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DETERMINING THE IMPACT OF THE SYNERGIC-EMERGENT APPROACH TO IDENTIFICATION OF THE MATRIX-VECTOR LEVEL ON THE DEVELOPMENT OF THE COMPETITIVENESS POTENTIAL OF INDUSTRIAL ENTERPRISES

pages 6–13

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The object of the study is the synergistic-emergent approach to identifying the matrix-vector level of development of the competitiveness potential of industrial enterprises. The problem of the study, which is solved in the course of the work, is the lack of a clear algorithm for identifying the matrix-vector level of development of the competitiveness potential of industrial enterprises.

The work develops a synergistic-emergent approach to identifying the matrix-vector level of development of the competitiveness potential of industrial enterprises. The state and current problems of forming the competitiveness potential of industrial enterprises are studied. The importance of making effective management decisions to respond to market needs and changes in the external environment is substantiated, since their solution is a necessary condition for restoring the ability of enterprises to generate profit. Internal and external factors related to the nature and efficiency of operational, investment and financial activities, as well as influencing the level of development of the competitiveness potential of industrial enterprises, are identified. According to the calculations, it was found that the management function in most cases is implemented through the mobilization of opportunities and can contribute to increasing the competitiveness of industrial enterprises in the context of using available financial and potential resources.

The practical significance of the research results is that by applying the developed synergistic-emergent approach to identifying the matrix-vector level of development of competitiveness potential, industrial enterprises will be able to improve their activities in competitive segments and maintain their competitive advantages, developing their potential taking into account the economic interests of all market participants.

Keywords: vector development, strategic directions, management resources, renovation factors, restructuring transformations, synergistic system.

References

1. Halchynskoho, A. P., Lovochkina, S. V., Semynozhenka, S. P. (Eds.) (2004). *Ekonomika znan: vyklyky hlobalizatsii ta Ukraina.* Kyiv: Natsionalnyi instytut stratehichnykh doslidzhen, 268.
2. Agrawal, R., Wankhede, V. A., Kumar, A., Upadhyay, A., Garza-Reyes, J. A. (2021). Nexus of circular economy and sustainable business performance in the era of digitalization. *International Journal of Productivity and Performance Management, 71 (3),* 748–774. https://doi.org/10.1108/ijppm-12-2020-0676
3. Babenko, V., Baksalova, O., Prokhorova, V., Dykan, V., Ovchynnikova, V., Chobitok, V. (2021). Information and Consulting Service Using in the Organization of Personnel Management. *Studies of Applied Economics, 38 (4).* https://doi.org/10.25115/eea.v38i4.3999
4. Bezuhla, J., Kononenko, Ya., Bytiak, O., Zaitseva, A., Zacharchyn, H., Korin, M. (2021). Renovation and sustainable development of the industrial energy enterprise: economic and legal management mechanism. *IOP Conference Series: Earth and Environmental Science, 628 (1),* 012009. https://doi.org/10.1088/1755-1315/628/1/012009
5. Bhattacharya, A. (2021). Achieving sustainability in supply chain operations in the interplay between circular economy and Industry 4.0. *Production Planning & Control, 34 (10),* 867–869. https://doi.org/10.1080/09537287.2021.1981032
6. Charan, R., Carey, D., Barton, D. (2019). *Talent wins: on a new approach to realizing HR potential.* Olymp-business, 224.
7. Daisley, B. (2020). *New rules of work. Generator of productive peace.* Bombora, 368.
8. Desruelle, P., Nepelski, D. (2017). The "Innovation Radar": A New Policy Tool to Support Innovation Management. *45th Research Conference on Communication, Infor mation and Internet Policy (TPRC 45).* Arlington. https://doi.org/10.2139/ssrn.2944104
9. Forsman, H. (2011). Innovation capacity and innovation development in small enterprises. A comparison between the manufacturing and service sectors. *Research Policy, 40 (5),* 739–750. https://doi.org/10.1016/j.respol.2011.02.003
10. Horng, J.-S., Chou, S.-F., Liu, C.-H., Tsai, C.-Y. (2013). Creativity, aesthetics and eco-friendliness: A physical dining environment design synthetic assessment model of innovative restaurants. *Tourism Management, 36,* 15–25. https://doi.org/10.1016/j.tourman.2012.11.002
11. Leyden, D. P. (2016). Public-sector entrepreneurship and the creation of a sustainable innovative economy. *Small Business Economics, 46 (4),* 553–564. https://doi.org/10.1007/s11187-016-9706-0
12. Mazzucato, M. (2016). From market fixing to market-creating: a new framework for innovation policy. *Industry and Innovation, 23 (2),* 140–156. https://doi.org/10.1080/13662716.2016.1146124
13. Mukhametlatypov, R. F., Gafarova, A. I. (2013). Plans of the joint-stock ownership of employees. ESOP, 6, 389–390.
14. Prokhorova, V., Protsenko, V., Abuselidze, G., Mushnykova, S., Us, Yu. (2019). Safety of industrial enterprises development: evaluation of innovative and investment component. *Naukovyi Visnyk Natsionalnoho Hirnychoho Universytetu, 5.* https://doi.org/10.29202/nvngu/2019-5/24
15. Prokhorova, V., Protsenko, V., Bezuglaya, Y., Us, J. (2018). The optimization algorithm for the directions of influence of risk factors on the system that manages the potential of machine-building enterprises. *Eastern-European Journal of Enterprise Technologies, 4 (1 (94)),* 6–13. https://doi.org/10.15587/1729-4061.2018.139513
16. Pylypenko, H., Fedorova, N., Huzenko, I., Naumenko, N. (2020). Paradoxes of economic development: science and innovation in the modern world. *Naukovyi Visnyk Natsionalnoho Hirnychoho Universytetu, 2,* 153–159. https://doi.org/10.33271/nvngu/2020-2/153
17. Pylypenko, H. M., Prokhorova, V. V., Mrykhina, O. B., Koleshchuk, O. Y., Mushnykova, S. A. (2020). Cost evaluation models of R&D products of industrial enterprises. *Naukovyi Visnyk Natsionalnoho Hirnychoho Universytetu, 5,* 163–170. https://doi.org/10.33271/nvngu/2020-5/163
18. Pylypenko, H. M. (2013). Cultural impact on the ratio of public and market coordination in Ukraine. *Naukovyi Visnyk Natsionalnoho Hirnychoho Universytetu, 3,* 118.
19. Sirko, A. V. (2004). *Corporate news in transition economies: problems of theory and practice.* Kyiv: Imeks, 414.
20. Zawislak, P. A., Alves, A. C., Gamarra, J. E. T., Barbieux, D., Reichert, F. M. (2011). Innovation Capabilities of the Firm: The Brazilian Experience. *9th Globelics International Conference.* Buenos Aires.
21. Pylypenko, Y., Pylypenko, H., Prokhorova, V. V., Mnykh, O. B., Dubiei, Yu. V. (2021). Transition to a new paradigm of human capital development in the dynamic environment of the knowledge economy. *Naukovyi Visnyk Natsionalnoho Hirnychoho Universytetu, 6,* 170–176. https://doi.org/10.33271/nvngu/2021-6/170

ISSN-L 2664-9969; E-ISSN 2706-5448

22. Pylypenko, Y., Prokhorova, V., Halkiv, L., Koleshchuk, O., Dubiei, Y. (2022). Innovative intellectual capital in the system of factors of technical and technological development. *Naukovyi Visnyk Natsionalnoho Hirnychoho Universytetu, 6,* 181–186. https://doi.org/10.33271/nvngu/2022-6/181

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ENSURING THE OBJECTIVITY OF THE TECHNOLOGY FOR FORECASTING BUSINESS PROCESS INDICATORS IN THE FIELD OF E-COMMERCE

pages 14–23

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The object of research is the technology of forecasting business process indicators in the field of e-commerce. These technologies were investigated to identify ways to increase their objectivity.

In the process of research, an analysis of input data was performed, time horizons were determined and expected results were formulated. Data normalization was carried out using the minmax method, anomaly detection was based on the standard deviation criterion. The choice of the forecasting method included the use of factual, expert and combined methods. Data processing was performed using the K-means and DBSCAN algorithms. Forecast formation was carried out using retrospective methods with the adjustment of indicators and activation functions. Monitoring and adjustment of forecasts was implemented through the MAPE, RMSE, MAE metrics and error analysis. The accuracy of forecasts was assessed by comparing methods by metrics in different scenarios, which ensured the adaptability of the model to a changing business environment. The proposed approaches integrate modern digital tools: big data analysis, automation of forecasting methods, anomaly processing, scenario approach and neural networks.

The objectivity of the technology for forecasting business process indicators in the field of e-commerce ensures increased forecast accuracy, adaptability to a changing market environment, and expands the possibilities for making strategic management decisions. This contributes to increasing the competitiveness of enterprises, their ability to quickly respond to changes in the market situation and improve management processes.

Due to increased objectivity of forecasting, enterprises can quickly respond to market changes and optimize resource use. The integration of modern data processing tools and multifactor metrics guarantees the accuracy of forecasts and takes into account complex relationships.

This creates a basis for strategic planning, ensures sustainable development of enterprises in the digital economy and allows for increased management efficiency in a dynamic market. The results of the study demonstrate that the adjusted technology for forecasting business process indicators in the field of e-commerce contributes to making informed management decisions focused on long-term effectiveness.

Keywords: forecasting, e-commerce, integration of results, business management, anomaly detection, neural networks, decision optimization.

