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DEVELOPMENT OF DIRECTIONS FOR INCREASING THE COMPANY'S VALUE

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The object of research is the issue of managing a company's value with the aim of increasing it in a changing economic environment.

One of the key contemporary issues is the need to develop and implement effective ways to increase a company's value, since it is precisely the increase in a company's value that can be considered a basic indicator of its effectiveness. On the other hand, insufficient attention to the comprehensive management of factors that determine a company's value leads to a weakening of its competitive position and a deterioration in its investment attractiveness.

In the course of the research, structural and logical analysis tools, critical assessment and systematization techniques, financial ratio and cost analysis methods, as well as scenario and expert approaches were used.

Based on the research results, a set of effective recommendations has been formulated for shaping the areas of growth in the company's value, which are key drivers of its increase. It has been determined that the company's use of these areas will contribute to increasing its profitability and creating additional economic value.

In addition, the effect of implementing these areas has been forecast, which allows for an assessment of the potential increase in the company's value and provides a basis for further effective management decisions.

The positive research results are achieved through a combination of analysis of indicators and key drivers of value creation, value assessment tools, and forecast calculations of future value dynamics. In turn, the developed directions for increasing the company's value should be used in modern cost management conditions. Unlike the existing ones, they are universal in nature, contribute to the rationalization of resource use and a more accurate determination of the impact of key factors on the final company's value.

Keywords: company's value, value-oriented management, value drivers, strategic directions, value growth.

References

1. Kulish, G., Chepka, V., Bystranovska, J. (2024). Development of the Value Base Management Concept and its Role in Maximizing the Value of the Corporate Enterprise. *Economics' Horizons*, 1 (27), 60–69. [https://doi.org/10.31499/2616-5236.1\(27\).2024.298758](https://doi.org/10.31499/2616-5236.1(27).2024.298758)
2. Nepochatenko, O., Ptashnyk, S. (2021). Financial management as a necessary component effective enterprise management system. *Efektivna Ekonomika*, 8. <https://doi.org/10.32702/2307-2105-2021.8.11>

3. Polozova, T. V., Murzabulatova, O. V., Lova, V. V., Lova, M. M. (2024). Vartist pidpriemstva yak faktor yoho investytsiinoi pryvablyvosti. *Funktsionuvannia Sotsialno-Ekonomichnykh System v Konteksti Tsilei Staloho Rozvytku*, 253–264. <https://doi.org/10.30837/ek.2023.018>
4. Karvatska, N., Savchenko, O., Suponina, A. (2025). Corporate Value as an Indicator of the Efficiency of its Functioning and Investment Attractiveness. *Development Service Industry Management*, 3, 157–162. [https://doi.org/10.31891/dsim-2025-11\(24\)](https://doi.org/10.31891/dsim-2025-11(24))
5. Kubetska, O. M., Maneilo, K. A. (2022). Otsinka vartosti pidpriemstva v suchasnykh ekonomichnykh umovakh. III Mizhnarodna naukova konferentsiia "Modernizatsiia vitchyznanoi pravovoi systemy v umovakh svitovoi intehratsii", 354–356. Available at: <https://ndekc.lviv.ua/pdf/17.pdf#page=355>
6. Novikov, V. (2022). Theoretical Analysis of Business Value Added Valuation Models. *Visnyk of Sumy State University*, 3, 91–96. <https://doi.org/10.21272/1817-9215.2022.3-10>
7. Yurchyshena, L. V., Karpov, D. O. (2023). Conceptual and practical aspects of enterprise capital valuation. *Economics and organization of management*, 3, 105–114. <https://doi.org/10.31558/2307-2318.2023.3.12>
8. Kovalchuk, T. M., Verhun, A. I. (2024). Methodical Approaches to Analyzing Non-Financial Factors of Enterprise Value Growth. *Efektivna ekonomika*, 7. <https://doi.org/10.32702/2307-2105.2024.7.18>
9. Moiseiev, V., Iorgachova, M. (2023). Value of a company: essence and peculiarities of definition. *Scientific Bulletin of the Odesa National Economic University*, 1–2 (302–303), 120–126. <https://doi.org/10.32680/2409-9260-2023-1-2-302-303-120-126>
10. Iorhachova, M. I., Moiseiev, V. V. (2024). Determining the Company's Value as an Indicator of Corporate Governance Efficiency: Main Approaches and Methods. *Herald of Lviv University of Trade and Economics Economic Sciences*, 79, 72–78. <https://doi.org/10.32782/2522-1205-2024-79-09>
11. Kaganovskiy, O. S., Chmutova, I. M. (2024). Predictive Models of Business Value Management. *The Problems of Economy*, 3 (61), 290–299. <https://doi.org/10.32983/2222-0712-2024-3-290-299>
12. Hrytsenko, L. L., Derkach, L. S. (2022). Economic Value Added as an Indicator of Evaluation Functioning Efficiency of a Company. *Visnyk of Sumy State University. Economy series*, 1, 41–52. <https://doi.org/10.21272/1817-9215.2022.1-4>
13. Panchenko, A. (2023). The Impact of War on Company Valuation. *Young Scientist*, 6 (118), 89–93. <https://doi.org/10.32839/2304-5809/2023-6-118-18>
14. Khadartsev, O. (2023). Problems of Enterprise Value Management in Modern Economic Conditions. *Economy and Society*, 58. <https://doi.org/10.32782/2524-0072/2023-58-93>
15. Sobko, O. M., Furyk, Yu. D. (2024). Socially Responsible Marketing Strategies as Component Systems of Business Value Management. *Journal of Strategic Economic Research*, 2, 136–145. <https://doi.org/10.30857/2786-5398.2024.2.12>
16. Moiseiev, V. (2024). Utilizing Innovative Technologies to Maximize Company Value. *Economy and Society*, 68. <https://doi.org/10.32782/2524-0072/2024-68-47>
17. Kudrytskyi, Y. (2024). Value Management of Private Companies. *Economy and Society*, 63. <https://doi.org/10.32782/2524-0072/2024-63-57>
18. Fomina, O. V. (2025). Creating Business Value: Managerial Accounting and Non-Financial Reporting. *Business Inform*, 6, 308–314. <https://doi.org/10.32983/2222-4459-2025-6-308-314>
19. Finansova zvitnist (2024). TOV "Ferrero Ukraina". Available at: https://www.ferrero.com/ua/sites/ferrero_ua/files/2025-08/1955.pdf

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DEVELOPMENT OF A PRIORITY TOOL FOR ENSURING LEADERSHIP IN SUSTAINABLE DEVELOPMENT IN TOURISM AND HOTEL-RESTAURANT ENTERPRISES

pages 14–24

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This research explores the processes of ensuring leadership in sustainable development and the related managerial interaction of enterprise leaders in the tourism and hotel-restaurant sectors.

Within the scope of the research, the issue of establishing managerial interaction among leaders of tourism and hotel-restaurant enterprises, as well as shaping their effective influence on subordinates, was examined. In addition, the research considered conditions in which there is a prevailing orientation toward the extensive use of natural resources, alongside a simultaneous aspiration for integration into the European economic space, where sustainable development is a priority.

This paper intends to identify a model that can serve as a tool for ensuring leadership in sustainable development through the integration of individual leaders' perceptions of the desired state of the enterprise into a shared vision. This implies that this vision is communicated across the strategic, coordination, and operational levels, while also balancing and enabling effective managerial interaction among its leaders.

This research defines optimal paths for achieving leadership in the field of sustainable development of tourism and hotel-restaurant enterprises. These results are explained by the following:

- integration of leaders' interests into a shared strategic vision allows for the coordination of their actions at all levels of interaction;
- formalizing the relationship between leaders' influences and sustainable development outcomes demonstrates the effectiveness of coalition proposals and their contribution to enhancing the significance of the Triple Bottom Line;
- translating the vision of sustainable development into specific managerial actions ensures a consistent increase in Triple Bottom Line indicators even under imperfect conditions.

The results can be implemented in organizational management, but under conditions where tourism and hotel-restaurant enterprises have formalized leader coalitions and their owners demonstrate a readiness to integrate sustainable development principles into their operations.

Keywords: sustainable development, leadership, conflicts, strategic level, game theory, vision.

