and a value approach to digitalization projects, a model for classifying digitalization values of development companies and a conceptual model for delivering digitalization values for a development company have been created.

Practical significance. The above developments are aimed at providing development companies with a scientific basis for meeting modern challenges and achieving competitiveness in difficult modern conditions. Thanks to the results of the study, which implements a systematic approach to the digitalization of a development company and allows for an assessment of the cumulative effect of digitalization and the impact of each of its components, taking into account the synergy of impacts, the complexity of management can be reduced, the creative resource of the development company's specialists can be released to solve complex design tasks, the effectiveness of the company's projects can increase, and the company's good reputation in the market can be formed.

Key words: project management; development company; digitalization; value-oriented approach; synergism.

Анотація. Мета. Метою цієї статті є дослідження напрацювань ціннісного підходу в управлінні проєктами та застосування його до проєктів діджиталізації девелоперських компаній, побудова на основі такого підходу моделі класифікації цінностей проєктів діджиталізації девелоперських компаній, концептуальної моделі поставання цінностей діджиталізації в девелоперських компаніях та проведення аналізу таких моделей.

Методи. В дослідженні застосовані методи ціннісно-орієнтованого управління для побудови моделей цінностей, методи управління проєктами для дослідження проєкту діджиталізації, методи класифікації для розробки моделі класифікації цінностей проєкту діджиталізації девелоперських компаній, методи формалізації для отримання математичної моделі та методи SWOT-аналізу для відповідного дослідження розроблених моделей.

Результати. Ідентифіковано об'єкти діджиталізації девелоперської компанії, запропоновано модель класифі-

кації цінностей діджиталізації девелоперських компаній, в якій виокремлено чотири класи цінностей, в межах яких визначено типи цінностей. На основі проведених досліджень запропоновано концептуальну модель поставки цінностей діджиталізації для девелоперської компанії у вигляді методологічного базису та ланцюжка цінностей – цінностей першого, другого і третього роду. Формалізована модель цінності третього роду з урахуванням синергетизму від отримуваних цінностей.

Наукова новизна. Вперше, на основі поєднання проєктного управління та ціннісного підходу до проєктів діджиталізації, створена модель класифікації цінностей діджиталізації девелоперських компаній та концептуальна модель поставки цінностей діджиталізації для девелоперської компанії.

Практична значимість. Зазначені розробки спрямовані на забезпечення для девелоперських компаній наукового підґрунтя для відповідності сучасним викликам і досягнення конкурентоспроможності у складних сучасних умовах. Завдяки результатам дослідження, яке реалізує системний підхід до діджиталізації девелоперської компанії та дозволяє отримати оцінку сукупного ефекту від діджиталізації і впливу кожної її складової з урахуванням синергетизму впливів, може зменшуватися складність управління, вивільняється творчий ресурс фахівців девелоперської компанії для вирішення складних проєктних задач, збільшуватися ефективність проєктів компанії, формуватися гарна репутація компанії на ринку.

Ключові слова: управління проєктами; девелоперська компанія; діджиталізація; ціннісно-орієнтований підхід; синергетизм.

PROBLEM STATEMENT

Digitalization of created and existing systems, in particular management systems, has been formulated as a general development trend in recent years. This trend is also inherent in development companies in their desire to increase competitiveness, as well as in response to new challenges associated with work during the war, which was caused by the aggression of the Russian Federation against Ukraine. At the same time, models and methods of digitalization of management systems for such companies are insufficiently developed, digitalization itself often occurs chaotically, out of touch with the development strategy of the development company and with an uncertain connection with corporate culture.

Therefore, on the one hand, there is a gap between the need for harmonious digitalization of management systems of development companies, which would increase the efficiency of such systems, and the insufficiency of the developed models and methods of such digitalization. This determines the relevance of this study. A separate vector is proposed to connect models and methods of digitalization with value-oriented management, the value dimension of digitalization artifacts, which forms the scientific novelty of the study.