References

1. *Kliuchovi tsyfry ta trendy e-commerce 2024* (2024). UA-Retail. Available at: https://ua-retail.com/2024/10/kliuchovi-tsyfry-ta-trendy-e-commerce-2024/?utm_source=chatgpt.com
2. Zakhozhyi, M. (2024). *Trendy ta vyklyky ukrainskoho rynku eCommerce u 2024 rotsi.* UAATEAM. Available at: https://uaateam.agency/blog/trendy-ta-vyklyky-ukrainskogo-rynku-ecommerce/?utm_source=chatgpt.com
3. Harrison, H. C., Qizhong, G. (1993). An intelligent business forecasting system. *Proceedings of the 1993 ACM Conference on Computer Science,* 229–236. https://doi.org/10.1145/170791.170834
4. Safavi, A. (2000). Choosing the right forecasting software and system. *The Journal of Business Forecasting Methods & Systems, 19 (3),* 6–10. Available at: https://typeset.io/papers/choosing-the-right-forecasting-software-and-system-5a5zfd2b5k
5. Fei-Fei, W. (2009). E-commerce market forecast system R&D based on time-series. *Information Sciences.* Available at: https://www.semanticscholar.org/paper/E-commerce-Market-Forecast-System-R%26D-Based-on-Fei-fei/db40ce09339277d57cf0052eacf37de1175fecc0?utm_source=consensus
6. Gordini, N., Veglio, V. (2017). Customers churn prediction and marketing retention strategies: An application of support vector machines based on the AUC parameter-selection technique in B2B e-commerce industry. *Industrial Marketing Management, 62,* 100–107. https://doi.org/10.1016/j.indmarman.2016.08.003
7. Carta, S., Medda, A., Pili, A., Recupero, D., Saia, R. (2018). Forecasting e-commerce products prices by combining an autoregressive integrated moving average (ARIMA) model and Google Trends data. *Future Internet, 11 (1),* 5. https://doi.org/10.3390/FI11010005
8. Bandara, K., Shi, P., Bergmeir, C., Hewamalage, H., Tran, Q., Seaman, B. (2019). Sales demand forecast in e-commerce using a long short-term memory neural network methodology. *Proceedings of the 26th International Conference on Neural Information Processing (ICONIP 2019), 11955,* 462–474. https://doi.org/10.1007/978-3-030-36718-3_39
9. Qi, Y., Li, C., Deng, H., Cai, M., Qi, Y., Deng, Y. (2019). A deep neural framework for sales forecasting in e-commerce. *Proceedings of the 28th ACM International Conference on Information and Knowledge Management,* 299–308. https://doi.org/10.1145/3357384.3357883
10. Ji, S., Wang, X., Zhao, W., Guo, D. (2019). An application of a three-stage XGBoost-based model to sales forecasting of a cross-border e-commerce enterprise. *Mathematical Problems in Engineering.* https://doi.org/10.1155/2019/8503252
11. Aal, S. (2020). An intelligent approach for demand forecasting in e-commerce. *American Journal of Business and Operations Research, 1 (2),* 77–83. https://doi.org/10.54216/ajbor.010203
12. Mia, M., Yousuf, M., Ghosh, R. (2021). Business forecasting system using machine learning approach. *2021 2nd International Conference on Robotics, Electrical and Signal Processing Techniques (ICREST),* 314–318. https://doi.org/10.1109/ICREST51555.2021.9331114
13. Yaremko, S., Kuzmina, E., Savina, N., Yepifanova, I., Gordiichuk, H., Mussayeva, D. (2022). Forecasting business processes in the management system of the corporation. *Informatyka, Automatyka, Pomiary w Gospodarce i Ochronie Środowiska, 12 (4),* 51–55. https://doi.org/10.35784/iapgos.3249
14. Kalifa, D., Singer, U., Guy, I., Rosin, G. D., Radinsky, K. (2022). Leveraging world events to predict e-commerce consumer demand under anomaly. *Proceedings of the Fifteenth ACM International Conference on Web Search and Data Mining (WSDM '22),* 430–438. https://doi.org/10.1145/3488560.3498452
15. Bajoudah, A., Alsaidi, M., Alhindi, A. (2023). Time series forecasting model for e-commerce store sales using FB-Prophet. *14th International Conference on Information and Communication Systems (ICICS),* 1–6. https://doi.org/10.1109/ICICS60529.2023.10330530
16. Tang, T. (2023). Analysis and demand forecasting based on e-commerce data. *6th International Conference on Artificial Intelligence and Big Data (ICAIBD), 64–68.* https://doi.org/10.1109/ICAIBD57115.2023.10206072
17. Kucher, L., Kniaz, S., Heorhiadi, N., Tyrkalo, Y., Bovsunivska, A. (2023). Development of a customer service system in electronic commerce. *Business Management, 2 (20),* 64–82. https://doi.org/10.58861/tae.bm.2023.2.04

18. Kniaz, S., Brych, V., Heorhiadi, N., Shevchenko, S., Dzvonyk, R., Skrynkovskyy, R. (2024). Enhancing the informativeness of managing mentoring activities based on simulation modeling. *Proceedings of the 2024 14th International Conference on Advanced Computer Information Technologies (ACIT),* 384–388. https://doi.org/10.1109/ACIT62333.2024.10712547

19. Kniaz, S., Brych, V., Heorhiadi, N., Shevchenko, S., Dzvonyk, R., Skrynkovskyy, R. (2024). Informational-reflective management of mentoring activities development in the enterprise. *Proceedings of the 2024 14th International Conference on Advanced Computer Information Technologies (ACIT),* 389–392. https://doi.org/10.1109/ACIT62333.2024.10712601

20. Shpak, N., Seliuchenko, N., Dvulit, Z., Kniaz, S., Kucher, L. (2023). Assessment of the impact of macroeconomic crises and war on the activities of JSC "Ukrzaliznytsia". *Financial and Credit Activity Problems of Theory and Practice, 6 (53),* 260–272. https://doi.org/10.55643/fcaptp.6.53.2023.4177

21. Wiljohn, F., Prince, L., Marvile, S., John, E., Centeno, C. (2024). Web-based ordering system for start-up business with forecasting. *World Journal of Advanced Research and Reviews, 22 (3),* 357–368. https://doi.org/10.30574/wjarr.2024.22.3.1721

22. Nan, X., Wanting, S., Shaowen, Z., Daoyan, J., Yutong, W., Xiang, J. (2024). Intelligent prediction system of e-commerce commodity demand based on big data technology. *IEEE 4th International Conference on Electronic Communications, Internet of Things and Big Data (ICEIB),* 483–488. https://doi.org/10.1109/ICEIB61477.2024.10602621

23. Madanchian, M. (2024). The role of complex systems in predictive analytics for e-commerce innovations in business management. *Systems, 12 (10),* 415. https://doi.org/10.3390/systems12100415

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INTEGRATION OF ENERGY INDEPENDENCE INTO MARKETING STRATEGIES OF SMALL AND MEDIUM-SIZED ENTERPRISES: STATE SUPPORT AND PROFITABILITY ANALYSIS

pages 24–32

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The object of research is the marketing strategy of energy independence of enterprises. One of the most problematic areas is determining the effectiveness of energy independence marketing strategies and their profitability due to limited access to official data, investment statistics, and reports on state programs for calculations.

The research used various methods. The logical method was used to justify the feasibility of energy independence, system analysis helped to assess its benefits and risks. Systematization and generalization methods were used to identify the main components of the concept, expert assessments were used to collect information, and statistical methods were used to assess the profitability of the activity.

The research results confirm that the implementation of a marketing strategy for energy independence of small and medium-sized enterprises, taking into account state support, can reduce electricity costs. Savings can range from 20 to 40 % over 5–7 years. The implementation of energy-efficient solutions contributes to an increase in the profitability of the activity by 3–5 %, which in the long term will lead to an increase in profit by up to 50 %. This is due to the fact that the proposed model of the marketing strategy for energy independence is to attract investment and state aid.

This provides the opportunity to reduce costs for alternative energy, increase profits due to business sustainability and increase the attractiveness of enterprises for environmentally conscious consumers and investors.

Compared to similar well-known traditional approaches to the so-called "green marketing", the implementation of the concept of energy independence provides significant advantages. The application of this concept in the marketing communications system of small and medium-sized businesses contributes to an increase in the level of trust from stakeholders. In particular, it ensures an increase in profitability due to state support and attraction of investments in energy-efficient technologies and alternative energy sources.

Keywords: energy sustainability, business, green marketing, marketing strategies, government assistance, cost reduction, profitability.

References

1. Pimonenko, T., Liulov, O., Us, Ya. (2019). Stratehii marketynhu "zelenykh" investytsii: osnovni polozhennia ta osoblyvosti. *Visnyk Ternopilskoho natsionalnoho ekonomichnoho universytetu, 1,* 177–185.

2. Kambur, O. L., Petryschenko, N. A. (2018). Marketing of energy savings on enterprises. *Efektyvna ekonomika, 9.* Available at: http://www.economy.nayka.com.ua/?op=1&z=6534

3. Orsato, R. J. (2006). Competitive Environmental Strategies: When Does it Pay to Be Green? California Management Review, 48 (2), 127–143. https://doi.org/10.2307/41166341

4. Padilla-Rivera, A., Russo-Garrido, S., Merveille, N. (2020). Addressing the Social Aspects of a Circular Economy: A Systematic Literature Review. *Sustainability, 12 (19),* 7912. https://doi.org/10.3390/su12197912

5. Roh, T., Noh, J., Oh, Y., Park, K.-S. (2022). Structural relationships of a firm's green strategies for environmental performance: The roles of green supply chain management and green marketing innovation. *Journal of Cleaner Production, 356,* 131877. https://doi.org/10.1016/j.jclepro.2022.131877

6. *The State of Sustainable Supply Chains: Building Responsible and Resilient Supply Chains* (2016). Ernst & Young United Nations Global Compact, 48.

7. Derevetska, A. O., Rehan, Yu. M. (2018). *"Zelenyi marketynh" yak innovatsiina kontseptsiia u prosuvanni orhanichnoi produktsii. Pidpryiemnytstvo, torhivlia, marketynh: stratehii, tekhnolohii ta innovatsii.* Kyiv: Kyivskyi natsionalnyi torhovelno-ekonomichnyi universytet, 26–28.

8. Zelenko, O. O. (2009). Sotsialno-vidpovidalnyi marketynh yak nevidiemna skladova sotsialnoi vidpovidalnosti biznesu. *Ekonomichnyi prostir, 19,* 118–123.

9. Amosov, O. Yu., Havkalova, N. L. (2011). Problema resursozberezhennia v Ukraini ta shliakhy yii vyrishennia. *Teoriia ta praktyka derzhavnoho upravlinnia, 3,* 3–7. Available at: http://nbuv.gov.ua/UJRN/Tpdu_2011_3_3

10. Aparashyna, O. I. (2011). Metodolohichni pidkhody do tlumachennia poniattia "resursozberezhennia". *Teoretychni ta praktychni aspekty ekonomiky ta intelektualnoi vlasnosti, 1,* 112–120.

11. Bukreieva, D., Kovalenko, T., Manukian, A. (2023). "Green" strategies for the sustainable development of the enterprise and increase in the efficiency of its activities. *Economy and Society, 56.* https://doi.org/10.32782/2524-0072/2023-56-121

12. Ashton, W., Russell, S., Futch, E. (2017). The adoption of green business practices among small US Midwestern manufacturing enterprises. *Journal of Environmental Planning and Management, 60 (12),* 2133–2149. https://doi.org/10.1080/09640568.2017.1281107

13. Solaiman, M., Osman, A., Halim, M. S. (2015). Green marketing: A marketing mix point of view. *International Journal of Business and Technopreneurship, 5 (1),* 87–98.

14. Hayu Agustini, M., Suciarto Athanasius, S., Bekti Retnawati, B. (2019). Identification of green marketing strategies: perspective of a developing country. *Innovative Marketing, 15 (4),* 42–56. https://doi.org/10.21511/im.15(4).2019.04