References

1. Savruk, O. (2025). Liderstvo – tse pro maibutnie. Pro daleke maibutnie intervju. *Kmbs*. Available at: <https://kmbs.ua/ua/article/liderstvo-pro-maibutnie-pro-dalekie-maibutnie>
2. Zhang, H., Zhang, R., Liu, J., Zhu, Y. (2025). Strategic manipulation behavior in graph model for conflict Resolution: The role of social trust network. *Information Sciences*, 686, 121313. <https://doi.org/10.1016/j.ins.2024.121313>
3. Antipova, E., Rashkovskiy, S. (2022). *Mathematical Theory of Conflicts as a Cognitive Control Theory*. *Information*, 14 (1), 1. <https://doi.org/10.3390/info14010001>
4. Khaletska, A. A. (2023). Responsible and global leadership for sustainable development. *Public Administration and Customs Administration*, 36 (1), 89–93. <https://doi.org/10.32782/2310-9653-2023-1.13>
5. Kulnich, T., Prosovykh, O., Zhayvoronok, I., Chyzmar, I., Sterniyuk, O. (2025). Concerning the issue of maximizing and balancing the components of the triple bottom line in sustainable business development. *Financial and Credit Activity Problems of Theory and Practice*, 4 (63), 440–454. <https://doi.org/10.55643/fcaptop.4.63.2025.4779>
6. Lypych, L. H., Kushnir, M. A. (2024). Kontseptsiiia stratehichnoho liderstva: vyklyky, evoliutsiia, pryntsyipy. *Dosiahnennia ekonomiky: perspektyvy ta innovatsii*, 8. <https://doi.org/10.5281/zenodo.13166294>
7. Carter, S. M., Greer, C. R. (2013). Strategic Leadership: Values, Styles, and Organizational Performance. *Journal of Leadership & Organizational Studies*, 20 (4), 375–393. <https://doi.org/10.1177/1548051812471724>
8. Browning, J. W. (2013). *Leading at the Strategic Level in an Uncertain World*. Washington: NDU Press. Available at: https://www.academia.edu/40799981/James_W_Browning_Leading_at_the_Strategic_Level_in_an_Uncertain_World
9. Rowe, G., Nejad, M. H. (2009). Strategic Leadership: Short-Term Stability and Long-Term Viability. *Ivey Business Journal*, 73 (5), 6–11. Available at: <https://www.iveypublishing.ca/s/product/strategic-leadership-shortterm-stability-and-longterm-viability/01t5c00000CwfuiAAB>
10. Sivili, F. O., Boateng, P. A. (2023). Assessment of Strategic Leadership Practices in Small Business Settings. *International Journal of Research and Innovation in Social Science*, 7 (5), 424–433. <https://doi.org/10.47772/ijriss.2023.70535>
11. Rusch, H. (2022). Modelling behaviour in intergroup conflicts: a review of microeconomic approaches. *Philosophical Transactions of the Royal Society B*, 377 (1851). <https://doi.org/10.1098/rstb.2021.0135>
12. Simons, T. L., Peterson, R. S. (2000). Task conflict and relationship conflict in top management teams: The pivotal role of intragroup trust. *Journal of Applied Psychology*, 85 (1), 102–111. <https://doi.org/10.1037/0021-9010.85.1.102>
13. Liu, J., Fu, P., Liu, S. (2009). Conflicts in top management teams and team/firm outcomes: The moderating effects of conflict-handling approaches. *International Journal of Conflict Management*, 20 (3), 228–250. <https://doi.org/10.1108/10444060910974867>
14. Karyy, O., Kisiolek, A., Dzyubina, A., Kucher, A. (2022). Social Capital, Rules and Their Influence on Agreement Implementation. *TEM Journal*, 11 (4), 1887–1896. <https://doi.org/10.18421/tem11457>
15. Zayed, A., Nasr, R. (2023). Analyzing the expected role of strategic leadership and supportive culture in executing business strategies: The mediating role of employee engagement. *The Academic Journal of Contemporary Commercial Research*, 3 (2), 18–42. Available at: https://www.researchgate.net/publication/392080097_Analyzing_the_expected_role_of_strategic_leadership_and_supportive_culture_in_executing_business_strategies_The_mediating_role_of_employee_engagement
16. Lewin, K. (1939). *Field Theory and Experiment in Social Psychology: Concepts and Methods*. *American Journal of Sociology*, 44 (6), 868–896. <https://doi.org/10.1086/218177>
17. Lewin, K., Lippitt, R., White, R. K. (1939). Patterns of Aggressive Behavior in Experimentally Created "Social Climates". *The Journal of Social Psychology*, 10 (2), 269–299. <https://doi.org/10.1080/00224545.1939.9713366>
18. Marova, S. F. (2024). Features of using tools leadership in war and peace times. *Central Ukrainian Journal of Law and Public Management*, 2. <https://doi.org/10.32782/cuj-2024-2-6>
19. Albashiti, B., Hamid, Z., Aboramadan, M. (2021). Fire in the belly: the impact of despotic leadership on employees work-related outcomes in the hospitality setting. *International Journal of Contemporary Hospitality Management*, 33 (10), 3564–3584. <https://doi.org/10.1108/ijchm-03-2021-0394>
20. Zhao, H., Guo, L. (2019). Abusive supervision and hospitality employees' helping behaviors: the joint moderating effects of proactive personality and ability to manage resources. *International Journal of Contemporary Hospitality Management*, 31 (4), 1977–1994. <https://doi.org/10.1108/ijchm-01-2018-0100>
21. Ye, Y., Lyu, Y., He, Y. (2019). Servant leadership and proactive customer service performance. *International Journal of Contemporary Hospitality Management*, 31 (3), 1330–1347. <https://doi.org/10.1108/ijchm-03-2018-0180>
22. Nguyen, G. N. T., Wechtler, H., Lai, P.-H. (2025). Mapping leadership studies to the achievement of sustainable development goals in tourism and hospitality: A systematic literature review and future research Agenda. *Journal of Hospitality and Tourism Management*, 65, 101351. <https://doi.org/10.1016/j.jhtm.2025.101351>

23. Hoang, G., Luu, T. T., Yang, M. (2024). A Systematic Literature Review of Authentic Leadership in Tourism and Hospitality: A Call for Future Research. *Cornell Hospitality Quarterly*, 66 (1), 110–132. <https://doi.org/10.1177/19389655241241471>
24. McGehee, N. G., Knollenberg, W., Komorowski, A. (2015). The central role of leadership in rural tourism development: a theoretical framework and case studies. *Journal of Sustainable Tourism*, 23 (8-9), 1277–1297. <https://doi.org/10.1080/09669582.2015.1019514>
25. McCarter, M. W., Wade-Benzoni, K. A., Kamal, D. K. F., Bang, H. M., Hyde, S. J., Maredia, R. (2020). Models of intragroup conflict in management: A literature review. *Journal of Economic Behavior & Organization*, 178, 925–946. <https://doi.org/10.1016/j.jebo.2018.04.017>
26. Xu, K., Zhang, J., Tian, F. (2017). Community Leadership in Rural Tourism Development: A Tale of Two Ancient Chinese Villages. *Sustainability*, 9 (12), 2344. <https://doi.org/10.3390/su9122344>
27. Torkabadi, A., Mamoudan, M. M., Erdebili, B., Aghsami, A. (2025). A multi-objective game theory model for sustainable profitability in the tourism supply chain: Integrating human resource management and artificial neural networks. *Systems and Soft Computing*, 7. <https://doi.org/10.1016/j.sasc.2025.200217>
28. Yulianeu, A., Ferdinand, A. T., Purnomo, R. (2021). Transformational leadership and energizing organizational learning: empirical model for improving community-based eco-tourism performance in Indonesia. *Geojournal of Tourism and Geosites*, 38 (4), 1135–1142. <https://doi.org/10.30892/gtg.38419-753>

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COMPOSITE ASSESSMENT OF THE ECONOMIC PERFORMANCE OF CIRCULAR TRANSFORMATION PERFORMANCE IN INDUSTRIAL ENTERPRISES IN THE ECONOMY – ENVIRONMENT – SOCIETY DIMENSION

pages 25–34

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The object of research is the economic effectiveness of the processes of circular transformation of industrial enterprises. The problem lies in the absence of an integrated enterprise-level approach that would make it possible to identify of inter-block imbalances, ensure analytical consistency of indicators, and strengthen the basis for managerial decision-making.

The paper provides a comprehensive assessment of circular transformation performance in industrial enterprises in the economy – environment – society dimension.

A composite CEI-360 index is proposed, combining a harmonized system of indicators, fixed min-max normalization, block weighting, and aggregation with limited inter-block compensability. In addition, a structural-balance coefficient is introduced to distinguish the overall level of effectiveness from

the consistency of change across the economic, environmental, and social dimensions.

The empirical basis is panel data for five Ukrainian industrial enterprises from different industries for 2015–2025 using scenario modeling for 2026–2030. The results showed growth in 2015–2021, a systemic decline in 2022 (–15.7%) and a further differentiated recovery in 2023–2025 exceeding the 2021 level. The scenario analysis confirmed the stable advantage of the circular-cluster development trajectory over the inertial one (up to +0.108 CEI-360 points in 2030).

The originality of the research lies in the development of an integrated tool for assessing circular transformation performance with explicit consideration of structural consistency across dimensions. The practical significance of the findings lies in using the framework for strategic diagnostics, benchmarking, monitoring of dynamics, and substantiating managerial decisions on the priorities of circular enterprise development.

Keywords: circular transformation, economic performance, economic development, innovation potential, enterprise competitiveness, digitalization.

References

1. Geissdoerfer, M., Savaget, P., Bocken, N. M. P., Hultink, E. J. (2017). The Circular Economy – A new sustainability paradigm? *Journal of Cleaner Production*, 143, 757–768. <https://doi.org/10.1016/j.jclepro.2016.12.048>
2. Kirchherr, J., Reike, D., Hekkert, M. (2017). Conceptualizing the circular economy: An analysis of 114 definitions. *Resources, Conservation and Recycling*, 127, 221–232. <https://doi.org/10.1016/j.resconrec.2017.09.005>
3. Korhonen, J., Nuur, C., Feldmann, A., Birkie, S. E. (2018). Circular economy as an essentially contested concept. *Journal of Cleaner Production*, 175, 544–552. <https://doi.org/10.1016/j.jclepro.2017.12.111>
4. Kirchherr, J., Yang, N.-H. N., Schulze-Spüntrup, F., Heerink, M. J., Hartley, K. (2023). Conceptualizing the Circular Economy (Revisited): An Analysis of 221 Definitions. *Resources, Conservation and Recycling*, 194, 107001. <https://doi.org/10.1016/j.resconrec.2023.107001>
5. Saidani, M., Yannou, B., Leroy, Y., Cluzel, F., Kendall, A. (2019). A taxonomy of circular economy indicators. *Journal of Cleaner Production*, 207, 542–559. <https://doi.org/10.1016/j.jclepro.2018.10.014>
6. Moraga, G., Huysveld, S., Mathieux, F., Blengini, G. A., Alaerts, L., Van Acker, K. et al. (2019). Circular economy indicators: What do they measure? *Resources, Conservation and Recycling*, 146, 452–461. <https://doi.org/10.1016/j.resconrec.2019.03.045>
7. Kristensen, H. S., Mosgaard, M. A. (2020). A review of micro level indicators for a circular economy – moving away from the three dimensions of sustainability? *Journal of Cleaner Production*, 243, 118531. <https://doi.org/10.1016/j.jclepro.2019.118531>
8. De Pascale, A., Arbolino, R., Szopik-Depczyńska, K., Limosani, M., Ioppolo, G. (2021). A systematic review for measuring circular economy: The 61 indicators. *Journal of Cleaner Production*, 281, 124942. <https://doi.org/10.1016/j.jclepro.2020.124942>
9. Elia, V., Gnoni, M. G., Tornese, F. (2024). Integrating circular economy and sustainability assessment on the micro-level: An umbrella review. *Sustainable Production and Consumption*, 50, 405–415. <https://doi.org/10.1016/j.spc.2024.08.012>
10. Ferrante, M., Vitti, M., Sassanelli, C. (2025). The evolution of circular economy performance assessment: A systematic literature review. *Renewable and Sustainable Energy Reviews*, 217, 115757. <https://doi.org/10.1016/j.rser.2025.115757>
11. Hossain, M., Park, S., Suchek, N., Pansera, M. (2024). Circular economy: A review of review articles. *Business Strategy and the Environment*, 33 (7), 7077–7099. <https://doi.org/10.1002/bse.3867>
12. *Handbook on Constructing Composite Indicators: Methodology and User Guide* (2008). OECD. <https://doi.org/10.1787/9789264043466-en>
13. Schroeder, P., Anggraeni, K., Weber, U. (2019). The Relevance of Circular Economy Practices to the Sustainable Development Goals. *Journal of Industrial Ecology*, 23 (1), 77–95. <https://doi.org/10.1111/jiec.12732>
14. Calisto Friant, M., Vermeulen, W. J. V., Salomone, R. (2020). A typology of circular economy discourses: Navigating the diverse visions of a contested paradigm. *Resources, Conservation and Recycling*, 161, 104917. <https://doi.org/10.1016/j.resconrec.2020.104917>