ANALYSIS OF LATEST RESEARCH

A review of scientific research shows that construction development absorbs all the latest achievements in the areas of management, construction production organization and project management, and urgently needs constant innovation to maintain and develop the competitiveness and attractiveness for the clients of the development company [1]. In this context, such companies should ensure a sustainable trend for the constant introduction of new models and management methods for confident growth [2].

Such innovations have recently been mostly concentrated in the field of process digitalization, on the digital transformation of management systems [3]. Moreover,

models and methods of such transformation include, in particular, the field of project management [4], which is extremely important for development companies (project-based by nature). Scientific research on the digitalization of processes and management systems includes: integrated models of digital transformation [5], building a sustainable society based on acquired digital competencies during a pandemic [6], conceptual models of changes due to digitalization and appropriate training for such changes [7], probabilistic models and networks in public sector digitalization projects, etc. Researchers also note the positive impact of digitalization of companies on the commitment (loyalty) of their customers, which allows us to argue that digitalization increases competitiveness, which is especially relevant for development companies during war.

A separate class of research is devoted to the digitalization of business processes of project-oriented companies. In this context, cognitive models [10], innovative technologies [11] are proposed, and models of necessary skills for specialists participating in the processes of digital transformation of enterprises are formulated [12], in particular, models of training young specialists of enterprises belonging to the new generation using appropriate information tools [13].

Classical project management standards, in particular PMBOK [14], can help formalize a project for digitizing a management system of a development company, but this standard can be used to select models and methods for all areas of such a project – regarding the management of the project content, its implementation time, cost, quality, etc. However, the value dimension should be identified as insufficiently researched in digitalization projects – in the context of management based on the values created. Such a dimension, which was first introduced by the Japanese P2M standard [14], is actively developing in the scientific literature on project management. Another methodological basis, in addition to digitalization and the

value dimension, for projects for digitizing management systems of development companies, can be identified as the flexible Agile project management methodology (originating from the IT sphere), the models and methods of which are also actively used for transformation projects in the construction industry [16].

Fragments of the combination of these approaches (digitalization, values, Agile) can be seen in the works of project management scholars, in particular in the work [17], which proposes a methodology for value-oriented management in the context of project interactions, in the work describing models of one of the classes of enterprise transformation projects based on a value approach [18], in the study on stakeholder management of a digitalization project based on a value approach [19], and in the work on models and methods for developing an organizational structure for value-oriented reengineering projects of construction enterprises [20].

SEPARATION OF PREVIOUSLY UNSOLVED PARTS OF THE PROBLEM

According to the results of the analysis, it can be concluded that the models and methods of digitalization of development companies based on values have generally not been sufficiently studied, which determines the relevance of scientific developments in this area. Despite the deep development of the value-oriented approach and sufficient research of digitalization models and methods, there are a number of unresolved issues that limit the effectiveness of project management systems of development companies, in particular, the combination of such models and methods to increase the effectiveness of project management systems of development companies has not been sufficiently studied and is not used enough. There is also no single approach to the application of value-oriented management in construction development. The work investigating this area [21] only lays the foundations for further research, which will be presented in this article.

PURPOSE OF THE RESEARCH

The purpose of this article is to study the developments of the value approach in project management and its application to digitalization projects of development companies, to build a model for classifying the values of digitalization projects of development companies, a conceptual model for delivering digitalization values in development companies, and to analyze such models based on this approach.

MAIN PART

The project management system of a development company is aimed at improving the manageability of projects, compliance with such projects with time, cost, quality of both management and project product constraints. Such a system should correspond to the corporate culture of the development company. An essential element of the corporate culture of modern development companies is the digitalization of customer communication services,

business processes of the company itself, its management systems for both operational and project activities.