ISSN-L 2664-9969; E-ISSN 2706-5448

15. Yazdanifard, R., Mercy, I. E. (2011). The impact of green marketing on customer satisfaction and environmental safety. *International Conference on Computer Communication and Management (ICCCM 2011).* Sydney. Available at: https://www.researchgate.net/publication/268502673_The_impact_of_Green_Marketing_on_Customer_satisfaction_and_Environmental_safety
16. Kaur, B., Gangwar, V. P., Dash, G. (2022). Green Marketing Strategies, Environmental Attitude, and Green Buying Intention: A Multi-Group Analysis in an Emerging Economy Context. *Sustainability, 14 (10),* 6107. https://doi.org/10.3390/su14106107
17. Ismail, I. J. (2022). The role of technological absorption capacity, enviropreneurial orientation, and green marketing in enhancing business' sustainability: evidence from fast-moving consumer goods in Tanzania. *Technological Sustainability, 2 (2),* 121–141. https://doi.org/10.1108/techs-04-2022-0018
18. Nguyen-Viet, B. (2022). The impact of green marketing mix elements on green customer based brand equity in an emerging market. *Asia-Pacific Journal of Business Administration, 15 (1),* 96–116. https://doi.org/10.1108/apjba-08-2021-0398
19. Stan ta potreby biznesu v umovakh viiny: rezultaty opytuvannia v sichni 2023 roku (2023). *Diia.Biznes.* Available at: https://business.diia.gov.ua/analytics/research/stan-ta-potreby-biznesu-v-umovakh-viiny-rezultaty-opytuvannia-v-sichni-2023-roku
20. Kobelia-Zvir, M., Vovchak, O. (2023). Grant financing of the usaid program "Competitive economy of Ukraine" for entrepreneurship development organizations in Ukraine in the conditions of war. *SWorld-Ger Conference Proceedings, 1,* 58–63. https://doi.org/10.30890/2709-1783.2023-29-01-017
21. Hranty na vlasnu spravu. Ministerstvo ekonomiky Ukrainy. Available at: https://vlasnaspravagrant.com.ua
22. Prohrama YeRobota. *Diia.Biznes*. Available at: https://erobota.diia.gov.ua/#start
23. Babych, T. (2024). Role of Grants in Ensuring Socio-Economic Stability in the Conditions of War in Ukraine. *Acta Academiae Beregsasiensis. Economics, 7,* 64–78. https://doi.org/10.58423/2786-6742/2024-7-64-78
24. Kobelya-Zvir, M., Zvir, Y. (2023). Grant support of the eu4business program for micro, small and medium-sized businesses in ukraine during the war. *Scientific Opinion: Economics and Management, 3 (83).* https://doi.org/10.32782/2521-666x/2023-83-12
25. Kredyt dlia enerhonezalezhnosti (2024). *PryvatBank*. Available at: https://privatbank.ua/business/credit-for-business-continuity
26. Minfin: Za chas dii viiskovoho stanu v mezhakh Derzhavnoi prohramy "Dostupni kredyty 5–7–9 %" vydano 22610 pilhovykh kredytiv na sumu bilshe 90 mlrd. hrn. hrn. *Ofitsiinyi sait Ministerstva finansiv Ukrainy.* Available at: https://mof.gov.ua/uk/news/minfin_za_chas_dii_voiennogo_stanu_v_mezhakh_derzhavnoi_programi_dostupni_krediti_5-7-9_vidano_22_610_pilgovikh_kreditiv_na_sumu_bilshe_90_mlrd_grn-3869
27. *Samozabezpechenist elektroenerhiieiu v sektori MSP v Ukraini: Tendentsii 2020–2023 rr., pereshkody ta potentsial rozvytku* (2024). DP "Ukrpromzovnisheksperty-za". Available at: https://www.expert.kiev.ua/docs/SME_prosumer_restyled_B.pdf
28. *Ukrainian Renewable Energy Association.* Available at: https://uare.com.ua/?utm_source
29. *International Renewable Energy Agency.* Available at: https://www.irena.org
30. Zvit pro rezultaty diialnosti Derzhavnoi sluzhby statystyky Ukrainy za 2023 rik. *Derzhavna sluzhba statystyky Ukrainy.* Available at: https://www.ukrstat.gov.ua/zvit/2024/zvit_rd_2023.htm

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DETERMINATION OF THE ROLE OF INNOVATION MANAGEMENT IN ENSURING SUSTAINABLE GROWTH OF ENTERPRISES

pages 33–41

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The object of research is the processes of innovation management in enterprises. One of the most problematic areas is the lack of proper funding, resistance from employees, and insufficient qualification of staff, which complicates the implementation of innovations. The research utilized methods such as surveys, interviews, case studies, and correlation analysis. This allowed for the identification of key factors influencing the success and effectiveness of innovation in enterprises under conditions of sustainable growth. In particular, the correlation analysis showed a significant relationship between the level of funding and the success of innovation processes (correlation coefficient 0.80), which confirms the importance of having sufficient resources for the implementation of innovations.

In addition to financing, the qualification of personnel plays a major role in the implementation of innovations. 60 % of respondents indicated that the level of training of employees is an important factor for effective adaptation to technological changes. In particular, the ability of personnel to adapt determines the speed of innovation implementation and reduces barriers in the change process. It was also found that support from management is critically important for the successful implementation of innovations (correlation coefficient 0.85), since it is managers who determine development strategies and provide the necessary conditions for their implementation.

The results obtained confirm that the proposed approach to innovation management, which includes the integration of modern digital technologies and the development of an innovation culture in the organization, allows significantly increasing the efficiency of innovation processes and ensuring sustainable development.

This provides the opportunity to obtain high indicators in such areas as innovative development and adaptation to change. Compared with similar known approaches, this provides such advantages as more effective management of financing and human resources. The study allows to formulate recommendations for improving innovation management processes in organizations, in particular, regarding the need to increase investment in innovative projects and improve the skills of personnel to adapt to technological changes.

Keywords: innovation management, innovation strategies, management support, innovation funding, digital technologies, innovation implementation barriers.

References

1. Endres, H., Huesig, S., Pesch, R. (2021). Digital innovation management for entrepreneurial ecosystems: services and functionalities as drivers of innovation management software adoption. *Review of Managerial Science, 16 (1),* 135–156. https://doi.org/10.1007/s11846-021-00441-4
2. Aslam, F., Aimin, W., Li, M., Ur Rehman, K. (2020). Innovation in the Era of IoT and Industry 5.0: Absolute Innovation Management (AIM) Framework. *Information, 11 (2),* 124. https://doi.org/10.3390/info11020124
3. Nambisan, S., Lyytinen, K., Majchrzak, A., Song, M. (2017). Digital Innovation Management: Reinventing Innovation Management Research in a Digital World. *MIS Quarterly, 41 (1),* 223–238. https://doi.org/10.25300/misq/2017/41:1.03
4. Weiss, M., Baer, M., Hoegl, M. (2022). The human side of innovation management: Bridging the divide between the fields of innovation management and organizational behavior. *Journal of Product Innovation Management, 39 (3),* 283–291. https://doi.org/10.1111/jpim.12624
5. Robbins, P., O'Connor, G. C. (2023). The professionalization of innovation management: Evolution and implications. *Journal of Product Innovation Management, 40 (5),* 593–609. https://doi.org/10.1111/jpim.12670
6. Kihlander, I., Magnusson, M., Karlsson, M. (2022). Certification of Innovation Management Professionals: Reasons for and Results from Acquiring Certification. *Journal of Innovation Management, 10 (1),* 58–75. https://doi.org/10.24840/2183-0606_010.001_0004

7. Frishammar, J., Richtnér, A., Brattström, A., Magnusson, M., Björk, J. (2019). Opportunities and challenges in the new innovation landscape: Implications for innovation auditing and innovation management. *European Management Journal, 37 (2),* 151–164. https://doi.org/10.1016/j.emj.2018.05.002
8. Bamel, N., Kumar, S., Bamel, U., Lim, W. M., Sureka, R. (2022). The state of the art of innovation management: insights from a retrospective review of the European Journal of Innovation Management. *European Journal of Innovation Management, 27 (3),* 825–850. https://doi.org/10.1108/ejim-07-2022-0361
9. Appio, F. P., Frattini, F., Petruzzelli, A. M., Neirotti, P. (2021). Digital Transformation and Innovation Management: A Synthesis of Existing Research and an Agenda for Future Studies. *Journal of Product Innovation Management, 38 (1),* 4–20. https://doi.org/10.1111/jpim.12562
10. Naeini, A. B., Zamani, M., Daim, T. U., Sharma, M., Yalcin, H. (2022). Conceptual structure and perspectives on "innovation management": A bibliometric review. *Technological Forecasting and Social Change, 185, 122052.* https://doi.org/10.1016/j.techfore.2022.122052
11. Cappa, F., Oriani, R., Peruffo, E., McCarthy, I. (2020). Big Data for Creating and Capturing Value in the Digitalized Environment: Unpacking the Effects of Volume, Variety, and Veracity on Firm Performance*. *Journal of Product Innovation Management, 38 (1),* 49–67. https://doi.org/10.1111/jpim.12545
12. Melendez, K., Dávila, A., Melgar, A. (2019). Literature Review of the Measurement in the Innovation Management. *Journal of Technology Management & Innovation, 14 (2),* 81–87. https://doi.org/10.4067/s0718-27242019000200081
13. Trantopoulos, K., von Krogh, G., Wallin, M. W., Woerter, M. (2017). External Knowledge and Information Technology: Implications for Process Innovation Performance. *MIS Quarterly, 41 (1),* 287–300. https://doi.org/10.25300/misq/2017/41.1.15
14. Svahn, F., Mathiassen, L., Lindgren, R. (2017). Embracing Digital Innovation in Incumbent Firms: How Volvo Cars Managed Competing Concerns. *MIS Quarterly, 41 (1),* 239–253. https://doi.org/10.25300/misq/2017/41.1.12
15. Becker, L., Coussement, K., Büttgen, M., Weber, E. (2021). Leadership in innovation communities: The impact of transformational leadership language on member participation. *Journal of Product Innovation Management, 39 (3),* 371–393. Portico. https://doi.org/10.1111/jpim.12588
16. Ko, Y. J., Choi, J. N. (2023). Collective turnover and firm innovation: Knowledge-sharing system as a contingency. *Journal of Product Innovation Management, 40 (6),* 817–835. https://doi.org/10.1111/jpim.12684

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CULTURE OF DIGNITY AS THE FOUNDATION OF ORGANIZATIONAL CULTURE OF HUMANISTIC MANAGEMENT. MODERN RESEARCH IN THE IT INDUSTRY

pages 42–47

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The object of research is the cognitive and structural parameters of the formation and transformation of the organizational culture of IT teams. Particular attention is paid to the influence of dignity as a humanistic construct on the dynamics of intragroup communications. The problem lies in the lack of interdisciplinary verified theoretical models that would allow integrating the principle of dignity into the strategic management system. Existing approaches mostly do not take into account cognitive distortions, moral autonomy, the influence of affective states and psychological resilience in a team environment. The article develops a conceptual model of the corporate culture of dignity in IT engineering, which is based on a synthesis of the provisions of cognitive psychology, behavioral economics, neuroethics and humanistic management. The model covers three levels: micro-level (executive control, intrinsic motivation, psychological security), meso-level (empathetic leadership, reflective practices, communication ethics), and macro-level (value coherence, institutional trust, cultural justice). The structure is presented as a dynamic process: cognitive factors – behavioral mechanisms – organizational results. The theoretical provisions can be applied to HRMS, agile processes, ESG strategies, and cognitive-sensitive management systems. The model is relevant in conditions of high dynamics, digital burnout, fragmented interaction and organizational turbulence, in particular, in times of war. The proposed model is an innovative approach to the construction of a culture of dignity in an intellectually saturated environment where traditional management paradigms are ineffective. Its application allows to reduce transaction costs of communication, increase the level of internal consistency and ensure ethical integration of cognitively complex practices into the daily activities of IT teams. This approach creates a new framework for studying behavioral mechanisms in digital organizations and opens up prospects for multi-agent culture modelling using data analytics, artificial intelligence, and neurobehavioral interpretation.

Keywords: dignity, humanistic management, IT engineering, organizational culture, behavioral economics, intrinsic motivation, ESG strategies.