15. 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>
16. Walker, A. M., Opferkuch, K., Roos Lindgreen, E., Simboli, A., Vermeulen, W. J. V., Raggi, A. (2021). Assessing the social sustainability of circular economy practices: Industry perspectives from Italy and the Netherlands. *Sustainable Production and Consumption*, 27, 831–844. <https://doi.org/10.1016/j.spc.2021.01.030>
17. Bianchini, A., Guarnieri, P., Rossi, J. (2022). A Framework to Assess Social Indicators in a Circular Economy Perspective. *Sustainability*, 14 (13), 7970. <https://doi.org/10.3390/su14137970>
18. Walker, A. M., Opferkuch, K., Roos Lindgreen, E., Raggi, A., Simboli, A., Vermeulen, W. J. V. et al. (2021). What Is the Relation between Circular Economy and Sustainability? Answers from Frontrunner Companies Engaged with Circular Economy Practices. *Circular Economy and Sustainability*, 2 (2), 731–758. <https://doi.org/10.1007/s43615-021-00064-7>
19. Jayakodi, S., Senaratne, S., Perera, S., Bamdad, K. (2024). Circular economy assessment using project-level and organisation-level indicators for construction organisations: A systematic review. *Sustainable Production and Consumption*, 48, 324–338. <https://doi.org/10.1016/j.spc.2024.05.025>
20. Opferkuch, K., Caeiro, S., Salomone, R., Ramos, T. B. (2021). Circular economy in corporate sustainability reporting: A review of organisational approaches. *Business Strategy and the Environment*, 30 (8), 4015–4036. <https://doi.org/10.1002/bse.2854>
21. *Annual reports*. ArcelorMittal Kryvyi Rih. Available at: <https://ukraine.arcelormittal.com/en/corporate-responsibility/annual-reports>
22. *Reports*. Interpipe. Available at: <https://interpipe.biz/en/reports/>
23. *Finansova zvitnist ta zvit nezaleznoho audytora* (2021). PrAT «Sentravis Prodakshn Yukrein». Available at: <https://www.centrastravis.com/wp-content/uploads/2023/03/2021-cpu-fs-with-audit-report-signed.pdf>
24. *Investors*. JSC "Ukrenergymachines". Available at: <https://ukrenergymachines.com/en/investors>
25. *Financial reporting*. Motor Sich. Available at: <https://motorsich.com/eng/investors/othetnost/bux/>
26. *SMIDA*. Available at: <https://smida.gov.ua/>
27. *Finansova zvitnist pidpriemstv (richna)*. Derzhavna sluzhba statystyky Ukrainy. Available at: <https://data.gov.ua/dataset/7436ae83-dfc1-4836-9962-8af3e831c522>

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ASSESSMENT OF THE IMPACT OF STRATEGIC MANAGEMENT OF BRAND DEVELOPMENT ON THE EFFICIENCY OF PRODUCTION RESOURCE USE

pages 35–42

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The object of research is the processes of brand development management at manufacturing enterprises, which are considered as a component of their strategic functioning. The research is aimed at identifying the main concept of branding processes, in particular in the focus of the strategic development of manufacturing enterprises. Since the current problem is the search for ways to increase the use of the brand to improve production efficiency.

The empirical research consisted of a questionnaire, interviews, and case and correlation analysis methods. The comprehensive research made it possible to trace that in the process of integrating the brand strategy into the general concept of enterprise development, it was possible to increase the efficiency of attracting material and labor resources. Thus, according to the survey, about 70% of respondents believe that strategic brand management should be considered as one of the key aspects of production stability. Correlation analysis also confirmed the strong relationship between the level of investment in branding of the enterprise and indicators of labor productivity growth (coefficient 0.81). Such results can be explained from the point of view of not only the communication, but also the integration function of production branding. It contributes to the creation of a unified system of values, increases the level of motivation of personnel, and also stimulates the development of an innovative culture. Martial law in Ukraine has exacerbated the manifestations of the influence of enterprises on society: the brand has become the embodiment of trust from partners and consumers. This allows companies to maintain a high level of competitiveness despite socio-economic and political instability.

The results obtained can be applied in practice in the context of developing brand management concepts and principles of production policy of individual enterprises. In addition, the analyzed data can be involved in the process of developing integrated management models, which is a symbiosis of branding and digital transformation policy.

Keywords: correlation analysis, innovative culture, brand strategy integration, production reserves, brand strategy, integrated management.

References

1. Gupta, S., Gallear, D., Rudd, J., Foroudi, P. (2020). The impact of brand value on brand competitiveness. *Journal of Business Research*, 112, 210–222. <https://doi.org/10.1016/j.jbusres.2020.02.033>
2. Urde, M. (2016). The brand core and its management over time. *Journal of Product & Brand Management*, 25 (1), 26–42. <https://doi.org/10.1108/jpbm-05-2015-0875>
3. Cui, H., Nie, Y., Li, Z., Zeng, J. (2022). Construction and Development of Modern Brand Marketing Management Mode Based on Artificial Intelligence. *Journal of Sensors*, 2022, 1–11. <https://doi.org/10.1155/2022/9246545>
4. Krap, A., Bataiev, S., Bobro, N., Kozub, V., Hlevatska, N. (2024). Examination of digital advancements: Their influence on contemporary corporate management methods and approaches. *Multidisciplinary Reviews*, 7. <https://doi.org/10.31893/multirev.2024spe026>
5. Lalounis, S. T. (2020). *Strategic Brand Management and Development Creating and Marketing*. Routledge. <https://doi.org/10.4324/9780429322556>
6. Mazaraki, A., Tarasiuk, M., Solonenko, Y., Galenko, O., Lysyniuk, M., Fayvishenko, D. (2021). Strategic Brand Management in the Market. *Studies of Applied Economics*, 39 (5). <https://doi.org/10.25115/eeav39i5.4829>
7. Gómez-Rico, M., Molina-Collado, A., Santos-Vijande, M. L., Molina-Collado, M. V., Imhoff, B. (2022). The role of novel instruments of brand communication and brand image in building consumers' brand preference and intention to visit wineries. *Current Psychology*, 42 (15), 12711–12727. <https://doi.org/10.1007/s12144-021-02656-w>
8. Iyer, P., Davari, A., Srivastava, S., Paswan, A. K. (2020). Market orientation, brand management processes and brand performance. *Journal of Product & Brand Management*, 30 (2), 197–214. <https://doi.org/10.1108/jpbm-08-2019-2530>
9. Šindleryová, I. B., Hoghová, K. (2020). Brand marketing of regional products – A potential strategic management tool in regional development. *Communication Today*, 11 (1), 164–184. Available at: https://www.researchgate.net/publication/398466568_BRAND_MARKETING_OF_REGIONAL_PRODUCTS_-_A_POTENTIAL_STRATEGIC_MANAGEMENT_TOOL_IN_REGIONAL_DEVELOPMENT

10. Carniello, M. F., dos Santos, M. J. (2022). Brand as a Territorial Development Strategy: convergence between city branding and the Master Plan of São Paulo city. *ReMark – Revista Brasileira De Marketing*, 21 (1), 134–153. <https://doi.org/10.5585/remar.v21i1.20542>
11. Beran, V., Dedkova, J. (2024). Attitudes of manufacturers toward the value attributes of regional product brands. *E+M Ekonomie a Management*, 27 (4), 176–191. <https://doi.org/10.15240/tul/001/2024-5-025>
12. Kinnunen, J., Saunila, M., Ukko, J., Rantanen, H. (2022). Strategic sustainability in the construction industry: Impacts on sustainability performance and brand. *Journal of Cleaner Production*, 368, 133063. <https://doi.org/10.1016/j.jclepro.2022.133063>
13. Wu, L., Jin, S. (2022). Corporate Social Responsibility and Sustainability: From a Corporate Governance Perspective. *Sustainability*, 14 (22), 15457. <https://doi.org/10.3390/su142215457>
14. Potwora, M., Vdovichena, O., Semchuk, D., Lypych, L., Saienko, V. (2024). The use of artificial intelligence in marketing strategies: Automation, personalization and forecasting. *Journal of Management World*, 2024 (2), 41–49. <https://doi.org/10.53935/jomwv2024i2.275>
15. Hoque, M. T., Nath, P., Ahammad, M. F., Tzokas, N., Yip, N. (2022). Constituents of dynamic marketing capability: Strategic fit and heterogeneity in export performance. *Journal of Business Research*, 144, 1007–1023. <https://doi.org/10.1016/j.jbusres.2022.02.011>
16. Dejanović, A. M., Nikolić, S. T., Stanković, J. (2015). Integral model of strategic management: Identification of potential synergies. *Acta Polytechnica Hungarica*, 12 (8), 115–133. <https://doi.org/10.12700/aph.12.8.2015.8.7>
17. Keller, K. L. (2013). *Strategic Brand Management: Building, Measuring, and Managing Brand Equity*. Edinburgh: Pearson Education, Inc, 591. Available at: <https://www.scirp.org/reference/referencespapers?referenceid=3044185>
18. Islami, M. M., Rahyuni, S., Rukayyah, A. (2024). Strategic Branding: Building Market Positioning and Business Growth through Integrated Management Practices. *Advances in Business & Industrial Marketing Research*, 2 (2). <https://doi.org/10.60079/abim.v2i2.293>
19. Kotler, P., Keller, K. L. (2016). *Marketing management*. Pearson Education. Available at: <https://www.scirp.org/reference/referencespapers?referenceid=3155681>