Among the objects of digitalization of a development company, the following should be highlighted (subsystems and processes):

- communication system within the project team;
- communication system of the project team with the internal project environment (with representatives of the top management of the development company and its other divisions);
- communication system of the project team with external stakeholders;
- communication system of the project with the regulatory environment (license providers, tax authorities, state authorities, etc.);
- business processes of the development company (main, auxiliary, support processes, IT processes, etc.);
- interaction environment with the development company's clients (CRM);
- document management system;
- quality management system (ensuring compliance with current standards, for example ISO 9001);
- project and project portfolio management system of the development company, etc.

We propose a model for classifying the values of digitalization of development companies. We will distinguish four classes of values, within which we will define the types of values.

Class 1. Conservative values of digitalization.

1.1. Reducing the time of implementation of business processes.

1.2. Reducing the labor intensity of business processes.

1.3. Improving the quality of business process products.

1.4. Ensuring the measurability of business process indicators.

Class 2. Development values due to digitalization.

2.1. Compliance with the market and customer demands.

2.2. Strengthening the competitive position.

2.3. Capabilities for successful forecasting of the vectors of desired development.

Class 3. Values of using AI.

3.1. Simplifying the project management system.

3.2. Simplifying the process of creating a project product.

3.3. Increasing the role of creativity of project team members.

Class 4. Values of a digitalized team.

4.1. Values of emotional cohesion of the team in a digitalized environment.

4.2. Values of acquired skills by project management team members.

4.3. Values of the team's potential for development.

Based on the research conducted, we will propose a conceptual model of delivering digitalization values for a development company (Fig. 1). The methodological

basis of the model is four entities: the subject area of construction development, a methodological hybrid of heavy (PM Standards) and light (Agile) project management methodologies, models and methods of digitalization of management systems and business processes, and models, methods and artifacts of a value-oriented approach to management.

Based on the methodological basis, the digitalization project management team creates four first-order values (identified above as value classes). These values are then clustered into two second-order values – the foundation value (created from the synergy of conservative digitalization values and the values of the digitalized team) and the institutional capacity value (created from the development values resulting from digitalization and the values of using AI). These values are clustered and form a third-order value – the resulting synergistic value from the digitalization project of the development company. The project stakeholders, who are the recipients of the product value, are provided with second- and third-order values.

We propose a model for describing the value of the third kind in the following form:

$$\begin{aligned}
 V^3 &= E \cdot (\sigma_1 \cdot V_1^2 + \sigma_2 \cdot V_2^2) \\
 &= E \cdot (\sigma_1 \cdot (\sigma_3 \cdot V_1^1 + \sigma_4 \cdot V_2^1) + \sigma_2 \cdot ((\sigma_5 \cdot V_3^1 + \sigma_6 \cdot V_4^1))) \\
 &= E \cdot (\sigma_1 \cdot (\sigma_3 \cdot (\sum_i w_i \cdot V_{1,i}^1) + \sigma_4 \cdot (\sum_j w_j \cdot V_{2,j}^1) + \sigma_2 \cdot \\
 &\quad (\sigma_5 \cdot (\sum_m w_m \cdot V_{3,m}^1) + \sigma_6 \cdot (\sum_n w_n \cdot V_{4,n}^1)))) \quad (1)
 \end{aligned}$$

where V_1, V_2, V_3 – values of the first, second and third kind, respectively;

σ – multipliers of synergism (indicators of how much the value of the corresponding kind increases from the total value of the previous kind relative to the values obtained separately; for example, how much the value of the third kind increases from the synergism of two values of the second kind relative to what if the values of the second kind were obtained separately and did not affect the strengthening of the general effect of their combination), are estimated by experts;

i, j, m, n – indices;

w – weight of components in the value of the first kind (components of the values of the first kind are defined above in the classification), $\sum w = 1$ for each index; are estimated by experts;

$V_{1,i}^1$ – components of values of the first kind (first class) according to the above classification.

It is proposed to conduct the assessment of values by experts, using the expert group method. The expert group should include specialists from both the development company itself and independent specialists. Each specialist should be assigned a rank, the sum of such ranks should be equal to one.

Let's conduct a study of the obtained results in the form of a SWOT analysis.