References

1. Deci, E. L., Ryan, R. M. (2017). *Self-Determination Theory: Basic Psychological Needs in Motivation, Development, and Wellness.* New York: Guilford Publications. https://doi.org/10.1521/978.14625/28806
2. Lakhyzha, R. M. (2025). Spetsifika diialnosti IT-kompanii yak factor formuvannia yikh korporatyvnoi kultury. *Problems of Modern Transformations. Series: Economics and Management, 17.* https://doi.org/10.54929/2786-5738-2025-17-04-01
3. Sadowski, C., Stolee, K. T., Elbaum, S. (2015). How developers search for code: a case study. *Proceedings of the 2015 10th Joint Meeting on Foundations of Software Engineering.* https://doi.org/10.1145/2786805.2786855
4. McCausland, T. (2023). Creating Psychological Safety in the Workplace. *Research-Technology Management, 66 (2),* 56–58. https://doi.org/10.1080/08956308.2023.2164439
5. *Gallup.* (2024). Global indicator: Employee Retention & Attraction. Available at: https://www.gallup.com/467702/indicator-employee-retention-attraction.aspx
6. Schein, E. H. (2017). *Organizational Culture and Leadership*. Wiley, 416.
7. Cameron, K. S., Quinn, R. E. (2011). *Diagnosing and Changing Organizational Culture: Based on the Competing Values Framework*. Wiley.
8. Kouzes, J. M., Posner, B. Z. (2017). *The Leadership Challenge*. Wiley.
9. Bennis, W., Nanus, B. (2003). *Leaders: The Strategies for Taking Charge*. Harper Collins.
10. Herzberg, F. (2003). One More Time, How Do You Motivate Employees? *Harvard Business Review.* Available at: https://hbr.org/2003/01/one-more-time-how-do-you-motivate-employees
11. Destriani, R., Adhitama, R. Y., Sensuse, D. I., Hidayat, D. S., Purwaningsih, E. H. (2024). Challenges and Technology Trends in Implementing a Human Resource Management System: A Systematic Literature Review. *Journal of Information Systems Engineering and Business Intelligence, 10 (3),* 355–367. https://doi.org/10.20473/jisebi.10.3.355-367
12. Islas-Calderón, S., Vázquez-Maguirre, M. (2024). Dignity, humanistic management, and the process of social innovation. *Humanistic Management Journal, 9 (3),* 313–326. https://doi.org/10.1007/s41463-024-00174-y
13. Huijser, D., Nullens, P. (2024). An anatomy of human dignity; dissecting the heart of humanistic management. *Humanistic Management Journal, 9,* 203–230. https://doi.org/10.1007/s41463-024-00183-x
14. Mazzetti, G., Schaufeli, W. B. (2022). The impact of engaging leadership on employee engagement and team effectiveness: A longitudinal, multi-level study on the mediating role of personal- and team resources. *PLOS One, 17 (6),* e0269433. https://doi.org/10.1371/journal.pone.0269433
15. Pearson, M. (2023). Dignity, Humanistic Management and the Sustainable Development Goals. *Journal of Management for Global Sustainability, 11 (2).* https://doi.org/10.13185/2244-6893.1001

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16. Kabadayi, S., Alkire (née Nasr), L., Broad, G. M., Livne-Tarandach, R., Wasieleski, D., Puente, A. M. (2019). Humanistic management of social innovation in service (SIS): An interdisciplinary framework. *Humanistic Management Journal, 4,* 159–185. https://doi.org/10.1007/s41463-019-00063-9
17. Hicks, D. (2018). *Leading with Dignity: How to Create a Culture That Brings Out the Best in People.* Yale University Press, 224. https://doi.org/10.2307/j.ctvqc6gvg
18. Nussbaum, M. (2011). *Creating Capabilities: The Human Development Approach.* Harvard University Press, Belknap Press, 237.

ECONOMIC CYBERNETICS

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STRATEGIC DIRECTIONS FOR ENERGY EFFICIENCY BASED ON INTELLECTUAL DECARBONIZATION: A CLUSTER ANALYSIS

pages 48–55

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The object of research is the processes of substantiating strategic directions for energy efficiency on the basis of intelligent decarbonization and sustainable development based on cluster analysis, taking into account international experience and challenges of the global environment. The problem that has been addressed is the lack of a systematic approach to clustering countries by energy efficiency, which also takes into account indicators of intelligent decarbonization. This makes it difficult to develop targeted strategies to improve energy efficiency and decarbonization, especially given the specifics of AI and innovative technologies in different countries.

The essence of the study results is to identify five clusters of the selected countries such as USA, India, Japan, China, Ukraine, Romania, Hungary, Poland, Czech Republic, Turkey, Portugal, Belgium, Greece, Sweden, Spain, Norway, Austria, Finland, Italy, France, The Netherlands, Germany, Switzerland, United Kingdom using cluster analysis based on the following indicators:

1. Applied AI research score.
2. Government Strategy AI: Strategy score.
3. Commercial Ecosystem AI: Companies score.
4. Energy intensity.
5. Carbon dioxide emissions from energy.

Cluster 1 includes India and Ukraine, countries with high energy intensity and significant CO_2 emissions, but with the potential to develop intelligent decarbonization. Cluster 2 is represented by the United States, a leader in AI and innovation, with low energy intensity but high CO_2 emissions due to its advanced industry. Cluster 3 covers countries with low energy intensity and low CO_2 emissions but weak AI development. Cluster 4 includes China, a country with a high level of AI research and commercial ecosystem, but high energy intensity and CO_2 emissions due to intensive industry. Cluster 5 covers countries with medium to high AI development, low to medium energy intensity, and varying levels of CO_2 emissions. The key principles of energy efficiency in these clusters are identified and strategic priorities for the development of energy efficiency in modern countries are defined.

The results obtained can be used in practice to develop energy efficiency and decarbonization strategies at the national and international levels.

Keywords: energy efficiency strategy, energy efficiency policy, economic decarbonization, intelligent decarbonization, artificial intelligence, energy policy.

References

1. Damayanti, S., Sudarmaji, E., Masrio, H. (2024). The Critical Role of Energy Intensity in Decarbonizing ASEAN: Integrating Growth and Emissions Reductions. *International Journal of Energy Economics and Policy, 14 (3),* 247–259. https://doi.org/10.32479/ijeep.15059
2. Kozlowska, A., Guarino, F., Volpe, R., Bisello, A., Gabaldòn, A., Rezaei, A. et al. (2024). Positive Energy Districts: Fundamentals, Assessment Methodologies, *Modeling and Research Gaps. Energies, 17 (17),* 4425. https://doi.org/10.3390/en17174425
3. Pylak, K., Pizoń, J., Łazuka, E. (2024). Evolution of Regional Innovation Strategies Towards the Transition to Green Energy in Europe 2014–2027. *Energies, 17 (22),* 5669. https://doi.org/10.3390/en17225669
4. Li, H., Wang, S., Zhen, L., Wang, X. (2022). Data-driven optimization for automated warehouse operations decarbonization. *Annals of Operations Research, 343 (3),* 1129–1156. https://doi.org/10.1007/s10479-022-04972-1
5. Kravchenko, M., Trofymenko, O., Kopishynska, K., Pyshnograiev, I., Boiarynova, K., Roshchyna, N. (2024). Ensuring energy security on the basis of intelligent decarbonisation and innovative economic development. *E3S Web of Conferences, 558,* 01009. https://doi.org/10.1051/e3sconf/202455801009
6. Almassalkhi, M. R., Kundu, S. (2023). Intelligent Electrification as an Enabler of Clean Energy and Decarbonization. *Current Sustainable/Renewable Energy Reports, 10 (4),* 183–196. https://doi.org/10.1007/s40518-023-00228-z
7. Wu, J. (2012). *Advances in K-means Clustering: A Data Mining Thinking.* Springer, 180.
8. Energy statistics – an overview (2024). *Eurostat.* Available at: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Energy_statistics_-_an_overview
9. Britain publishes 'Bletchley Declaration' on AI safety (2023). *Reuters.* Available at: https://www.reuters.com/technology/britain-publishes-bletchley-declaration-ai-safety-2023-11-01/
10. Artificial Intelligence Act: MEPs adopt landmark law (2024). *European Parliament.* Available at: https://www.europarl.europa.eu/news/en/press-room/20240308IPR19015/artificial-intelligence-act-meps-adopt-landmark-law
11. The Global AI Index. *Tortoise.* Available at: https://www.tortoisemedia.com/intelligence/global-ai#data
12. IEA policy review highlights leadership of United States on energy security and clean energy transitions (2024). *IEA.* Available at: https://www.iea.org/news/iea-policy-review-highlights-leadership-of-united-states-on-energy-security-and-clean-energy-transitions
13. *US Department of Energy.* Available at: https://www.energy.gov/mesc/about-us
14. *Energy. US Department of State.* Available at: https://www.state.gov/policy-issues/energy/
15. Energy system of Sweden. *IEA.* Available at: https://www.iea.org/countries/sweden
16. Energy system of Portugal. *IEA.* Available at: https://www.iea.org/countries/portugal
17. Norway 2022. Energy Policy Review (2022). *IEA.* Available at: https://iea.blob.core.windows.net/assets/de28c6a6-8240-41d9-9082-a5dd65d9f3eb/NORWAY2022.pdf

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COMPARING THE E-COMMERCE APPEAL OF UKRAINE AND GERMANY

pages 56–64

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The subject of research is e-commerce and the conditions for its operation in different countries. One of the most problematic aspects is the lack of information about the attractiveness of countries in relation to this topic. To address this gap, the author's own experience of conducting e-commerce in Germany and Ukraine was used, along with an analysis of the main factors influencing the state and development of e-commerce. The research methods used include: theoretical generalization and classification; comparative analysis; expert evaluations; formalization; and multi-criteria analysis. As a result, a system of 13 criteria was proposed to assess the convenience and profitability of conducting e-commerce: infrastructure convenience level, healthcare, availability of private housing and the possibility of purchasing it, small business development, climatic conditions, consumer basket size, tax and fine rates, road quality and safety, internet quality, degrees of freedom, life safety, right to information, and the level of development and speed of delivery. Based on this system and with the help of experts, a comparative analysis of e-commerce conditions and prospects in Germany and Ukraine was conducted. A methodology for assessing the attractiveness of e-commerce in Ukraine and Germany was developed. This methodology allows obtaining comparable values of indicators for any countries, which was not possible before but is desirable with the researchers' practical experience, i. e., their long-term life and work in the countries being studied to ensure accurate results. Compared to other known systems for determining the attractiveness of countries, our methodology provides advantages such as: the availability of a specific mechanism for evaluating this indicator for e-commerce based on 13 criteria; the ability to involve different groups of experts to compare and adjust the results; and the construction of an integral criterion for the overall assessment of a country's attractiveness. In practice, a methodology for calculating the degree of convenience and attractiveness of conducting e-commerce in different countries was proposed, and the results obtained were applied to the example of e-commerce in Ukraine and Germany.

Keywords: Ukraine, Germany, appeal of countries, e-commerce, scales, expert evaluations, integral criterion, multi-criteria model, "weight" coefficients, weighted criteria aggregation method, natural normalization, complex assessment.