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ASSESSMENT OF THE EFFECTIVENESS OF IMPLEMENTING AI TOOLS IN BUSINESS ANALYTICS OF ENTERPRISES IN THE CONDITIONS OF DIGITAL CHANGE

pages 43–54

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The object of research is the processes of formation, analysis, processing and analysis of information by business analysts of an enterprise in the conditions of changing digital environment. The problem being solved is the need to process a large amount of data to make high-quality management decisions and reduce economic costs. The relevance of the research is due to the trends in the development of the digital environment. The paper considers theoretical and applied aspects and stages of the development of business analytics under the influence of AI tools. The paper explores the fundamental principles of using

AI tools in analytical processes of enterprises and assesses their effectiveness. The methodological apparatus is based on the use of a systems approach, methods of theoretical and economic and mathematical modulation. As a research result, it was determined that the AI implementation tools create a positive effect and reduce errors in forecasting (up to 90%) based on business analysis. Accordingly, a positive economic result was established, which proves the feasibility of improving business analytics. A significant increase in the efficiency of such business processes as logistics (by 20–30%), marketing and foreign economic activity of enterprises has been identified. Company management indicates a reduction in additional costs (up to 92%), which contributes to the choice of optimal development strategies. Key barriers to the development of AI have been identified, including the shortage of personnel and the ethics of using digital platforms. It is empirically presented that this is due to the use of only 16% of AI tools in enterprise management. For further effective implementation, a phased transformation of the management environment of enterprises is envisaged through the gradual introduction of digital tools on a permanent basis and the creation, as a result, of a common digital ecosystem of the enterprise in various areas of activity.

Keywords: digital transformation, business analytics, intelligent algorithms, forecasting, modelling, resilience, algorithmizing.

References

1. Chui, M., Manyika, J., Miremadi, M., Henke, N., Chung, R., Nel, P., Malhotra, S. (2018). Notes from the AI frontier: applications and value of deep learning. *McKinsey & Company*. Available at: <https://www.mckinsey.com/featured-insights/artificial-intelligence/notes-from-the-ai-frontier-applications-and-value-of-deep-learning>
2. Maragno, G., Tangi, L., Gastaldi, L., Benedetti, M. (2023). Exploring the factors, affordances and constraints outlining the implementation of Artificial Intelligence in public sector organizations. *International Journal of Information Management*, 73, 102686. <https://doi.org/10.1016/j.ijinfomgt.2023.102686>
3. Noble, S. M., Mende, M. (2023). The future of artificial intelligence and robotics in the retail and service sector: Sketching the field of consumer-robot-experiences. *Journal of the Academy of Marketing Science*, 51 (4), 747–756. <https://doi.org/10.1007/s11747-023-00948-0>
4. Zhao, X., Zhai, G., Lee, H., Apergis, N., Ma, X. (2025). Harnessing artificial intelligence for urban economic resilience. *Applied Economics*, 1–20. <https://doi.org/10.1080/00036846.2025.2501352>
5. Andriushchenko, K., Buriachenko, A., Liezina, A., Lavruk, O., Korzhenivska, N., Slavina, N. (2024). The impact of labor resources on the economic security of an enterprise in the sustainable development concept. *Technology Audit and Production Reserves*, 6 (4 (80)), 21–31. <https://doi.org/10.15587/2706-5448.2024.318702>
6. de Bellis, E., Venkataramani Johar, G. (2020). Autonomous Shopping Systems: Identifying and Overcoming Barriers to Consumer Adoption. *Journal of Retailing*, 96 (1), 74–87. <https://doi.org/10.1016/j.jretai.2019.12.004>

7. Liezina, A., Andriushchenko, K., Domina, O., Titova, O., Petukhova, H. (2024). Regional clustering of FEC enterprises to strengthen the country's economic security. *Technology Audit and Production Reserves*, 6 (4 (80)), 51–61. <https://doi.org/10.15587/2706-5448.2024.320341>
8. Misra, K., Schwartz, E. M., Abernethy, J. (2019). Dynamic Online Pricing with Incomplete Information Using Multiarmed Bandit Experiments. *Marketing Science*, 38 (2), 226–252. <https://doi.org/10.1287/mksc.2018.1129>
9. Pokataiev, P., Teteruk, K., Andriushchenko, A. (2023). A biotechnological business incubator as an instrument of innovation entrepreneurship. *Recent Trends in Business and Entrepreneurial Ventures*. Nova, 37–60.
10. Sundaram, A., Wesselbaum, D. (2024). Economic development reloaded: the AI revolution in developing nations. *New Zealand Economic Papers*, 59 (1), 11–17. <https://doi.org/10.1080/00779954.2024.2439955>
11. Andriushchenko, K., Liezina, A., Slavkova, A., Logvinov, P., Lavruk, V., Petrukha, S., Storozhenko, A. (2024). The Impact of Energy-Efficient Technologies on the Development of the Agricultural Industry. *Journal of Environmental & Earth Sciences*, 7 (1). <https://doi.org/10.30564/jeesv7i1.7635>
12. A Year of Solving Together (2024). *Global Annual Review*. Available at: <https://www.pwc.com/gx/en/global-annual-review/2024/pwc-global-annual-review-2024.pdf>
13. Andriushchenko, A., Liezina, A., Kolybo, D., Gurina, G., Havrysh, K., Mazur, N. et al. (2026). Determining the investment attractiveness of the biohacking and bioinnovation market based on market trends in the pharmaceutical business. *Technology Audit and Production Reserves*, 1 (4 (87)), 21–33. <https://doi.org/10.15587/2706-5448.2026.352711>
14. Fotheringham, D., Wiles, M. A. (2022). The effect of implementing chatbot customer service on stock returns: an event study analysis. *Journal of the Academy of Marketing Science*, 51 (4), 802–822. <https://doi.org/10.1007/s11747-022-00841-2>
15. Buriachenko, A., Zakhochay, K., Liezina, A., Lysak, V. (2022). Sustainability and security of public budget of the Visegrad Group countries. *Acta Innovations*, 42, 71–88. <https://doi.org/10.32933/actainnovations.42.6>
16. Liezina, A., Lavruk, A., Matviienko, H., Ivanets, I., Tseluiko, O., Kuchai, O. (2023). Impact of econometric modeling and perspectives of economic security of the cross-industry complex. *Acta Innovations*, 47, 73–83. <https://doi.org/10.32933/actainnovations.47.7>
17. Riachy, C., He, M., Joneidy, S., Qin, S., Payne, T., Boulton, G. et al. (2025). Enhancing deep learning for demand forecasting to address large data gaps. *Expert Systems with Applications*, 268, 126200. <https://doi.org/10.1016/j.eswa.2024.126200>
18. Koval, A. Iu., Riepina, I. M., Shvydanenko, H. O. (2021). Goodwill Evaluation at the Machine Building Plants. *The Importance of New Technologies and Entrepreneurship in Business Development: In The Context of Economic Diversity in Developing Countries*, 1393–1409. https://doi.org/10.1007/978-3-030-69221-6_104
19. Zierau, N., Hildebrand, C., Bergner, A., Busquet, F., Schmitt, A., Marco Leimeister, J. (2022). Voice bots on the frontline: Voice-based interfaces enhance flow-like consumer experiences & boost service outcomes. *Journal of the Academy of Marketing Science*, 51 (4), 823–842. <https://doi.org/10.1007/s11747-022-00868-5>
20. Yu, H., Hou, Y., Liu, Y., Li, Y. (2025). How generative AIs support selection and evaluation in complex decision tasks: insights from academic paper review. *Journal of Management Analytics*, 12 (3), 435–449. <https://doi.org/10.1080/23270012.2025.2537410>
21. Andriushchenko, K., Kovtun, V., Cherniaieva, O., Datsii, N., Aleinikova, O., Mykolalets, A. (2020). Transformation of the Educational Ecosystem in the Singularity Environment. *International Journal of Learning, Teaching and Educational Research*, 19 (9), 77–98. <https://doi.org/10.26803/ijlter.19.9.5>
22. Aung, T. S., Fischer, T. B. (2025). Impact assessment in the age of artificial intelligence: reflections from IAIA25. *Impact Assessment and Project Appraisal*, 43 (3), 166–170. <https://doi.org/10.1080/14615517.2025.2505265>
23. Bakker, A. B., Demerouti, E. (2017). Job demands-resources theory: Taking stock and looking forward. *Journal of Occupational Health Psychology*, 22 (3), 273–285. <https://doi.org/10.1037/ocp0000056>
24. Tech & AI Insights. *McKinsey*. Available at: <https://www.mckinsey.com/capabilities/mckinsey-digital/our-insights>
25. Shalko, M., Domina, O., Korobko, I., Melnyk, D., Andriushchenko, A. (2024). The transformative impact of large language models in healthcare. *Technology Audit and Production Reserves*, 6 (4 (80)), 32–42. <https://doi.org/10.15587/2706-5448.2024.319006>
26. Bazaluk, O., Kader, S. A., Zayed, N. M., Chowdhury, R., Islam, Md. Z., Nitsenko, V. S., Bratus, H. (2024). Determinant on Economic Growth in Developing Country: A Special Case Regarding Turkey and Bangladesh. *Journal of the Knowledge Economy*, 16 (1), 135–159. <https://doi.org/10.1007/s13132-024-01989-8>
27. Danyliuk, V., Riepina, I., Shafalyuk, A., Valinkevych, N., Reznik, N. (2022). Methodical approaches to measurement of the technical level of a production enterprise. *International conference on sustainable innovation in mechanical engineering*, 2413, 040017. <https://doi.org/10.1063/5.0080013>
28. Ying, S., Li, Z., Yu, M. (2025). Beyond words: evaluating large language models in transportation planning. *Geo-Spatial Information Science*, 29 (1), 451–473. <https://doi.org/10.1080/10095020.2025.2493073>
29. Schneier, B. (2025). AI and Trust. *Communications of the ACM*, 68 (8), 29–33. <https://doi.org/10.1145/3737610>
30. Andriushchenko, K., Liezina, A., Vasylychak, S., Manylich, M., Shterma, T., Petrynyak, U. (2022). Management of the Development of the Innovative Potential of the Region. *TEM Journal*, 11 (1), 339–347. <https://doi.org/10.18421/tem111-43>
31. Bughin, J. (2025). Incumbent strategic renewal drivers to AI disruption. *Technology Analysis & Strategic Management*, 1–12. <https://doi.org/10.1080/09537325.2025.2509233>
32. DeMasi, O., Kording, K., Recht, B. (2017). Meaningless comparisons lead to false optimism in medical machine learning. *PLOS ONE*, 12 (9), e0184604. <https://doi.org/10.1371/journal.pone.0184604>
33. Grandinetti, R. (2020). How artificial intelligence can change the core of marketing theory. *Innovative Marketing*, 16 (2), 91–103. [https://doi.org/10.21511/im.16\(2\).2020.08](https://doi.org/10.21511/im.16(2).2020.08)
34. Grewal, D., Noble, S. M., Roggeveen, A. L., Nordfalt, J. (2019). The future of in-store technology. *Journal of the Academy of Marketing Science*, 48 (1), 96–113. <https://doi.org/10.1007/s11747-019-00697-z>
35. Holthöwer, J., van Doorn, J. (2022). Robots do not judge: service robots can alleviate embarrassment in service encounters. *Journal of the Academy of Marketing Science*, 51 (4), 767–784. <https://doi.org/10.1007/s11747-022-00862-x>
36. Cooper, R. G., Brem, A. M. (2024). Insights for Managers About AI Adoption in New Product Development. *Research-Technology Management*, 67 (6), 39–46. <https://doi.org/10.1080/08956308.2024.2418734>
37. Demsar, V., Ferraro, C., Sands, S., Kohn, A. (2025). Harmony or Discord? The Intersection of Generative AI and Human Creativity in Advertising. *Journal of Advertising Research*, 65 (2), 150–166. <https://doi.org/10.1080/00218499.2025.2464305>
38. Stender, S., Bulkot, O., Iastremska, O., Saienko, V., Pereguda, Y. (2024). Digital transformation of the national economy of Ukraine: challenges and opportunities. *Financial and Credit Activity Problems of Theory and Practice*, 2 (55), 333–345. <https://doi.org/10.55643/fcaptop.2.55.2024.4328>
39. Kmiecik, M., Skórnióg, D. (2025). Impact of generative AI on logistics companies' business models. *International Journal of Logistics Research and Applications*, 1–25. <https://doi.org/10.1080/13675567.2025.2497537>
40. Riepina, I., Ligonenko, L., Sadovnyk, O., Dzyubenko, L., Kovtun, V. (2022). Identification of factors related to transport entrepreneurship influencing the economic development of Ukraine. *Transport Problems*, 17 (4), 151–163. <https://doi.org/10.20858/tp.2022.17.4.13>
41. Andriushchenko, K., Khaletska, A., Ushenko, N., Zholnerchuk, H., Ivanets, I., Petrychuk, S., Uliganets, S. (2021). Education process digitalization and its impact on human capital of an enterprise. *Journal of Management Information and Decision Sciences*, 24 (5).
42. Bonetti, F., Montecchi, M., Plangger, K., Schau, H. J. (2022). Practice co-evolution: Collaboratively embedding artificial intelligence in retail practices. *Journal of the Academy of Marketing Science*, 51 (4), 867–888. <https://doi.org/10.1007/s11747-022-00896-1>
43. Mohamed, N. (2025). Cutting-edge advances in AI and ML for cybersecurity: a comprehensive review of emerging trends and future directions. *Cogent Business & Management*, 12 (1). <https://doi.org/10.1080/23311975.2025.2518496>
44. Choi, D., Cho, I. (2025). Analysis of informatization-related factors for digital transformation in manufacturing small and medium-sized enterprises using machine learning techniques. *International Journal of Production Research*, 63 (18), 6669–6689. <https://doi.org/10.1080/00207543.2025.2481182>