Strengths.

– implementation of a systematic approach to the digitalization of the development company;

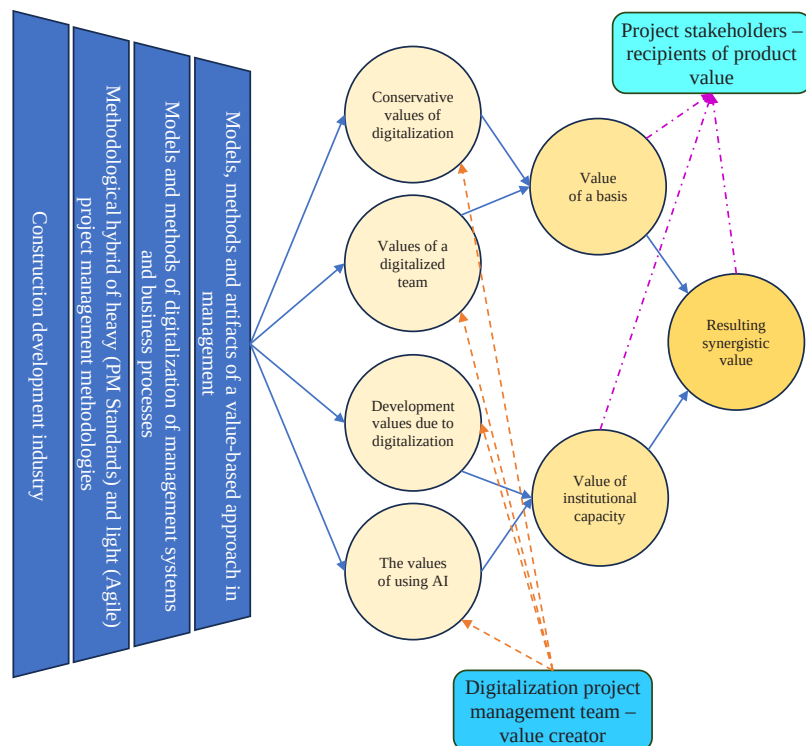


Fig. 1. Conceptual model of digitalization value delivery in a development company

- obtaining an assessment of the cumulative effect of digitalization, the ability to assess each of its components and its impact;

- taking into account the synergy of impacts.

Weaknesses.

- the presence of subjectivity of assessment, which may remain even when processing expert information;

- complexity of the assessment model;

- sensitivity of the overall assessment to even a slight change in the assessments of its components.

Opportunities.

- strengthening the competitive positions of developers in the market;

- obtaining greater loyalty from customers of the younger age group;

- obtaining additional orders (projects) by the development company as a result of digitalization.

Threats.

- war and military risks can shift the emphasis from digitalization to ensuring survival and the use of simpler and less expensive models and management methods, including anti-crisis;

- slow implementation of the digitalization project can move the development company from market leadership and reveal the opposite effect relative to what is expected from the project;

- errors in using models can negatively affect the effectiveness of the digitalization project.

Visualization of the results of the SWOT analysis is given in Table. 1.

Table 1. SWOT analysis results of the proposed approach

Strengths	Weaknesses
– implementation of a systemic approach; – evaluation of each component of the overall assessment; – consideration of synergy of impacts.	– the presence of subjectivity in the assessment; – the complexity of the assessment model; – the sensitivity of the overall assessment.
Opportunities	Threats
– strengthening competitive positions; – greater customer loyalty; – obtaining additional projects.	– war and war risks; – slow implementation of the digitalization project; – errors in the use of models.

Based on the results of the SWOT analysis, it can be concluded that the proposed models have high potential in the context of increasing the efficiency of management systems of development companies. The weaknesses of the models and the threats that may potentially accompany their implementation can be minimized by

leveraging their strengths and using the opportunities they provide.

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

1. Development of a model of a value map of development companies.

2. Research on the value-risk model regarding the ratio of benefits received by stakeholders of the digitalization project of development companies and probable losses due to unforeseen circumstances during its implementation.