References

1. Hlushach, Yu. S. (2018). Ranking of Countries in the Global Economic World. *Biznes-inform, 9,* 13–19. Available at: https://cyberleninka.ru/article/n/reytingu-vannya-krayin-u-globalnomu-ekonomichnomu-sviti/viewer
2. Kyrychenko, K. I. (2017). International rankings and indexes in the system for evaluation of the level of social, economic and political transformations in Ukraine. *Upravlinnia rozvytkom, 1-2,* 18–25.
3. HabroI. (2024). International rankings and indices in forming the image of a state. *Acta De Historia & Politica: Saeculum XXI, 8,* 141–149. https://doi.org/10.26693/ahpsxxi2024.08.141
4. Kytaichuk, T. (2023). Investment attractiveness: theoretical analysis and influential factors. *Economy and Society, 54.* https://doi.org/10.32782/2524-0072/2023-54-65
5. Matyushenko, I., Hlibko, S., Khanova, O., Kudlai, Y. (2022). Investment climate of the EU countries and Ukraine in the context of realization of "green" economy. *Economics of Development, 21 (4),* 19–36. https://doi.org/10.57111/econ.21(4).2022.19-36
6. Slavkova, A., Kolisnyk, D. (2023). Investment attractiveness of ukraine: realities in the context of war and prospects for post-war reconstruction. *Economy and Society, 56.* https://doi.org/10.32782/2524-0072/2023-56-138
7. Iakushko, I. V. (2019). Rating approaches to estimating the investment attractiveness of the national economy. *Naukovyi visnyk Uzhhorodskoho natsionalnoho universytetu. Seriia: Mizhnarodni ekonomichni vidnosyny ta svitove hospodarstvo, 23 (2),* 152–159. Available at: http://www.visnyk-econom.uzhnu.uz.ua/archive/23_2_2019ua/31.pdf
8. Shchytov, D., Mormul, M., Shchytov, O., Romanchuk, L., Chupilko, T. (2022). IT services outsourcing in Ukraine. *Information Technology and Computer Engineering, 55 (3),* 85–90. https://doi.org/10.31649/1999-9941-2022-55-3-85-90
9. Chaliuk, Y. (2020). International assessment of the socio-economic situation of Ukraine. Herald UNU. *International Economic Relations and World Economy, 31,* 138–145. https://doi.org/10.32782/2413-9971/2020-31-21
10. Zayats, O., Roshko, S., Ivashkovich, V. (2021). Image of Ukraine in the global economic space. *Herald UNU. International Economic Relations and World Economy, 39.* https://doi.org/10.32782/2413-9971/2021-39-11
11. Kirilina, M. (2022). Indexes and ratings as a marketing tool for determining the competitiveness of the management system. *Economy and Society, 40.* https://doi.org/10.32782/2524-0072/2022-40-69
12. Shchytov, D. M., Zhadko, K. S., Mormul, M. F. (2024). Status and trends of the development of electronic commerce potential by Ukrainian companies. *Scientific innovations and advanced technologies, 8 (36),* 1024–1036. https://doi.org/10.52058/2786-5274-2024-8(36)-1024-1036
13. Romanchuk, L. A., Shchytov, D. M., Mormul, M. F. (2024). Reitynhova systema kryteriiv pryvablyvosti krain (na prykladi Nimechchyny ta Ukrainy): porivnialnyi analiz. *Modern aspects of science, 43,* 68–97. Available at: http://perspectives.pp.ua/public/site/mono/mono-43.pdf
14. *Vlasne zhytlo: bilshist ukraintsiv zhyvut na svoikh kvadratnykh metrakh (infohrafika)* (2020). Available at: https://news.finance.ua/ru/news/-/480368/sobstvennoe-zhile-bolshinstvo-ukraintsev-zhivut-na-svoih-kvadratnyh-metrah-infografika
15. Mykhailenko, D. (2024). Current trends in the development of small business in Ukraine. *Economy and Society, 60.* https://doi.org/10.32782/2524-0072/2024-60-139
16. *Formy vedennia biznesu v Nimechchyni.* Available at: https://europortal.biz.ua/evropa/nimechchyna/biznes/formy-oformlenyia-fyrm-u-hermanyy.html
17. *Ukraina ta Nimechchyna* (2000). Kyiv: Derzhavnyi komitet statystyky Ukrainy; Federalne statystychne upravlinnia Nimechchyny, 40.
18. Lipinskyi, V. M., Diachuk, V. A., Babichenko, V. M. (Eds.) (2003). *Klimat Ukrainy.* Kyiv: Vyd-vo Raievskoho, 343.
19. Iaki tsiny v Nimechchyni? (2025). *Migrant.* Available at: https://migrant.biz.ua/nimechina/zhittya-de/tsiny-v-nimechyni.html
20. Stepanova, T. (2024). *Tsiny na produkty: skilky koshtuie skupytys do sviat v Ukraini, Polshchi ta Nimechchyni.* RBK-Ukraina. Available at: https://www.rbc.ua/rus/news/tsini-produkti-skilki-koshtue-skupitis-svyat-1733235593.html
21. *Spozhyvchyi koshyk ukraintsia – 2024.* Available at: https://www.buhoblik.org.ua/kadry-zarplata/vyplaty-kompensaczii-soczialnaya-zashhita/3363-spozhivchij-koshik.html
22. Kurovtseva, N. (2024). *Podatky v Nimechchyni.* Monito. Available at: https://www.monito.com/uk/wiki/podatky-v-nimechchyni
23. Aleksyk, A. (2024). Shtrafy za perevyshchennia shvydkosti v Nimechchyni: aktualna ta povna tablytsia shtrafiv na 2024 rik. *Ukrainska hazeta.* Available at: https://golooking.eu/korysno-znaty/shtrafi-za-perevishhennya-shvidkosti-v-nimechchini-povna-tabliczya-shtrafiv-na-2024-rik/
24. *Dlia vyzhyvannia u viini z RF Ukraina povynna znykhyty tsinnist liudskoho zhyttia, – Portnykov* (2025). Available at: https://antikor.com.ua/articles/746958-dlja_vyhivanija_v_vojne_s_rf_ukraina_dolhna_snizitj_tsennostj_chelovecheskoj_hizni_-_portnikov
25. Mormul, M., Shchytov, D., Shchytov, O., Rudianova, T. (2023). Aspects of multi-criterion selection of administrative decisions. *SWorldJournal, 1 (19-01),* 64–76. https://doi.org/10.30888/2663-5712.2023-19-01-018
26. Azizova, M. (2024). Svitovyi reitynh shchastia 2024: khto ocholyv i na yakomu mistsi Ukraina. *TSN.* Available at: https://tsn.ua/svit/svitoviy-reyting-schastya-2024-hto-ocholiv-i-na-yakomu-misci-ukrayina-2539393.html
27. E-commerce worldwide. *Statista.* Available at: https://www.statista.com/topics/871/online-shopping/ #topicOverview

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INTEGRATED ERP-BPMS APPROACH FOR OPTIMIZING HCS MANAGEMENT: PERSONNEL QUALIFICATIONS, MAINTENANCE COSTS, AND CONTRACTOR SELECTION

pages 65–73

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The object of the study is the integrated ERP–BPMS framework designed to optimize housing and communal services (HCS). The most problematic area identified during audit was the fragmentation of personnel qualification assessments, maintenance cost forecasting, and outsourcing decisions, causing inconsistent performance metrics, increased diagnostic errors, and prolonged service-resolution times under budget constraints.

The research implemented three approaches: an Integral Evaluation Method (IEM) for quantifying staff competencies, a Maintenance Cost Assessment module for enhanced budget planning, and an IEM-based decision mechanism for comparing in-house versus outsourced work. These methods were integrated into the Business Operation System – Central Information System (BOS CIS) with an Information Administrator (IA) role that cross-validates digital logs against manual safety and compliance checklists.

Implementation increased the Integral Qualification Score from 9.8 to 64.0, reducing diagnostic errors by 66 % and issue-resolution times by 50 %. Cost prediction accuracy improved from 0.76 to 0.93, while outsourcing decisions shortened project durations by 25–28.6 % and enhanced financial efficiency by 6 %. Data retrieval times decreased by 75 %, and the Information Utilization Rate rose from 65 % to 88 %. These improvements stem from the framework's real-time processing of both positive and negative performance factors and its hybrid human-machine validation process.

This synergy enables accurate, data-driven decisions that optimize resource allocation under strict budget limitations. Unlike solutions focusing on isolated elements, this integrated platform simultaneously addresses personnel development, cost modeling, and strategic outsourcing, increasing operational transparency and adaptability.

The framework is recommended for large-scale service environments where uninterrupted operation, cost-effectiveness, and high service quality are essential. By combining automated analytics with oversight, it provides a scalable model for enhancing project performance and strategic decision-making in resource-constrained service sectors.

Keywords: ERP-BPMS, housing, communal, integral, evaluation, maintenance, outsourcing, personnel, management, optimization.

References

1. Smolinska, N., Sokil, V. (2021). Directions of improvement of activity of housing and communal enterprises. *Herald of Khmelnytskyi National University, 294 (3),* 229–237. https://doi.org/10.31891/2307-5740-2021-294-3-37
2. Mottaeva, A., Borisova, A. (2019). Improvement of quality of housing-and-communal services management. *E3S Web of Conferences, 138,* 02015. https://doi.org/10.1051/e3sconf/201913802015
3. Taruta, S. V. (2022). Management of housing and communal services in apartment building: evaluation of alternative methods. *Omsk Scientific Bulletin. Series Society. History. Modernity, 7 (1),* 138–146. https://doi.org/10.25206/2542-0488-2022-7-1-138-146
4. Sergeeva, I. G., Medvedeva, O. E., Vasilenok, V. L. (2020). Smart Technologies in Housing and Communal Services. *Proceedings of the III International Scientific and Practical Conference "Digital Economy and Finances" (ISPC-DEF 2020).* https://doi.org/10.2991/aebmr.k.200423.002
5. AL-Zaidi, M. M., Al-Samarae, S. A.-D. (2020). Employing Smart Systems In Integrated Management Of Infrastructure For Housing Projects. *The Iraqi Journal of Architecture and Planning, 19 (2),* 72–87. https://doi.org/10.36041/iqjap.v19i2.518
6. Borkovskaya, V. (2018). Project Management Risks in the Sphere of Housing and Communal Services. *MATEC Web of Conferences, 251,* 06025. https://doi.org/10.1051/matecconf/201825106025
7. Chernenko, Y., Danchenko, O., Melenchuk, V. (2022). Conceptual model of risk management in development projects of providers of housing and utility services. *Management of Development of Complex Systems, 51,* 41–48. https://doi.org/10.32347/2412-9933.2022.51.41-48
8. Teller, J., Gemünden, H. G., Kock, A. (2014). Risk Management in Project Portfolios is More than Managing Project Risks: A Contingency Perspective on Risk Management. *Project Management Journal, 45 (4),* 67–80. https://doi.org/10.1002/pmj.21431
9. Dobrosavljevic, A., Urošević, S., Astratova, G. (2019). Assessment of HR competencies in housing and communal utility services taking into account consumer perception. *Upravlenets, 10 (1),* 72–77. https://doi.org/10.29141/2218-5003-2019-10-1-7
10. Hewavitharana, T., Nanayakkara, S., Perera, A., Perera, J. (2019). Impact of enterprise resource planning (ERP) systems to the construction industry. *International Journal of Research in Electronics and Computer Engineering, 7 (2),* 887–893.
11. Alexander, A., Li, Y., Plante, R. (2023). Comparative study of two menus of contracts for outsourcing the maintenance function of a process having a linear failure rate. *IISE Transactions, 55 (12),* 1230–1241. https://doi.org/10.1080/24725854.2023.2175939
12. Rahimi, F., Møller, C., Hvam, L. (2015). Business process management and IT management: The missing integration. *International Journal of Information Management, 36 (1),* 142–154. https://doi.org/10.1016/j.ijinfomgt.2015.10.004
13. Loggen, T., Ravesteyn, P. (2023). How does BPM maturity affect process performance? *Communications of the IIMA, 20 (2).* https://doi.org/10.58729/1941-6687.1437
14. Tidd, J., Bessant, J. (2018). *Managing innovation: Integrating technological, market and organizational change.* Wiley.
15. Bilir, C., Yafez, E. (2022). Project success/failure rates in Turkey. International *Journal of Information Systems and Project Management, 9 (4).* https://doi.org/10.12821/ijispm090402
16. Rahi, K., Bourgault, M., Preece, C. (2022). Risk and vulnerability management, project agility and resilience: a comparative analysis. *International Journal of Information Systems and Project Management, 9 (4),* 5–21. https://doi.org/10.12821/ijispm090401
17. Varajão, J., Trigo, A., Pereira, J. L., Moura, I. (2022). Information systems project management success. *International Journal of Information Systems and Project Management, 9 (4),* 62–74. https://doi.org/10.12821/ijispm090404
18. Gavali, A., Halder, S. (2019). Identifying critical success factors of ERP in the construction industry. *Asian Journal of Civil Engineering, 21 (2),* 311–329. https://doi.org/10.1007/s42107-019-00192-4
19. Westphal, P., Sohal, A. (2016). Outsourcing decision-making: does the process matter? *Production Planning & Control, 27 (11),* 894–908. https://doi.org/10.1080/09537287.2016.1159350
20. Emelyanov, D. I., Ponyavina, N. A., Chesnokova, E. A., Bredikhina, N. V. (2018). Planning of repair construction works in the solution of problems of technical operation of the residential real estate. *Proceedings of the Southwest State University, 22 (3),* 40–50. https://doi.org/10.21869/2223-1560-2018-22-3-40-50
21. Gončarovs, M., Geipele, I. (2023). Qualification of the Residential House Administrator in the Sustainable Housing Conservation Context. *Baltic Journal of Real Estate Economics and Construction Management, 11 (1),* 315–322. https://doi.org/10.2478/bjreecm-2023-0020
22. Kedir, F., Hall, D. M., Brantvall, S., Lessing, J., Hollberg, A., Soman, R. K. (2023). Circular information flows in industrialized housing construction: the case of a multi-family housing product platform in Sweden. *Construction Innovation, 24 (5),* 1354–1379. https://doi.org/10.1108/ci-08-2022-0199