45. Zhao, J., Gómez Fariñas, B. (2022). Artificial Intelligence and Sustainable Decisions. *European Business Organization Law Review*, 24 (1), 1–39. <https://doi.org/10.1007/s40804-022-00262-2>
46. Davenport, T., Guha, A., Grewal, D., Bressgott, T. (2019). How artificial intelligence will change the future of marketing. *Journal of the Academy of Marketing Science*, 48 (1), 24–42. <https://doi.org/10.1007/s11747-019-00696-0>
47. Andriushchenko, K., Liezina, A., Lavruk, V., Sliusareva, L., Rudevska, V. (2022). Intelligent enterprise capital control based on Markov chain. *Acta Innovations*, 45, 18–30. <https://doi.org/10.32933/actainnovations.45.2>
48. Ligonenko, L., Riepina, I., Nykyforuk, O., Berezhnytska, U., Myslyuk, V., Ovsienko, A. (2023). Prospects for the Development of Enterpreneurship: the Role of Universities. *Science and Innovation*, 19 (3), 15–37. <https://doi.org/10.15407/scine19.03.015>
49. Kovtun, V., Andriushchenko, K., Horbova, N., Lavruk, O., Yelyzaveta Muzychka, Y. (2020). Features of the Management Process of Ambidextrous Companies. *TEM Journal*, 9 (1), 221–226. <https://doi.org/10.18421/tem91-31>
50. Mende, M., Scott, M. L., Ubal, V. O., Hassler, C. M. K., Harmeling, C. M., Palmatier, R. W. (2023). Personalized Communication as a Platform for Service Inclusion? Initial Insights Into Interpersonal and AI-Based Personalization for Stigmatized Consumers. *Journal of Service Research*, 27 (1), 28–48. <https://doi.org/10.1177/10946705231188676>
51. Arsawan, I. W. E., Suhartanto, D., Koval, V., Tralo, I., Demenko, V., Azizah, A. (2024). Enhancing the circular economy business model towards sustainable business performance: Moderating the role of environmental dynamism. *Journal of Infrastructure Policy and Development*, 8 (5), 3321. <https://doi.org/10.24294/jipdv8i5.3321>
52. Pokataiev, P., Liezina, A., Petukhova, H., Andriushchenko, A. (2022). The role of biotechnology in the development of the bioeconomy. *Acta Innovations*, 46, 19–34. <https://doi.org/10.32933/actainnovations.46.2>
53. Ligonenko, L., Riepina, I., Shevchuk, N., Tepliuk, M., Domina, O. (2024). Innovation and infrastructure: driving forces for entrepreneurship development and economic opportunities. *Naukovyi Visnyk Natsionalnoho Hirnychoho Universytetu*, 5, 163–169. <https://doi.org/10.33271/nvngu/2024-5/163>
54. Silcox, C., Zimlichmann, E., Huber, K., Rowen, N., Saunders, R., McClellan, M. et al. (2024). The potential for artificial intelligence to transform healthcare: perspectives from international health leaders. *Npj Digital Medicine*, 7 (1). <https://doi.org/10.1038/s41746-024-01097-6>
55. Andriushchenko, K., Riepina, I., Buriachenko, A., Kyryliuk, O. (2025). Determining the capabilities of artificial intelligence on the development of cryptotrading and blockchain technology. *Technology Audit and Production Reserves*, 3 (4 (83)), 42–52. <https://doi.org/10.15587/2706-5448.2025.330463>
56. Haleem, A., Javaid, M., Asim Qadri, M., Pratap Singh, R., Suman, R. (2022). Artificial intelligence (AI) applications for marketing: A literature-based study. *International Journal of Intelligent Networks*, 3, 119–132. <https://doi.org/10.1016/j.ijin.2022.08.005>
57. Financial statements. *PrivatBank*. Available at: <https://privatbank.ua/about/finansovaja-otchetnost>
58. Zvit nezalezhnogo audytora. *Nova Poshta*. Available at: <https://static.novaposhta.ua/sitecard/misc/doc/Фінансова%20звітність%202023.pdf>
59. Kernel zavershyv finansovyi rik zbilshenniam valovoho y operatsiinoho prybutku na 38% i 25% vidpovidno. *Kernel*. Available at: <https://career.kernel.ua/novyny/kernel-zavershyv-finansovyj-rik-zbilshennyam-valovogo-j-operatsijnogo-prybutku-na-38-i-25-vidpovidno/>
60. Finansova zvitnist za 2006 – 2025 roky. *Kyivstar*. Available at: <https://kyivstar.ua/about/investors-and-shareholders/issuers>

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DETERMINING THE IMPACT OF DIGITALIZATION ON FINANCIAL MANAGEMENT AND DEVELOPING MODELS TO ASSESS ITS EFFICIENCY

pages 55–64

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The object of research is financial digitalization and the effectiveness of its impact on financial management. The problem of defining the mission of digitalization and formalizing its impact on financial management was solved.

The research results are as follows:

- defining the mission of digitalization in management as reforming its information support;
- distinguishing two management systems: digital and management technologies, and the presence of a systemic impact of the first on the second;
- assessing the effectiveness of digitalization taking into account the economic interests of stakeholders through the use of indicators: the effectiveness of investment in financial digitalization (ROIf), the effectiveness of financial management (Ef), the profitability of equity (ROE);
- the factorial relationship between the indicators: ROIf → Ef → ROE;
- formalizing ROIf, Ef, ROE for profitable enterprises and non-profit organizations through factor modeling and eliminating factors not related to digitalization;
- a mechanism for intensification of management processes due to the reduction of time and costs for management, the growth of sales volumes and net profit.