3. Development of models of competencies of participants in the digitalization project of development companies.

4. Research on the application of individual models and artificial intelligence tools in digitalization projects of development companies.

5. Practical testing of value models and value-oriented management in general in the practice of development companies, adjustment of models based on the results of such testing.

CONCLUSIONS

Digitalization of projects and management systems is a leading trend of our time. As a result of digitalization, the complexity of management is reduced, the creative resource of the development company's specialists is released to solve complex project tasks, the efficiency of projects increases, and a good reputation of the company is formed in the market. However, the application of a value-oriented approach in digitalization projects of development companies has not been studied enough, which determines the practical value of the research and the scientific novelty of its results.

This article identifies the objects of digitalization of a development company, proposes a model for classifying the values of digitalization of development companies, which distinguishes four classes of values (conservative values of digitalization, values of development due to digitalization, values of AI use, values of a digitalized team), within which the types of values are defined. Based on the research conducted, a conceptual model of delivering digitalization values for a development company is proposed in the form of a methodological basis and a chain of values – values of the first, second and third kind. A model of value of the third kind is formalized taking into account the synergy of the values obtained, a study of the results obtained in the form of a SWOT analysis is conducted, which confirmed the high potential of the proposed models, and the prospects for further research in the chosen direction are formulated.

These research results are aimed at providing construction development companies with a scientific basis to meet modern challenges and achieve competitiveness in difficult modern conditions.