23. Jayamaha, B. H. V. H., Perera, B. A. K. S., Gimhani, K. D. M., Rodrigo, M. N. N. (2023). Adaptability of enterprise resource planning (ERP) systems for cost management of building construction projects in Sri Lanka. *Construction Innovation, 24(5),* 1255–1279. https://doi.org/10.1108/ci-05-2022-0108

24. Mbachu, J. (2008). Conceptual framework for the assessment of subcontractors' eligibility and performance in the construction industry. *Construction Management and Economics, 26 (5),* 471–484. https://doi.org/10.1080/01446190801918730

25. Zubair, M. U., Farid, O., Hassan, M. U., Aziz, T., Ud-Din, S. (2024). Framework for Strategic Selection of Maintenance Contractors. *Sustainability, 16 (6),* 2488. https://doi.org/10.3390/su16062488

26. Hallgren, K. A. (2012). Computing Inter-Rater Reliability for Observational Data: An Overview and Tutorial. *Tutorials in Quantitative Methods for Psychology, 8 (1),* 23–34. https://doi.org/10.20982/tqmp.08.1.p023

27. Au-Yong, C. P., Chua, S. J. L., Ali, A. S., Tucker, M. (2019). Optimising maintenance cost by prioritising maintenance of facilities services in residential buildings. *Engineering, Construction and Architectural Management, 26 (8),* 1593–1607. https://doi.org/10.1108/ecam-07-2018-0265

28. Farahani, A., Wallbaum, H., Dalenbäck, J.-O. (2018). Optimized maintenance and renovation scheduling in multifamily buildings – a systematic approach based on condition state and life cycle cost of building components. *Construction Management and Economics, 37 (3),* 139–155. https://doi.org/10.1080/01446193.2018.1512750

29. Chen, W., Chen, K., Cheng, J. C. P., Wang, Q., Gan, V. J. L. (2018). BIM-based framework for automatic scheduling of facility maintenance work orders. *Automation in Construction, 91,* 15–30. https://doi.org/10.1016/j.autcon.2018.03.007

30. Piasny, J., Pasławski, J. (2015). Selection of Subcontractors as the Quality Improvement Tool in Housing Construction. *Procedia Engineering, 122,* 274–281. https://doi.org/10.1016/j.proeng.2015.10.036

31. Stenström, C., Norrbin, P., Parida, A., Kumar, U. (2015). Preventive and corrective maintenance – cost comparison and cost-benefit analysis. *Structure and Infrastructure Engineering, 12 (5),* 603–617. https://doi.org/10.1080/15732479.2015.1032983

32. Nikolaiev, V., Shcherbyna, A., Siniak, N., Nikolaieva, T. (2021). Different Management Functions in Housing Operation Practice: Ukrainian Case Study. *Real Estate Management and Valuation, 29 (2),* 29–37. https://doi.org/10.2478/remav-2021-0011

33. Scott, W. R. (2013). *Institutions and Organizations: Ideas, Interests, and Identities.* SAGE Publications.

34. Jiang, K., Messersmith, J. (2017). On the shoulders of giants: a meta-review of strategic human resource management. *The International Journal of Human Resource Management, 29 (1),* 6–33. https://doi.org/10.1080/09585192.2017.1384930

35. Sedayu, A., Mangkoedihardjo, S. (2019). Housing Project Performance Evaluation with Review Sharia Construction Management. *Current World Environment, 14 (2),* 239–244. https://doi.org/10.12944/cwe.14.2.08

36. Szelągowski, M., Berniak-Woźny, J., Lupeikiene, A. (2022). The Direction of the Future Development of ERP and BPMS: Towards a Single Unified Class? *Digital Business and Intelligent Systems,* 111–124. https://doi.org/10.1007/978-3-031-09850-5_8

37. Pontoh, G. T., Indrijawati, A., Handayanto, A. B., Tahang, R. A., Supardi, T. S. (2024). Transforming public sector operations with enterprise resource planning: Opportunities, challenges, and best practices. *Corporate Law and Governance Review, 6 (2),* 8–24. https://doi.org/10.22495/clgrv6i2p1

38. Shi, C., Chen, Y., Hua, Y., Tang, Y. (2022). Understanding subcontracting organizational arrangements for construction projects in China: integrating capabilities and uncertainty. *Engineering, Construction and Architectural Management, 30 (6),* 2381–2399. https://doi.org/10.1108/ecam-11-2019-0631

39. Inkinen, H. (2016). Review of empirical research on knowledge management practices and firm performance. *Journal of Knowledge Management, 20 (2),* 230–257. https://doi.org/10.1108/jkm-09-2015-0336

40. Mottaeva, A. (2019). Methodical approach to the assessment of housing-and-communal services management. *E3S Web of Conferences, 110,* 02164. https://doi.org/10.1051/e3sconf/201911002164

41. Park, M., Kwon, N., Lee, J., Lee, S., Ahn, Y. (2019). Probabilistic Maintenance Cost Analysis for Aged Multi-Family Housing. *Sustainability, 11 (7),* 1843. https://doi.org/10.3390/su11071843

42. Dragone, I. S., Biotto, C. N., Serra, S. M. B. (2021). Evaluation of Lean Principles in Building Maintenance Management. *Proc. 29th Annual Conference of the International Group for Lean Construction (IGLC),* 13–22. https://doi.org/10.24928/2021/0151

43. Schuh, G., Jussen, P., Optehostert, F. (2019). Iterative Cost Assessment of Maintenance Services. *Procedia CIRP, 80,* 488–493. https://doi.org/10.1016/j.procir.2019.01.067

44. Pan, Y., Zhang, L. (2021). A BIM-data mining integrated digital twin framework for advanced project management. *Automation in Construction, 124,* 103564. https://doi.org/10.1016/j.autcon.2021.103564

45. Abraham, R., Schneider, J., Vom Brocke, J. (2019). Data governance: A conceptual framework, structured review, and research agenda. *International Journal of Information Management, 49,* 424–438. https://doi.org/10.1016/j.ijinfomgt.2019.07.008

46. Sri, M. T., Suresh, N., Varalakshmi, T. (2024). Integration of ERP in optimizing business process. *International Research Journal on Advanced Engineering and Management, 2 (5),* 1584–1587. https://doi.org/10.47392/irjaem.2024.0216

47. Wouters, M., Stecher, J. (2017). Development of real-time product cost measurement: A case study in a medium-sized manufacturing company. *International Journal of Production Economics, 183,* 235–244. https://doi.org/10.1016/j.ijpe.2016.10.018

48. Mohammed, A., Busaeedi, N., Mohamed, A., Saud, S. (2022). *Smart project management system (SPMS) – An integrated and predictive solution for proactively managing oil & gas client projects.* https://doi.org/10.2118/210877-ms

49. Grakhov, V. P., Kuznecov, A. L., Kislyakova, Yu. G., Simakova, U. F., Knyazeva, Y. O. (2021). Implementation of Digital Project Management for Construction and Operation of Energy-Efficient Residential Buildings. *Science & Technique, 20 (1),* 66–74. https://doi.org/10.21122/2227-1031-2021-20-1-66-74

50. Matos, R., Rodrigues, F., Rodrigues, H., Costa, A. (2021). Building condition assessment supported by Building Information Modelling. *Journal of Building Engineering, 38,* 102186. https://doi.org/10.1016/j.jobe.2021.102186

51. Kim, H. G., Kim, S. S. (2023). Complementary Methodology for Energy Efficiency Ratio-Based Assessments with Change-Point Model Parameters. *Buildings, 13 (11),* 2703. https://doi.org/10.3390/buildings13112703

52. Teece, D. J. (2007). Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal, 28 (13),* 1319–1350. https://doi.org/10.1002/smj.640

DEVELOPMENT OF PRODUCTIVE FORCES AND REGIONAL ECONOMY

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DETERMINATION OF THE IMPACT OF INNOVATIVE DEVELOPMENT INSTRUMENTS ON THE POST-WAR RECOVERY OF THE ECONOMY OF UKRAINE

pages 74–79

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Wars, by their very nature, lead to a decline in economic activity, and a significant decline in living standards. One of the most powerful tools for economic recovery is an innovative approach to economic development. The object of research is the process of incorporating the tools of innovative development of the economy and its development for the restoration of the economy of Ukraine during the war period. The problems of feeding the use of innovative tools in the period of war are revealed. It is primed that the tools of innovative development will play a viralized role in the new economy, which has become known to the significant shocks of the hour of the war.

When writing the article, the method of theoretical generalization, scientific abstraction was used to systematize innovative tools; financial, economic, statistical, comparative analysis – to study the direct losses of infrastructure destruction as a result of the Russian-Ukrainian war, the rate of change in exports, imports of goods, the level of inflation and migration processes; systematization, structural analysis, generalization – to form an integrated approach to post-war economic recovery.

It is proposed to use state policy instruments in the process of post-war recovery to stimulate innovative projects through tax benefits and the creation of a favorable business environment. It has been proven that innovation is a tool for important international cooperation, which will contribute to the rapid exchange of technologies and knowledge, which is especially important for countries recovering from war. Proposals have been made for an integrated approach to the economic, social and environmental recovery of Ukraine on the basis of innovative development. Measures aimed creating institutional conditions for innovative development of the Ukrainian economy are proposed.

Keywords: innovation activity, investment climate, economic growth, post-war reconstruction, innovation policy, russian aggression.