The originality of the results obtained lies in: using a systematic approach to defining the mission of digitalization of management; specifying the category of efficiency through its a posteriori definition and taking into account the interests of stakeholders; formalizing the indicators of the effectiveness of financial digitalization. This approach allowed to solve the above-mentioned problem, which regulates the scientific perception of digitalization of management and the prospects for its implementation. In practical activities, the developed methods will allow to objectively assess the effectiveness of financial digitalization and ensure the activation of investments in digital transformation. But their practical use is possible provided that the management personnel are motivated and the system of management accounting and reporting is developed.

Keywords: financial digitalization, digital technologies, management technologies, financial management, digitalization effectiveness, information support.

References

1. Zianko, V., Nechyporenko, T. (2025). Digital transformation of the banking sector: Current trends and development vectors. *Innovation and Sustainability*, 4, 6–21. <https://doi.org/10.31649/ins.2024.4.6.21>
2. Kraus, K., Kraus, N. (2025). Institutionalization of the Metaverse Based on the Development of the Exabyte Economy and Gig Economy. *Journal of Vasyl Stefanyk Precarpathian National University*, 12 (2), 6–13. <https://doi.org/10.15330/jpnu.12.2.6-13>
3. Shevchenko, I., Ukhova, N. (2025). Rozvytok yevropeiskoi tsyfrovoy ekonomichnoi intehratsii v konteksti pislivoiennoho vidnovlennia Ukrainy. *Zhurnal yevropeiskoy ekonomiky*, 24 (2), 217–232. Available at: <https://jeej.wunu.edu.ua/index.php/ukjee/article/view/1864>
4. Pustovarov, A. I. (2021). *Mekhanizm tsyfrovoy transformatsii upravlinnia rozvytkom natsionalnoi ekonomiky*. [PhD dissertation; Klasychnyi pryvatnyi universytet]

5. Kostoviat, H. I., Rohov, V. H. (2024). Strategic management development vectors in the conditions of digital transformation. Scientific Works of Interregional Academy of Personnel Management. *Economic Sciences*, 3 (75), 20–26. <https://doi.org/10.32689/2523-4536/75-3>
6. Ostrovska, H., Sherstiuk, R., Tsikh, H. (2024). Upravlinnia biznes-protesamy v konteksti tsyfrovoy transformatsii pidpriemstv. *Transformatsiia biznesu dlia staloho maibutnoho: doslidzhennia, tsyfrovizatsiia ta innovatsii*. Ternopil: FOP Palianytsia V.A., 254–275. Available at: <https://elartu.tntu.edu.ua/handle/lib/46506>
7. Briukhovetska, N. Y., Bulieiev, I. P., Zaloznova, Y. S. (2024). *Upravlinnia pidpriemstvamy v umovakh tsyfrovizatsii: vyklyky ta mekhanizmy transformatsii*. Kyiv: NAN Ukrainy, Instytut ekonomiky promyslovosti, 302. Available at: https://ie.org.ua/wp-content/uploads/application/pdf/mono_2024_compressed.pdf
8. Shlapak, O., Kovalenko, O. (2021). Digital management model for international enterprises. *Efektivna Ekonomika*, 1. <https://doi.org/10.32702/2307-2105-2021.1.83>
9. Trofymenko, O., Boiarynova, K., Melnychuk, V. (2024). Prerequisites and strategies for digital transformation of enterprises in Ukraine and in the world. *Economic Analysis*, 34 (2), 385–394. <https://doi.org/10.35774/econa2024.02.385>
10. Mishchenko, V. (2022). Strategic management of digital transformation of the economy. *Economy of Ukraine*, 65 (1 (722)), 67–81. <https://doi.org/10.15407/economyukr.2022.01.067>
11. Lavreniuk, V., Strilchuk, Y. (2025). Global trends and challenges of financial ecosystem digital transformation. *Scientific Notes*, 39 (2), 263–273. https://doi.org/10.33111/vz_kneu.39.25.02.22.152.158
12. Dombrovska, N., Farion, V. (2024). Digital transformation in enterprise management: adaptation of business models under the influence of innovative technologies. *Economic Analysis*, 34 (3), 40–53. <https://doi.org/10.35774/econa2024.03.040>
13. Korol, S., Yakoviv, A. (2025). Analysis of digital financial platforms as a means of reducing financial inequality in Ukraine. *Economic Analysis*, 35 (1), 246–254. <https://doi.org/10.35774/econa2025.01.246>
14. Borodenko, T. M., Slavkova, A. A., Savoiskyi, V. V. (2024). Financial technologies: trends, challenges and investment horizons. *Investytsiyyi: praktyka ta dosvid*, 3, 97–105. <https://doi.org/10.32702/2306-6814.2024.3.97>
15. Mandych, O., Skudlarski, J., Babko, N., Blyzniuk, O., Lysak, H., Kot, O. (2023). Methodological research of financial sector digital transformation trends in banking. *Technology Audit and Production Reserves*, 2 (4 (70)), 10–14. <https://doi.org/10.15587/2706-5448.2023.276408>
16. *Pro zatverdzhennia Natsionalnoi ekonomichnoi stratehii na period do 2030 roku* (2021). Postanova Kabinetu Ministriv Ukrainy No. 179. 03.03.2021. Available at: <https://zakon.rada.gov.ua/laws/show/179-2021-%D0%BF#Text>
17. *Pro stymulivannia rozvytku tsyfrovoy ekonomiky v Ukraini* (2021). Zakon Ukrainy No. 1667-IX. 15.07.2021. Available at: <https://zakon.rada.gov.ua/laws/show/1667-20#Text>
18. *Pro vnesennia zmin do Zakonu Ukrainy "Pro stymulivannia rozvytku tsyfrovoy ekonomiky v Ukraini" ta deiakyykh inshykh zakonodavchykh aktiv shchodo vdoskonalennia instrumentiv stymulivannia rozvytku tsyfrovoy ekonomiky* (2026). Proekt Zakonu Ukrainy No. 14362. 09.01.2026. Available at: <https://ips.ligazakon.net/document/J114094A>
19. Rudenko, O. (2026). Verkhovna Rada pryznachyla Fedorova novym holovoiu Ministerstva oborony. Shcho vin obitsiiae zrobyty? *TELEHRAF*. Available at: <https://telegraf.ua/ukr/politic/2026-01-14/5930529-verkhovna-rada-pryznachila-fedorova-novim-glavoyu-minoboroni-shcho-vin-obitsiiae-zrobiti>
20. Unynets-Khodakivska, V. (2022). Digital transformation of the financial services market in context of the fintech industry development. *Scientific perspectives*, 10 (28). [https://doi.org/10.52058/2708-7530-2022-10\(28\)-208-218](https://doi.org/10.52058/2708-7530-2022-10(28)-208-218)
21. Angelova, M., Zielinska-Chmielewska, A. (2025). Algorithmic Management in the Digital Transformation of Enterprises: a Qualitative Study of Motivations and Strategic Implications. *Economics Ecology Socium*, 9 (4), 79–96. <https://doi.org/10.61954/2616-7107/2025.9.4-6>
22. Khalatur, S., Masiuk, I., Kravchenko, M., Kurbatska, L., Sirko, A. (2025). Digitalization as a modern trend in the development of financial management in small business. *Financial and Credit Activity Problems of Theory and Practice*, 3 (62), 370–382. <https://doi.org/10.55643/fcaptop.3.62.2025.4758>
23. Iefymenko, T., Dmytrenko, T. (2025). Development and Integration of Digital Currencies in the Virtual Asset Market. *Science and Innovation*, 21 (2), 3–14. <https://doi.org/10.15407/scine21.02.003>
24. Manoylenko, O., Kuznetsova, S. (2025). Identifying factors impact on investment in financial services under digital financial ecosystem transformation. *Technology Audit and Production Reserves*, 6 (4 (86)), 22–30. <https://doi.org/10.15587/2706-5448.2025.346108>
25. Almasria, N. A., Ershaid, D., Jalghoum, Y. A., Almajali, A. (2025). The role of fintech in transforming risk management and financial services: a systematic review and meta-analysis. *Financial and Credit Activity Problems of Theory and Practice*, 2 (61), 409–429. <https://doi.org/10.55643/fcaptop.2.61.2025.4698>
26. Nazarenko, I., Volynets, L., Gorobinska, I., Lushchai, Y. (2025). Formation of an adaptive model of entrepreneurial risk management as an element of enterprise crisis management. *Technology Audit and Production Reserves*, 5 (4 (85)), 6–12. <https://doi.org/10.15587/2706-5448.2025.339131>
27. Tashenova, L., Mamrayeva, D., Kulzhambekova, B. (2024). Organizational and technological mechanism of interaction of subjects and objects of digital ecosystems of industrial enterprises with third-party. *Economic Annals-XXI*, 209 (5–6), 15–28. <https://doi.org/10.21003/eav209-02>
28. Kostev, R., Anguelov, K. (2024). Assessing Employee Perceptions of Information Technologies in Public Sector Digitalization. *Economics Ecology Socium*, 8 (4), 42–52. <https://doi.org/10.61954/2616-7107/2024.8.4-4>
29. Solodzhuk, T., Shchur, R., Drysluk, V. (2023). Financial technologies (fintech) market in Ukraine: status and prospects of development. *Economy and Society*, 56. <https://doi.org/10.32782/2524-0072/2023-56-160>
30. Viazovi, S. (2023). Fintech in Ukraine: the way to the innovative future of cashless payments. *Economy and Society*, 54. <https://doi.org/10.32782/2524-0072/2023-54-36>
31. Mulyk, T. O., Oliinyk, O. O. (2021). The Economic Meaning and Types of Fintech Innovations. *Business Inform*, 12, 72–78. <https://doi.org/10.32983/2222-4459-2021-12-72-78>
32. Shevchenko, O., Rudych, L. (2020). Development of financial technologies in conditions of digitalization of Ukraine's economy. *Efektivna Ekonomika*, 7. <https://doi.org/10.32702/2307-2105-2020.7.61>
33. Prots, I. M. (2022). Financial technologies – object of financial and legal regulation. *Juridical Scientific and Electronic Journal*, 4, 271–274. <https://doi.org/10.32782/2524-0374/2022-4/64>
34. Tsyupak, V., Bodnar, A., Romaniuk, A. (2024). Implementation of digital technologies in enterprise management: opportunities and challenges. *Economic Analysis*, 34 (2), 465–479. <https://doi.org/10.35774/econa2024.02.465>
35. Shyshkina, O. V. (2023). Digital technologies of financial institutions: risks and prospects for use. *The Actual Problems of Regional Economy Development*, 2 (19), 130–143. <https://doi.org/10.15330/apred.2.19.130-143>
36. *Ukrainska asotsiatsiia fintekh ta innovatsiynykh kompanii*. Available at: <https://fintechua.org/about>
37. Lampropulos, S. D., Tanasas, H. L., Kontoheorha, H. N. (2025). Vyiavleniia shakhrastva v bankivskykh tranzaktsiakh z vykorystanniam shuchnoho intelektu ta anonimizovanykh danykh. *Zhurnal yevropeiskoi ekonomiky*, 24 (4), 677–698. Available at: <https://jeej.wunu.edu.ua/index.php/ukjee/article/view/1904>
38. Rašticová, M., Versal, N., Prykaziuk, N., Balytska, M., Dudnyk, Y. (2025). Digital banking and (in)equality: a systematic overview. *Financial and Credit Activity Problems of Theory and Practice*, 1 (60), 49–62. <https://doi.org/10.55643/fcaptop.1.60.2025.4657>
39. Shkarlet, S., Dubyna, M., Shchur, R., Shyshkina, O. (2025). The Role of Cloud Technologies in Modern Development of Banking Institutions. *Journal of Vasyl Stefanyk Precarpathian National University*, 12 (2), 143–157. <https://doi.org/10.15330/jpnu.12.2.143-157>
40. Dyuk, R. (2024). Theoretical principles and main trends of digitalization of the financial sector. *The Ukrainian Economic Journal*, 6, 17–25. <https://doi.org/10.32782/2786-8273/2024-6-3>
41. Kholiavko, N., Popelo, O., Tarasenko, O. (2021). Innovation and information technologies in the activities of financial institutions: world experience. *Black Sea Economic Studies*, 70, 151–157. <https://doi.org/10.32843/bses.70-24>
42. Khalatur, S., Dovgal, O., Karamushka, O., Brovko, L., Vodolazska, O. (2024). Innovative trends of financial engineering to the way of digital economy. *Financial and Credit Activity Problems of Theory and Practice*, 6 (59), 136–150. <https://doi.org/10.55643/fcaptop.6.59.2024.4508>