REFERENCES

- [1] Orhanizatsiyno-tehnolohichnyy development ta intehrovana realizatsiya proyektiv u budivnytstvi: kolektyvna monohrafiya [Organizational and technological development and integrated implementation of projects in construction: collective monograph] (2025). Kyiv, *KNUBA – KNUCA*, 201 p. [in Ukrainian]
- [2] Bushuyev S.D., Bushueva N.S., Bushuyev D.A., Bushueva V.B. (2022) Stratehiya staloho rozvytku shvydkozrostayuchykh orhanizatsiy [Strategy of sustainable development of fast-growing organizations]. *Visnyk Natsional'noho tekhnichnoho universytetu «KhPI»*. Ser.: *Stratehichne upravlinnya, upravlinnya portfelyamy, prohramamy ta proektamy* : zb. nauk. pr. – *Bulletin of the National Technical University “KhPI”*. Ser.: *Strategic management, portfolio management, programs and projects: scientific collection*. Kharkiv: NTU “KhPI”, No. 1(5), pp. 23-28. [in Ukrainian] <https://doi.org/10.20998/2413-3000.2022.5.2>
- [3] Wolff C., Verenych O., Kevorkova S. (2020) Digital Transformation Time: Research Results for Ukrainian Community. *Proceedings of the 1st International Workshop IT Project Management (ITPM 2020)*, Vol. 2565, pp. 46-57. <https://ceur-ws.org/Vol-2565/>
- [4] Zasukha I.P. (2021) Tsyfrovizatsiya yak transformatsiyna evolyutsiya v upravlinni proyektamy [Digitalization as a transformational evolution in project management]. *Tezy dopovidey XVII Mizhnarodnoyi naukovo-praktychnoyi konferentsiyi: «Upravlinnya proyektamy: stan ta perspektyvy» – Abstracts of the XVII International Scientific and Practical Conference: “Project Management: State and Prospects”*. Responsible for the issue Chernov S.K., September 7-10, 2021, Mykolaiv. Admiral Makarov National University of Shipbuilding, pp. 29-31. [in Ukrainian]
- [5] Bushuyev S., Bushueva N., Bushuyev D., Bushueva V. (2023) Integrated Intelligence Model for Assessment Digital Transformation Project. *Proceedings of the 2023 IEEE International Conference on Smart Information Systems and Technologies (SIST)*, pp. 42-46. <https://doi.org/10.1109/SIST58284.2023.10223578>
- [6] Sá M.J., Santos A.I., Serpa S. & Miguel Ferreira C. (2021). Digitainability – Digital competences post-COVID-19 for a sustainable society. *Sustainability*, 13(17), 9564. <https://doi.org/10.3390/su13179564>
- [7] Harteis C., Goller M. & Caruso C. (2020). Conceptual change in the face of digitalization: Challenges for workplaces and workplace learning. *Frontiers in Education*, 5, 1. <https://doi.org/10.3389/educ.2020.00001>
- [8] Bushuyev S.D., Bushueva V.B., Zasukha I.P. (2021) Zastosuvannya stokhastychnykh merezh u proyektakh tsyfrovizatsiyi derzhavnoho sektoru [Application of stochastic networks in public sector digitalization projects]. *Visnyk Odes'koho natsional'noho morskoho universytetu – Bulletin of the Odessa National Maritime University*, No. 65, pp. 159-172. [in Ukrainian] <https://doi.org/10.47049/2226-1893-2021-2-159-172>
- [9] Shabani L., Behluli A., Qerimi F., Pula F. & Dallosi P. (2022). The effect of digitalization on the quality of service and customer loyalty. *Emerging Science Journal*, 6(6), pp. 1274–1289. <https://doi.org/10.28991/ESJ-2022-06-06-04>
- [10] Raichuk I., Khlevna Iu., Timinskiy O., Voitenko O. (2022) Cognitive model of digitalization of business processes of a project-oriented it company. *CEUR 7th International Conference “Digital Technologies in Education, Science and Industry” (DTES-2022)*, 20-21 October, Almaty, Kazakhstan, 10 p. <https://ceur-ws.org/Vol-3382/Paper12.pdf>