References

1. Bila, I., Posna, V., Shevchenko, O. (2023). Innovative development as a factor of the post-war economy of Ukraine. *Scientific Papers NaUKMA. Economics, 8 (1),* 10–16. https://doi.org/10.18523/2519-4739.2023.8.1.10-16
2. Cherep, O., Cherep, A., Ohrenych, Y., Helman, V., Gorbunova, A. (2024). Improvement of the management mechanism of the strategy of innovative activities of enterprises. *Financial and Credit Activity Problems of Theory and Practice, 1 (54),* 471–484. https://doi.org/10.55643/fcaptp.1.54.2024.4295
3. Fedulova, L. (2012). The conceptual model of Ukraine's innovation strategy. *Economy and Forecasting, 1,* 87–100.
4. Susidenko, V., Susidenko, J. (2020). Realities of innovative development of enterprises of Ukraine. *European Scientific Journal of Economic and Financial Innovation, 2 (6),* 183–193. https://doi.org/10.32750/2020-0217
5. Smiesova, V., Ischenko, I. (2020). Innovation as the basis of increasing product quality and ensuring competitiveness of the enterprise. *International Humanitarian University Herald. Economics and Management, 43,* 76–82. https://doi.org/10.32841/2413-2675/2020-43-12
6. Yurchuk, N., Liudvik, I. (2021). Factors of innovative development of agricultural enterprises. *Efektyvna Ekonomika, 5.* https://doi.org/10.32702/2307-2105-2021.5.98
7. Liudvik, I. (2022). Innovative development of ukraine in the context of globalization of the economic space. *State and Regions. Series: Economics and Business, 2 (125).* https://doi.org/10.32840/1814-1161/2022-2-6
8. Kovalchuk, V. (2023). Analysis of trends in innovative development of the national economy. *Economy and Society, 58.* https://doi.org/10.32782/2524-0072/2023-58-33
9. Gonchar, O., Cherep, A., Cherep, A. (2019). Substantiation of the model of innovative development of the enterprise. *Proceedings of the 6th International Conference on Strategies, Models and Technologies of Economic Systems Management (SMTESM 2019).* https://doi.org/10.2991/smtesm-19.2019.69
10. Kovalchuk, V. (2023). Analysis of trends in innovative development of the national economy. *Economy and Society, 58.* https://doi.org/10.32782/2524-0072/2023-58-33
11. Omelianenko, V. A. (Ed.) (2022). *Innovatsiini osnovy vidnovlennia ta rozvytku krain pislia zbroinykh konfliktiv: innovatsiinyi vymir.* Sumy: Instytut stratehii innovatsiinoho rozvytku i transferu znan, 280. Available at: https://iidskt.org.ua/wp-content/uploads/Monografiya_Vidnovlennya_2022.pdf
12. Perminova, S., Sytnik, H., Chuprina, M. (2024). Innovation activity in ukraine during the period of military aggression: trends and prospects. *Economy and Society, 59.* https://doi.org/10.32782/2524-0072/2024-59-62
13. Xu, Q., Li, X., Dong, Y., Guo, F. (2023). Digitization and green innovation: how does digitization affect enterprises' green technology innovation? *Journal of Environmental Planning and Management, 68 (6),* 1282–1311. https://doi.org/10.1080/09640568.2023.2285729
14. Esmanov, O., Sntyka, Y., Lynnyk, M. (2024). Strategies for innovative development of territories and smart specialization: essence, features. *Digital Economy and Economic Security, 3 (12),* 13–18. https://doi.org/10.32782/dees.12-3
15. Rahmouni, M. (2013). Innovativeness of exporting firms in a developing country: The case of Tunisia. *Economics Bulletin, 33 (2),* 914–930. Available at: https://ideas.repec.org/a/ebl/ecbull/eb-12-00359.html
16. Pastukh, K. (2021). Strategic development planning of territorial communities. *Scientific Herald: Public Administration, 1 (1 (7)),* 195–215. https://doi.org/10.32689/2618-0065-2021-1(7)-195-215
17. Sntyka, Y., Lynnyk, M., Esmanov, O. (2024). Systematization of methodological tools for strategic planning of territorial development. *Digital Economy and Economic Security, 1 (10),* 52–55. https://doi.org/10.32782/dees.10-9
18. Samara, E., Andronikidis, A., Komninos, N., Bakouros, Y., Katsoras, E. (2022). The Role of Digital Technologies for Regional Development: a System Dynamics Analysis. *Journal of the Knowledge Economy, 14 (3),* 2215–2237. https://doi.org/10.1007/s13132-022-00951-w
19. Ludmila, O., Alla, C., Anna, H., Svitlana, D., Sofiya, A. (2024). Socio-Economic Significance of the Formation of an Effective Financial System in the Context of Hostilities. *Navigating the Technological Tide: The Evolution and Challenges of Business Model Innovation.* Cham: Springer, 309–319. https://doi.org/10.1007/978-3-031-67434-1_29
20. Oleynikova, L., Cherep, O., Androsova, E., Bexhter, L., Korotaieva, O. (2023). Modern architecture of the infrastructure of Ukraine and its development strategy in the post-war period. *Financial and Credit Activity Problems of Theory and Practice, 5 (52),* 299–313. https://doi.org/10.55643/fcaptp.5.52.2023.4180
21. Russia will pay. *Kyiv School of Economics.* Available at: https://kse.ua/ua/russia-will-pay/
22. Zovnishnia torhivlia Ukrainy tovaramy u 2022 rotsi (2023). *Derzhavna sluzhba statystyky Ukrainy.* Available at: https://stat.gov.ua/uk/publications/zovnishnya-torhivlya-ukrayiny-tovaramy-u-2022-rotsi
23. *Zovnishnia torhivlia Ukrainy tovaramy za 2024 rik (ekspres-vypusk).* Available at: https://stat.gov.ua/uk/publications/zovnishnya-torhivlya-ukrayiny-tovaramy-za-2024-rik-ekspres-vypusk
24. Indeks infliatsii (2000–2024). *Stavky, yndeksy, taryfy.* Available at: https://index.minfin.com.ua/ua/economy/index/inflation/
25. R&D Tax Credits Explained. *ForrestBrown.* Available at: https://forrestbrown.co.uk/rd-tax-credits-explained/
26. Vplyv viiny na ukrainske silske hospodarstvo. *Kyiv School of Economics.* Available at: https://kse.ua/ua/war-impacts-on-ukrainian-agriculture/
27. Vidnovlennia ekonomiky Ukrainy. *Kyiv School of Economics.* Available at: https://kse.ua/ua/vidnovlennya-ekonomiki-ukrayini/
28. Vorona, A. (2020). Global factors influencing the innovative development of the national economy. *Economics. Finances. Law, 3 (1),* 32–36. https://doi.org/10.37634/efp.2020.3(1).6

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TECHNOLOGY TRANSFER IN THE SYSTEM OF INNOVATION DEVELOPMENT: CHALLENGES AND OPPORTUNITIES

pages 80–87

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The paper is aimed at assessing the processes of technology transfer in the context of innovative economic development and to develop measures to improve them. The article examines the economic essence, importance of technology transfer, and features of its use. It is found that the most problematic issues in the use of technology transfer in Ukraine are insufficient financing of innovation activities, weak interconnection of scientists and practitioners, lack of interest of researchers in promoting developments, imperfection of state regulation and patent and license support, etc. In order to address these issues, it is proposed to improve funding for researchers at the expense of the state budget, international funds, private capital, investors, grant programs, etc. The attraction of private capital to the implementation of new technologies can also be facilitated by the spread of tax incentives for business entities. This paper presents a new toolkit aimed at enhancing technology transfer in Ukraine. It is focused on building relationships between science and business. Along with solving financial problems, it involves the widespread use of various online and advertising products to ensure the most efficient and rapid information and communication between scientists and representatives of business organizations, and the formation of a modern technology transfer infrastructure. The article outlines the features of effective technology transfer in Ukrainian practice and in developed countries. The proposed approaches to intensifying technology transfer management, unlike the known similar ones, which are mainly characterized by one-sidedness of problem solving, are the most systematic, focused on broad information and communication of participants in the innovation process. The latter can be carried out through the active use of online resources and the latest digital technologies. It is assumed that in the long term, this can provide significant results and create additional opportunities for more effective innovative development of the Ukrainian economy.

Keywords: technology transfer, innovative development, science, business, technology, development, projects, implementation, commercialization, innovators.

References

1. Schwab, K. (2015). *The Fourth Industrial Revolution: what it means, how to respond.* Available at: https://www.foreignaffairs.com/articles/2015-12-12/fourth-industrial-revolution
2. Gorecky, D., Schmitt, M., Loskyll, M., Zuhlke, D. (2014). Human-machine-interaction in the industry 4.0 era. *2014 12th IEEE International Conference on Industrial Informatics (INDIN),* 289–294. https://doi.org/10.1109/indin.2014.6945523
3. Rüßmann, M., Lorenz, M., Gerbert, P., Waldner, M., Engel, P., Harnisch, M., Justus, J. (2015). Industry 4.0: *The Future of Productivity and Growth in Manufacturing Industries.* Boston Consulting Group, 20. Available at: https://www.bcg.com/publications/2015/engineered_products_project_business_industry_4_future_productivity_growth_manufacturing_industries.aspx
4. Rogers, E. M. (2003). *Diffusion of innovations.* New York: The Free Press.
5. Bass Frank, M. (2004). *Diffusion Model estimation using adaptive nonlinear least squares Multiple Generation Algorithm NL2SOL.* Bass Economics. Glenmoor Court, Frisco, 214.
6. Kagermann, H., Anderl, R., Gausemeier, J., Schuh, G., Wahlster, W. (Eds.) (2016). *Industrie 4.0 in a Global Context. Strategies for Cooperating with International Partners.* Herbert Utz Verlag GmbH, 74. Available at: https://www.acatech.de/wp-content/uploads/2016/11/acatech_eng_STUDIE_Industrie40_global_Web.pdf
7. Hornostai, N. I., Mykhalchenkova, O. Y., Lyubarsky, O. I. (2020). Technology transfer tools and mechanisms. *Science, Technologies, Innovation, 4 (16),* 87–92. https://doi.org/10.35668/2520-6524-2020-4-09
8. Kushnir, H. L. (2018). *Transfer tekhnolohii: mekhanizmy ta instrumenty.* Kyiv: UkrINTEI, 260. Available at: http://www.uintei.kiev.ua/page/transfer-tehnologiy-mehanizmy-ta-instrumenty
9. Melnik, L., Baidak, I. (2024). International transfer of technology and its impact on the organization of production in the agro- industrial complex of Ukraine. *Efektyvna ekonomika, 5.* https://doi.org/10.32702/2307-2105.2024.5.79
10. Soloviov, V. P., Koreniako, H. I., Holovatiuk, V. M. (2008). *Innovatsiinyi rozvytok rehioniv: pytannia teorii ta praktyky.* Kyiv: Feniks, 224.
11. Lysenko, V. S., Yehorov, S. O., Rudnytskyi, Ye. A. (2014). Informatsiino-komunikatsiini instrumenty merezhi transferu tekhnolohii vyshchykh navchalnykh zakladiv Ukrainy. *Matematychni mashyny i systemy, 1,* 104–107.
12. Chervinska, L. P. (2014). *Upravlinnia innovatsiinoiu diialnistiu personalu.* Kyiv: KNEU, 194.
13. Breus, S., Polishchuk, T. (2021). Research of the essence of innovation potential in the context of innovation management at the enterprise. *Market Infrastructure, 51,* 98–103. https://doi.org/10.32843/infrastruct51-15
14. *Platforma vidkrytykh innovatsii.* Available at: http://technology.ukrintei.ua/
15. *Mizhrehionalna merezha transferu tekhnolohii.* Available at: https://merezha-tt.ukrintei.ua/
16. Chervinska, L., Kalina, I., Chervinska, T., Safonov, Y., Lishchenko, A., Shulyar, N. (2024). Forced migration in times of war: challenges, financial and economic risks, and ways to solve them. *Financial and Credit Activity Problems of Theory and Practice, 2 (55),* 531–545. https://doi.org/10.55643/fcaptp.2.55.2024.4331
17. *Derzhavna sluzhba statystyky Ukrainy.* Available at: https://www.ukrstat.gov.ua/
18. Hryhorenko, Yu. (2021). *Chastka innovatsiinoi produktsii v Ukraini ne perevyshchuie 2 %–Infohrafika–GMK Center.* GMK. Available at: https://gmk.center/ua/infographic/chastka-innovacijnoi-produkcii-v-ukraini-ne-perevishhuie-2/
19. *Pro derzhavne rehuliuvannia diialnosti u sferi transferu tekhnolohii* (2006). Zakon Ukrainy No. 143-V. 14.09.2006. Available at: https://zakon.rada.gov.ua/laws/show/143-16#Text
20. *Avtomatyzovana systema formuvannia intehrovanykh mizhderzhavnykh informatsiinykh resursiv (ASFIMIR).* Available at: http://www.uintei.kiev.ua/transfer/store/index.html

PROBLEMS OF MACROECONOMICS AND SOCIO-ECONOMIC DEVELOPMENT

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THRESHOLD EFFECTS OF GLOBALIZATION ON ECONOMIC GROWTH: INSIGHTS FROM AZERBAIJAN USING REGRESSION AND FUZZY C-MEANS

pages 88–92

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The object of this research is the relationship between globalization and economic growth in Azerbaijan, analyzed using regression analysis and Fuzzy C-Means (FCM) clustering. While globalization is often linked to economic expansion, its effects in resource-dependent economies remain unclear. This

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study examines whether increasing globalization, measured by the KOF Globalization Index and its sub-indices (economic, social, and political globalization), positively impacts GDP per capita growth.