43. Vagan, S. M., Sidra, S. (2024). Vplyv doslidzhen u sferi shtuchnoho intelektu, venchurnykh investytsiy ta vprovadzhennia ShI-tehnolohii na produktyvnist: bahatokrainnyi analiz panelnykh danykh. *Zhurnal yevropeiskoi ekonomiky*, 23 (4), 715–742. Available at: <https://jeej.wunu.edu.ua/index.php/ukjee/article/view/1812>
44. Kucher, A., Moskvyyak, Y., Fedorchak, O. (2025). Improving the approach to assessing the impact of financial market digitalization on the rationality of financial decisions. *Technology Audit and Production Reserves*, 3 (4 (83)), 64–75. <https://doi.org/10.15587/2706-5448.2025.331165>
45. Assanova, A., Issaeva, A., Dzhubaliev, Z., Arzikulova, R., Uchkampirova, A. (2025). Financial-digital investments in human capital as a factor of sustainable economic growth: assessment, dynamics and impact of artificial intelligence (a Kazakhstan case study). *Economic Annals-XXI*, 213 (1–2), 18–29. <https://doi.org/10.21003/eav213-02>
46. Shulzhyk, Y. O., Hrytsko, R. Y., Pekanets, S. R. (2022). Management of changes in the conditions of digitalization. *Public Management*, 2 (30), 127–134. [https://doi.org/10.32689/2617-2224-2022-2\(30\)-16](https://doi.org/10.32689/2617-2224-2022-2(30)-16)
47. Grynko, T., Hviniazhvili, T., Kaliberda, M. (2023). Strategic management of the enterprise in the conditions of the digital economy. *Economy and Society*, 50. <https://doi.org/10.32782/2524-0072/2023-50-71>
48. Rassadnikova, S. (2024). Management of digital transformation processes: a strategic approach. *Transformational Economy*, 3 (8), 89–94. <https://doi.org/10.32782/2786-8141/2024-8-13>
49. Korobkina, T., Dashenkova, N., Danchenko, I., Omelchenko, H. (2025). The impact of corporate culture of dignity on cognitive biases, strategic decision-making and technical debt management in IT engineering. *Technology Audit and Production Reserves*, 3 (4 (83)), 6–13. <https://doi.org/10.15587/2706-5448.2025.329635>
50. Rassadnikova, S. (2024). Strategic management in the context of digital transformation: challenges for business management. *City development*, 4 (4), 61–67. <https://doi.org/10.32782/city-development.2024.4-9>
51. Kravchuk, O. (2025). Digital Transformation of Human Capital Management: Enhancing Social Mobility in the Digital Economy. *Journal of Vasyl Stefanyk Precarpathian National University*, 12 (2), 80–100. <https://doi.org/10.15330/jpnu.12.2.80-100>
52. Bashlai, S. V., Pavlovskiy, M. V., Lyzak, M. P. (2023). Development of financial management in the conditions of digitalization of the economy. *Efektivna ekonomika*, 5. <https://doi.org/10.32702/2307-2105.2023.5.52>
53. Ismailov, T., Honcharova, I., Radukanov, S., Kabakchieva, T. (2025). Digital Technology Management and Resource Efficiency in Agricultural Production. *Economics Ecology Socium*, 9 (2), 81–95. <https://doi.org/10.61954/2616-7107/2025.9.2-6>
54. Brovko, S. (2025). Methodical approaches to the study of innovative technologies in the insurance services market. *Transformatsiina Ekonomika*, 2 (11), 13–18. <https://doi.org/10.32782/2786-8141/2025-11-2>
55. Kovalenko, M., Sikalo, M., Kovalova, T., Radchenko, O., Velychko, L., Nakisko, O. et al. (2025). Development of an integrated quality management model in the context of digital transformation: public administration, education, economics. *Technology Audit and Production Reserves*, 6 (4 (86)), 46–61. <https://doi.org/10.15587/2706-5448.2025.348540>
56. Antonenko, V. M. (2025). Stratehichne upravlinnia v umovakh tsyfrovoy transformatsii. XI Mizhnarodna naukovo-praktychna konferentsiia "Aktualni problemy upravlinnia sotsialnoekonomichnyimi systemami". Lutsk: Nadstyria, 349–351. Available at: <https://repositoriy.lntu.edu.ua/handle/123456789/2517>

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MODELING OF SUSTAINABLE DEVELOPMENT OF THE HEALTHCARE SYSTEM ON THE BASIS OF SYNERGY OF EFFECTIVE PUBLIC ADMINISTRATION AND DIGITAL ACCOUNTING AND ANALYTICS

pages 65–76

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The object of research is the public administration system in the healthcare sector and its transformational changes under the influence of digitalization. Currently, new challenges for the healthcare system are emerging in the global world. These include global pandemics, active hostilities, migration shifts and processes, economic instability, and digital transformation. That is why ensuring the sustainability of the healthcare system is a critically important aspect of creating appropriate conditions for the social well-being of the population. The paper examines the system of management decisions in the medical field, which is considered as a multi-component dynamic structure that must adaptively respond to the challenges of the external environment and conditions of uncertainty. The paper substantiates a conceptual model of health care system sustainability based on the synergy of public administration and accounting and analytical support. The model is based on the concept of adaptive system dynamics and feedback, which allows mathematically determining the level of management actions on the level of sustainability of the healthcare system. The results of the analysis among five countries (Ukraine, Poland, USA, Germany and Estonia) are presented according to the indicators: healthcare spending in GDP, human resources and level of digitalization. Methodologies used: correlation-regression analysis, index method, comparative analysis. The results obtained showed a high level of causality and correlation between digital tools and economic performance, considering data verification by accounting and analytical support (Pearson coefficient $r_{xy} > 0.85$ for leading countries), which confirm the relevance of their implementation. The obtained data of the integrated index of health system sustainability (IS for Ukraine increased by 0.28) confirm that the introduction of public management tools in health care allows for a transition to its proactive management.

Keywords: e-health, accessibility, sustainability, digital development, public institutions, driver of modernization, correlation-regression model.