- [11] Berawi M. A. (2021). Innovative technology for post-pandemic economic recovery. *International Journal of Technology*, 12(1), pp. 1–4. <https://doi.org/10.14716/ijtech.v12i1.4691>
- [12] Florea A. (2019). Digital design skills for factories of the future. *Proceedings of the 9th International Conference on Manufacturing Science and Education – MSE 2019 “Trends in New Industrial Revolution”*. Sibiu, Romania, 5–7 June 2019; Volume 290, 14 p. <https://doi.org/10.1051/mateconf/201929014002>
- [13] Lesinsks K., Mavlutova I., Spilbergs A. & Hermanis J. (2023). Digital transformation in entrepreneurship education: The use of a digital tool KABADA and entrepreneurial intention of Generation Z. *Sustainability*, 15(13), 10135. <https://doi.org/10.3390/su151310135>
- [14] 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.
- [15] A Guidebook of Program & Project Management for Enterprise Innovation (Third Edition P2M) (2016). *PMIJ*. Access mode: [https://www.pmaj.or.jp/ENG/p2m/p2m_guide/P2M_Biblot\(All\)_R3.pdf](https://www.pmaj.or.jp/ENG/p2m/p2m_guide/P2M_Biblot(All)_R3.pdf).
- [16] Bushuyev S.D., Bushuyev D.A., Bushueva V.B., Boyko O.O. (2020) Agile transformatsiya pidkhodiv v upravlinni budivel'nykh proyektamy fazakh initsiatsiyi ta proyektuvannya [Agile transformation of approaches in construction project management in the initiation and design phases]. *Upravlinnya rozvytkom skladnykh system – Management of development of complex systems*, No. 41, pp. 14-20. [in Ukrainian] <https://doi.org/10.32347/2412-9933.2020.41.15-20>
- [17] Medvedieva O.M. (2013) Tsinnisno-oriyentovane upravlinnya vzayemodiyeyu v proyektakh: metodolohichni osnovy: avtoref. dys ... d-ra tekhn. nauk [Value-oriented management of interaction in projects: methodological substances: author's abstract dissertation of Doctor tech. sciences]: 05.13.22, *Kyyivs'kyy natsional'nyy universytet budivnytstva i arkhitektury – Kyiv national university construction and architecture*, Kyiv, 44 p. [in Ukrainian]
- [18] Marushchak, I.A. (2018). Modeli proektu terytorial'noho rozvytku proektno-oriyentovanykh orhanizatsiy z urakhuvannyam tsinnisnoho pidkhodu [Models of the project of territorial development of project-oriented organizations with principle of valuable approach]. *Upravlinnya rozvytkom skladnykh system – Management of development of complex systems*, 34, pp. 51-57. [in Ukrainian] ISSN 2219-5300.
- [19] Timinskiy O.G., Raychuk I.V. (2019). Metod tsinnisno-oriyentovanoho upravlinnya zatsikavlenymy storonamy proektu didzhyalizatsiyi [Method of value-oriented management of stakeholders of a digitalization project]. *Upravlinnya proyektamy ta rozvytok vyrobnytstva – Project Management and Production Development*, 3(71), pp. 114–120. [in Ukrainian] ISSN 2222-8810.
- [20] Bushuyev S., Puzyichuk A. (2021) Development organizational structure for value-oriented reengineering project of construction enterprises. *2021 IEEE 16th International Conference on Computer Sciences and Information Technologies (CSIT)*, 22-25 September, Lviv, Ukraine, Vol.2, pp. 367-370. Access mode: <https://doi.org/10.1109/CSIT52700.2021.9648758>
- [21] Kochuma V. (2025) IT ensuring models for innovative development of construction (development) companies. *Information Technology and Implementation (Satellite): Conference Proceedings*, November 21, Kyiv, Publishing House «Caravela», pp. 78–81. <https://fit.knu.ua/wp-content/uploads/2025/12/ITIIS-2025-36ipka.pdf>