Regression analysis reveals significant negative impacts of globalization on GDP per capita growth, with social globalization showing the strongest negative effect (coefficient: –10.93, p<0.01), followed by political (–9.55, p<0.01) and economic globalization (–5.96, p<0.05). Conversely, institutional quality, measured by the rule of law, significantly promotes growth (10.22, p<0.01). Fuzzy C-Means clustering further identifies clear nonlinear (threshold) patterns: moderate globalization levels (KOF Globalization Index≈49.36) correspond with the highest average GDP per capita growth (≈14.47), whereas lower (≈32.13) and higher (≈62.52) levels associate with significantly lower or negative growth (–10.91 % and 1.29 %, respectively). These findings indicate that excessive global integration can undermine economic stability in resource-dependent economies at the early stages of industrialization, such as Azerbaijan.

In practice, globalization should be approached strategically. Policymakers must strengthen institutions, enhance long-term investment policies, and prioritize industrial learning before promoting deeper integration. A balanced approach will maximize globalization's benefits while minimizing risks.

Keywords: Azerbaijan, fuzzy C-Means clustering, threshold effects, economic integration, KOF Globalization Index, resource-dependent economy.

References

1. Samimi, P., Jenatabadi, H. S. (2014). Globalization and Economic Growth: Empirical Evidence on the Role of Complementarities. *PLoS ONE, 9 (4),* e87824. https://doi.org/10.1371/journal.pone.0087824
2. Huh, H.-S., Park, C.-Y. (2019). A New Index of Globalization: Measuring Impacts of Integration on Economic Growth and Income Inequality. *ADB Economics Working Paper Series. Manila*. https://doi.org/10.22617/wps190245-2
3. Kılıçarslan, Z., Dumrul, Y. (2018). The Impact of Globalization on Economic Growth: Empirical Evidence from the Turkey. *International Journal of Economics and Financial Issues, 8 (5),* 115–123.
4. Hasan, M. A. (2019). Does globalization accelerate economic growth? South Asian experience using panel data. *Journal of Economic Structures, 8 (1).* https://doi.org/10.1186/s40008-019-0159-x
5. Šimić, V. (2021). Empirical Investigation of the Impact of Globalization on Economic Growth: Any Difference between the de Jure and de Facto Measures of Globalization? *Selected Papers (Part of ITEMA Conference Collection),* 29–38. https://doi.org/10.31410/itema.s.p.2021.29
6. Majidi, A. F. (2017). Globalization and Economic Growth: The Case Study of Developing Countries. *Asian Economic and Financial Review, 7 (6),* 589–599. https://doi.org/10.18488/journal.aefr.2017.76.589.599
7. Tho Tran, D., Thi Cam Nguyen, V. (2018). Impact of Globalization on Economic Growth in Vietnam: An Empirical Analysis. *Journal of Economics and Development,* 32–47. https://doi.org/10.33301/jed-p-2018-20-01-02
8. Ainscough, T. L., Shank, T. (2023). The impact of globalization on domestic growth in Africa. *Journal of Global Business Insights, 8 (2),* 168–178. https://doi.org/10.5038/2640-6489.8.2.1245
9. Şimşek, T. (2023). The Relationship Between Economic, Social, and Political Globalization and Economic Performance In Turkic States. *Eskişehir Osmangazi Üniversitesi Sosyal Bilimler Dergisi, 24 (2),* 321–335. https://doi.org/10.17494/ogusbd.1287909
10. Scholte, J. A. (2008). Defining Globalisation. *The World Economy, 31 (11),* 1471–1502. https://doi.org/10.1111/j.1467-9701.2007.01019.x
11. Rodrik, D. (2011). *The globalization paradox: democracy and the future of the world economy.* New York: W. W. Norton & Co, 368.
12. Studwell, J. (2013). *How Asia works: success and failure in the world's most dynamic region.* New York: Grove Atlantic, 320.
13. *KOF Globalisation Index Data.* Available at: https://kof.ethz.ch/en/forecasts-and-indicators/indicators/kof-globalisation-index.html Last accessed: 09.01.2024
14. Aliyev, R. (2025). *Azerbaijan – KOF globalization index and economic growth of Azerbaijan.* Mendeley Data. https://doi.org/10.17632/83HN772BJP.1
15. Dunn, J. C. (1973). A Fuzzy Relative of the ISODATA Process and Its Use in Detecting Compact Well-Separated Clusters. *Journal of Cybernetics, 3 (3),* 32–57. https://doi.org/10.1080/01969727308546046
16. Bezdek, J. C. (1981). *Pattern Recognition with Fuzzy Objective Function Algorithms.* Springer US. https://doi.org/10.1007/978-1-4757-0450-1

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DETERMINING THE REGULAR IMPACT ON THE PROCESSES OF STIMULATING THE INNOVATION CIRCULATION WITHIN THE LIMITS OF THE EU SUSTAINABLE DEVELOPMENT POLICY

pages 93–98

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The object of this scientific research is the system of management and regulatory methods of state influence on the processes of stimulating innovation circulation in the European Union (EU), through the prism of the implemented sustainable development policy. The regular influence on the processes of innovative circulation in the EU is studied, as well as its compliance with the goals of sustainable development. During the study, it was established that the process of stimulating innovative development is partially unified with the implemented sustainable development policy in the EU. It is proved that the existing regulatory model of stimulating innovative circulation in the EU is not focused on achieving most of the goals of sustainable development, and those regulatory structures that are used do not take into account the model of applying the sustainable development policy. Most of the incentive tools are aimed exclusively at protecting the personal interests of participants in innovation relations. The feasibility of improving the current approach to regulating and managing innovation circulation in the EU is substantiated, in order to eliminate the identified discrepancies. Proposals are substantiated regarding the directions of improving state policy tools for the processes of regulating innovation circulation in the EU. Proposals are made to amend the provisions of the Horizon Europe framework program in order to bring it into line with the goals of the EU's sustainable development policy.

The study is aimed at forming general theoretical principles for improving the management and regulatory processes of innovation circulation in the EU. The results of this study can be used to improve the official rules of innovation circulation in the EU, as well as at the level of national systems of EU member states, to form strategic public management decisions, state policy on innovation circulation, and serve as a basis for further scientific research on these issues. The conclusions obtained in the course of this study can be used to address issues and problems of improving international agreements and EU regulatory documents.

Keywords: regulatory documents, innovation circulation, public needs, innovations in the EU, public relations.

References

1. Davydiuk, O., Duiunova, T., Shovkoplias, H., Sivash, O., Hlushchenko, S., Lisohorova, K., Maryniv, I. (2023). Directions for improving the international legal regulation of the support program for the transfer of innovations and technologies Horizon Europe. *Eastern-European Journal of Enterprise Technologies, 2 (13 (122)),* 85–91. https://doi.org/10.15587/1729-4061.2023.276747
2. Shams, R., Sohag, K., Islam, Md. M., Vrontis, D., Kotabe, M., Kumar, V. (2024). B2B marketing for industrial value addition: How do geopolitical tension and economic policy uncertainty affect sustainable development? *Industrial Marketing Management, 117,* 253–274. https://doi.org/10.1016/j.indmarman.2024.01.002
3. D'Adamo, I., Gastaldi, M., Morone, P. (2022). Economic sustainable development goals: Assessments and perspectives in Europe. *Journal of Cleaner Production, 354,* 131730. https://doi.org/10.1016/j.jclepro.2022.131730
4. Bautista-Puig, N., Barreiro-Gen, M., Statulevičiūtė, G., Stančiauskas, V., Dikmener, G., Akylbekova, D., Lozano, R. (2024). Unraveling public perceptions of the Sustainable Development Goals for better policy implementation. *Science of The Total Environment, 912,* 169114. https://doi.org/10.1016/j.scitotenv.2023.169114
5. Zarghami, S. A. (2025). The role of economic policies in achieving sustainable development goal 7: Insights from OECD and European countries. *Applied Energy, 377,* 124558. https://doi.org/10.1016/j.apenergy.2024.124558
6. Meng, F. (2024). Driving sustainable development: Fiscal policy and the promotion of natural resource efficiency. *Resources Policy, 90,* 104687. https://doi.org/10.1016/j.resourpol.2024.104687
7. Cook, D., Davíðsdóttir, B. (2021). An appraisal of interlinkages between macroeconomic indicators of economic well-being and the sustainable development goals. *Ecological Economics, 184,* 106996. https://doi.org/10.1016/j.ecolecon.2021.106996
8. Chien, H., Lin, S. (2023). Innovations amid Gaps between Policy and Practice for Sustainable Development. *Innovation in the Social Sciences, 1 (1),* 70–98. https://doi.org/10.1163/27730611-bja10001
9. *TRIPS – Trade-Related Aspects of Intellectual Property Rights.* WTO. Available at: https://www.wto.org/english/tratop_e/trips_e/trips_e.htm
10. *Global Innovation Index* (2024). WIPO. Available at: https://webcast.wipo.int/video/WIPO_GII_GE_24_2024-09-26_PM_123520
11. *The Measurement of Scientific, Technological and Innovation Activities.* https://doi.org/10.1787/24132764
12. Regulation (EU) 2021/695 of the European Parliament and of the Council of 28 April 2021 establishing Horizon Europe – the Framework Programme for Research and Innovation, laying down its rules for participation and dissemination, and repealing Regulations (EU) No. 1290/2013 and (EU) No 1291/2013 (Text with EEA relevance) (2021). *Official Journal of the European Union.* Available at: https://eur-lex.europa.eu/eli/reg/2021/695
13. *Transforming our world: the 2030 Agenda for Sustainable Development* (2015). UUN. The General Assembly. A/70/PV.4 25. Available at: https://undocs.org/A/RES/70/1
14. Davydiuk, O., Shovkoplias, H., Holina, O., Sukhodubova, I., Khaletska, K. (2024). Justification of directions for improving the means of regulating innovative relations within the limits of the sustainable development policy in the European Union. *Eastern-European Journal of Enterprise Technologies, 6 (13 (132)),* 128–135. https://doi.org/10.15587/1729-4061.2024.317718
15. *EUROPE 2020 A strategy for smart, sustainable and inclusive growth.* (COM/2010/2020). Available at: https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:2020:FIN:en:PDF
16. *BERD by industry orientation (NACE Rev. 2 activity)* (2024). Eurostat. https://doi.org/10.2908/rd_e_berdpfr2
17. *Sustainable development in the European Union – Overview of progress towards the SDGs in an EU context – 2024 edition* (2024). Eurostat's publication 'Sustainable development in the European Union – 2024 monitoring report on progress towards the SDGs in an EU context. Available at: https://ec.europa.eu/eurostat/documents/4031688/19398139/KS-05-24-072-EN-N.pdf/021a09dd-277d-87d1-e347-867f0263ab59?version=2.0&t=1720710353372