СПИСОК ВИКОРИСТАНОЇ ЛІТЕРАТУРИ

- [1] Організаційно-технологічний девелопмент та інтегрована реалізація проєктів у будівництві: колективна монографія (2025). Київ: КНУБА, 201 с.
- [2] Бушуєв С.Д., Бушуєва Н.С., Бушуєв Д.А., Бушуєва В.Б. (2022) Стратегія сталого розвитку швидкозростаючих організацій. *Вісник Національного технічного університету «ХПІ»*. Сер. : Стратегічне управління, управління портфелями, програмами та проєктами : зб. наук. пр. Харків : НТУ «ХПІ», №1(5), С. 23-28. <https://doi.org/10.20998/2413-3000.2022.5.2>
- [3] Wolff C., Verenych O., Kevorkova S. (2020) Digital Transformation Time: Research Results for Ukrainian Community. *Proceedings of the 1st International Workshop IT Project Management (ITPM 2020)*, Vol. 2565, pp. 46-57. <https://ceur-ws.org/Vol-2565/>
- [4] Засуха І.П. (2021) Цифровізація як трансформаційна еволюція в управлінні проєктами. Тези доповідей XVII Міжнародної науково-практичної конференції: «Управління проєктами: стан та перспективи». Відповідальний за випуск Чернов С.К., 7-10 вересня 2021 р., м. Миколаїв. Національний університет кораблебудування імені адмірала Макарова, С. 29-31.
- [5] Bushuyev S., Bushueva N., Bushuyev D., Bushueva V. (2023) Integrated Intelligence Model for Assessment Digital Transformation Project. *Proceedings of the 2023 IEEE International Conference on Smart Information Systems and Technologies (SIST)*, pp. 42-46. <https://doi.org/10.1109/SIST58284.2023.10223578>
- [6] Sá M. J., Santos A. I., Serpa S. & Miguel Ferreira C. (2021) Digitainability – Digital competences post-COVID-19 for a sustainable society. *Sustainability*, 13(17), 9564. <https://doi.org/10.3390/su13179564>
- [7] Harteis C., Goller M., Caruso C. (2020) Conceptual change in the face of digitalization: Challenges for workplaces and workplace learning. *Frontiers in Education*, 5, 1. <https://doi.org/10.3389/educ.2020.00001>
- [8] Бушуєв С.Д., Бушуєва В.Б., Засуха І.П. (2021) Застосування стохастичних мереж у проєктах цифровізації державного сектору. *Вісник Одеського національного морського університету*, № 65, С. 159-172. <https://doi.org/10.47049/2226-1893-2021-2-159-172>
- [9] Shabani L., Behluli A., Qerimi F., Pula F. & Dalloshi P. (2022) The effect of digitalization on the quality of service and customer loyalty. *Emerging Science Journal*, 6(6), pp. 1274–1289. <https://doi.org/10.28991/ESJ-2022-06-06-04>
- [10] Raichuk I., Khlevna Iu., Timinskyi O., Voitenko O. (2022) Cognitive model of digitalization of business processes of a project-oriented it company. *CEUR 7th International Conference “Digital Technologies in Education, Science and Industry” (DTESI-2022)*, 20-21 October 2022, Almaty, Kazakhstan, 10 p. <https://ceur-ws.org/Vol-3382/Paper12.pdf>
- [11] Berawi M. A. (2021) Innovative technology for post-pandemic economic recovery. *International Journal of Technology*, 12(1), pp. 1–4. <https://doi.org/10.14716/ijtech.v12i1.4691>
- [12] Florea A. (2019) Digital design skills for factories of the future. *Proceedings of the 9th International Conference on Manufacturing Science and Education—MSE 2019 “Trends in New Industrial Revolution”*. Sibiu, Romania, 5–7 June 2019; Volume 290, 14 p. <https://doi.org/10.1051/mateconf/201929014002>
- [13] Lesinskis K., Mavlutova I., Spilbergs A. & Hermanis J. (2023) Digital transformation in entrepreneurship education: The use of a digital tool KABADA and entrepreneurial intention of Generation Z. *Sustainability*, 15(13), 10135. <https://doi.org/10.3390/su151310135>
- [14] 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.
- [15] A Guidebook of Program & Project Management for Enterprise Innovation (Third Edition P2M). (2016). *PMAJ*. 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)
- [16] Бушуєв С.Д., Бушуєв Д.А., Бушуєва В.Б., Бойко О.О. (2020) Agile трансформація підходів в управлінні будівельними проєктами фазах ініціації та проєктування. *Управління розвитком складних систем*, №41, С. 14-20. <https://doi.org/10.32347/2412-9933.2020.41.15-20>
- [17] Медведєва О.М. (2013) Ціннісно-орієнтоване управління взаємодією в проєктах: методологічні основи: автореф. дис ... д-ра техн. наук: 05.13.22. Київський національний університет будівництва і архітектури, Київ, 44 с.
- [18] Марущак І.А. (2018) Моделі проєкту територіального розвитку проєктно-орієнтованих організацій з урахуванням ціннісного підходу. *Управління розвитком складних систем*, 34, С. 51-57. ISSN 2219-5300.
- [19] Тімінський О.Г., Райчук І.В. (2019) Метод ціннісно-орієнтованого управління зацікавленими сторонами проєкту діджиталізації. *Управління проєктами та розвиток виробництва*, 3(71), С. 114–120. ISSN 2222-8810.
- [20] Bushuyev S., Puzichuk A. (2021) Development organizational structure for value-oriented reengineering project of construction enterprises. *2021 IEEE 16th International Conference on Computer Sciences and Information Technologies (CSIT)*, 22-25 September 2021, Lviv, Ukraine, Vol.2, pp. 367-370. Access mode: <https://doi.org/10.1109/CSIT52700.2021.9648758>
- [21] Kochuma V. (2025) IT ensuring models for innovative development of construction (development) companies. *Information Technology and Implementation (Satellite): Conference Proceedings*, November 21, Kyiv, Publishing House «Caravela», pp. 78–81. <https://fit.knu.ua/wp-content/uploads/2025/12/ITIIS-2025-збірка.pdf>

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