References

- Digdowniseiso, K. (2024). Fiscal decentralization and social stability in selected developing countries: the role of institutional quality. *Cogent Social Sciences*, 10 (1). <https://doi.org/10.1080/23311886.2024.2432070>
- Strietholt, M. (2026). Money, liberty and nonpublic sources of social stability. *Review of Social Economy*, 1–41. <https://doi.org/10.1080/00346764.2025.2612022>
- Chauhan, S., Gupta, P., Goyal, S. (2022). The role of innovation type and country context in diffusion of innovative technologies in organisations – a meta-analytic review. *Behaviour & Information Technology*, 42 (11), 1845–1873. <https://doi.org/10.1080/0144929x.2022.2100826>
- Kovtun, V., Andriushchenko, K., Horbova, N., Lavruk, O., Yelyzaveta Muzychka, Y. (2020). Features of the Management Process of Ambidextrous Companies. *TEM Journal*, 9 (1), 221–226. <https://doi.org/10.18421/tem91-31>
- Turyasiima, M., Niwampaire, P., Ssendyona, M., Akot, B., Acheng, M., Katongole, S. et al. (2025). Enhancing Diagnostic and Patient Safety in Healthcare Systems: Key Insights from the World Patient Safety Day 2024 Commemoration in Uganda. *Drug, Healthcare and Patient Safety*, 17, 135–143. <https://doi.org/10.2147/dhps.s520743>
- James, T. S. (2025). Democracy, public administration, and democratic backsliding. *Policy Studies*, 1–26. <https://doi.org/10.1080/01442872.2025.2521170>
- Yatsenko, O. M., Nitsenko, V. S., Mardani, A., Tananaiko, T. S. (2018). The impact of global risks on the world trade and economic environment. *Financial and Credit Activity Problems of Theory and Practice*, 4 (27), 435–444. <https://doi.org/10.18371/fcaptpv4i27.154279>
- Liu, W., James, T. S., Man, C. (2022). Governance and public administration in China. *Policy Studies*, 43 (3), 387–402. <https://doi.org/10.1080/01442872.2022.2054091>
- Andriushchenko, K., Liezina, A., Vasylychak, S., Manylich, M., Shterma, T., Petrynyak, U. (2022). Management of the Development of the Innovative Potential of the Region. *TEM Journal*, 11 (1), 339–347. <https://doi.org/10.18421/tem111-43>
- Equils, O., Bakaj, A., Wilson-Mifsud, B., Chatterjee, A. (2023). Restoring Trust: The Need for Precision Medicine in Infectious Diseases, Public Health and Vaccines. *Human Vaccines & Immunotherapeutics*, 19 (2). <https://doi.org/10.1080/21645515.2023.2234787>
- Lei, K. C., Loi, C. I., Cen, Z., Li, J., Liang, Z., Hu, H. et al. (2023). Adopting an electronic medication administration system in long-term care facilities: a key stakeholder interview study in Macao. *Informatics for Health and Social Care*, 48 (3), 252–266. <https://doi.org/10.1080/107538157.2023.2165084>
- Andriushchenko, K., Kovtun, V., Cherniaieva, O., Datsii, N., Aleinikova, O., Mykolaets, A. (2020). Transformation of the Educational Ecosystem in the Singularity Environment. *International Journal of Learning, Teaching and Educational Research*, 19 (9), 77–98. <https://doi.org/10.26803/ijlter.199.5>
- Katz, E., Chikwenhere, Y., Essien, E., Olorun Owilli, A., Westerhaus, M. (2023). Rethinking global health from south and north: A social medicine approach to global health education. *Global Public Health*, 18 (1). <https://doi.org/10.1080/17441692.2023.2191685>
- Senghor, A. S., Mbaye, M. S., Diop, R., Tosam, M. J., Kabou, P., Niang, A., Okoye, G. (2023). Towards a transactional medicine approach to combating global emerging pathogens: the case of COVID-19. *Global Public Health*, 18 (1). <https://doi.org/10.1080/17441692.2023.2272710>
- Andriushchenko, K., Tepliuik, M., Boniar, S., Ushenko, N., Liezina, A. (2019). Influence of cost drivers on value-oriented management of investment activity of companies. *Investment Management and Financial Innovations*, 16 (3), 353–364. [https://doi.org/10.21511/imfi.16\(3\).2019.31](https://doi.org/10.21511/imfi.16(3).2019.31)
- Kraitzman, A. P., Genauer, J. (2023). The impact of security issues on government evaluation: evidence from the Arab World. *Democratization*, 30 (4), 693–714. <https://doi.org/10.1080/13510347.2023.2177639>
- Jambi, L., Almutairi, F., Alotaibi, A., Alshaya, A., Alharbi, O., Alqahtani, A. et al. (2025). The Impact of the COVID-19 Pandemic on a Nuclear Medicine Department in Riyadh, Saudi Arabia. *Journal of Multidisciplinary Healthcare*, 18, 6431–6444. <https://doi.org/10.2147/jmdh.s523104>
- Yatsenko, O., Nitsenko, V., Tananaiko, T., Szetela, B., Kobylanska, A. (2019). Trade and economic integration dominants in North America countries' interaction. *Journal of International Studies*, 12 (3), 277–293. <https://doi.org/10.14254/2071-8330.2019/12-3/22>
- Rockholt, M. M., Addae, G., Chee, A., Chin, W., Cuff, G., Wang, J. et al. (2023). Implementing Telemedicine During the COVID-19 Pandemic: Disparities in Utilization in an Urban Pain Medicine Practice. *Journal of Pain Research*, 16, 2763–2775. <https://doi.org/10.2147/jpr.s415415>
- Mekonen, Z. T., Fenta, T., Nadeem, S., Cho, D. (2024). Global Health Commodities Supply Chain in the Era of COVID-19 Pandemic: Challenges, Impacts, and Prospects: A Systematic Review. *Journal of Multidisciplinary Healthcare*, 17, 1523–1539. <https://doi.org/10.2147/jmdh.s448654>
- Andriushchenko, K., Datsii, O., Aleinikova, O., Mohamed Abdulla, A., Mohammed Ali, A. (2019). Improvement of the water resources management system at the territorial level. *Problems and Perspectives in Management*, 17 (3), 421–437. [https://doi.org/10.21511/ppm.17\(3\).2019.34](https://doi.org/10.21511/ppm.17(3).2019.34)
- Ortiz-Prado, E., Izquierdo-Condoy, J. S., Vasconez-Gonzalez, J., López-Cortés, A., Salazar-Santoliva, C., Vargas Michay, A. R. et al. (2025). From pandemic onset to present: five years of insights into ARDS caused by COVID-19. *Expert Review of Respiratory Medicine*, 19 (8), 843–862. <https://doi.org/10.1080/17476348.2025.2507207>
- Polishchuk, Y., Kornyluk, A., Lavreniuk, V., Horbov, V., Ivashchenko, A., Tepliuik, M. (2024). Running a business during wartime: Voice of Ukrainian displaced business. *Problems and Perspectives in Management*, 22 (3), 287–302. [https://doi.org/10.21511/ppm.22\(3\).2024.23](https://doi.org/10.21511/ppm.22(3).2024.23)
- Andriushchenko, K., Lavruk, V., Uliganets, S., Kovtun, V., Matviienko, H. (2019). Reputation Risk Management Companies Based on Competence Approach. *TEM Journal*, 8 (2), 516–524. <https://doi.org/10.18421/tem82-27>
- Jung, H.-J., Kim, D.-I., Choi, S.-J., Park, J.-K., Lee, J.-M. (2025). Effectiveness and Safety of Korean Medicine in Treating Female Infertility: A Prospective Multicenter Observational Study. *International Journal of Women's Health*, 17, 1771–1787. <https://doi.org/10.2147/ijwh.s520044>
- Pokataiev, P., Liezina, A., Petukhova, H., Andriushchenko, A. (2022). The role of biotechnology in the development of the bioeconomy. *Acta Innovations*, 46, 19–34. <https://doi.org/10.32933/actainnovations.46.2>
- Schmalhofer, C., Otte im Kampe, E., Eheberg, D., Sandhu, H., Maier, M., Perschke, A. et al. (2025). Economic evaluation of oral Nirmatrelvir/ritonavir versus best supportive care in patients at high risk for progression to severe COVID-19 in Germany: a cost-effectiveness analysis. *Journal of Medical Economics*, 28 (1), 1226–1240. <https://doi.org/10.1080/13696998.2025.2536974>
- Agostino, M., Mammone, M., Ruberto, S. (2024). Pandemic and Infodemic: The Role of Social Media in Disinformation Relating to COVID-19 in Italy. *Forum for Social Economics*, 54 (4), 499–529. <https://doi.org/10.1080/07360932.2024.2405588>
- Tepliuik, M., Polishchuk, Y., Fomenko, B., Bortnik, A., Domina, O., Matsola, S. (2024). An entropic perspective on business relocation in the context of sustainable development. *Financial and Credit Activity Problems of Theory and Practice*, 1 (54), 421–439. <https://doi.org/10.55643/fcaptp.1.54.2024.4248>
- Andriushchenko, A., Liezina, A., Kolybo, D., Gurina, G., Havrysh, K., Mazur, N. et al. (2026). Determining the investment attractiveness of the biohacking and bioinnovation market based on market trends in the pharmaceutical business. *Technology Audit and Production Reserves*, 1 (4 (87)), 21–33. <https://doi.org/10.15587/2706-5448.2026.352711>
- Triadafilopoulos, T., Taylor, Z. (2023). The domestic politics of selective permeability: disaggregating the Canadian migration state. *Journal of Ethnic and Migration Studies*, 50 (3), 702–725. <https://doi.org/10.1080/1369183x.2023.2269785>
- Buriachenko, A., Zakhzhay, K., Liezina, A., Lysak, V. (2022). Sustainability and security of public budget of the Visegrad Group countries. *Acta Innovations*, 42, 71–88. <https://doi.org/10.32933/actainnovations.42.6>
- Hirata, R., Tago, M., Shikino, K., Watari, T., Takahashi, H., Sasaki, Y., Shimizu, T. (2024). Standardizing Generalist Definitions to Improve Evidence in General Medicine: Addressing Diverse Interpretations and Lack of Consistency. *International Journal of General Medicine*, 17, 2939–2943. <https://doi.org/10.2147/ijgm.s468755>

34. Andriushchenko, K., Liezina, A., Lavruk, V., Sliusareva, L., Rudevska, V. (2022). Intelligent enterprise capital control based on Markov chain. *Acta Innovations*, 45, 18–30. <https://doi.org/10.32933/actainnovations.45.2>
35. Kermani, F., Reandi, S. T. A. (2023). Exploring the Funding Challenges Faced by Small NGOs: Perspectives from an Organization with Practical Experience of Working in Rural Malawi. *Research and Reports in Tropical Medicine*, 14, 99–110. <https://doi.org/10.2147/rrtm.s424075>
36. Hallal, H., Hoteit, M., Hallit, S., Hallal, M. (2025). Perceptions, attitudes and experiences of hospital pharmacists working in the private sector regarding drug shortage in Lebanon: a national cross-sectional study. *Journal of Pharmaceutical Policy and Practice*, 18 (1). <https://doi.org/10.1080/20523211.2025.2464786>
37. Huerta, A., Huerta, J. (2024). Navigating the nexus of personalized medicine and healthcare management: Advancing paediatric pain management modalities in sickle cell disease through thematic analysis for ages 1–12. *International Journal of Healthcare Management*, 19 (1), 145–155. <https://doi.org/10.1080/20479700.2024.2413797>
38. Andriushchenko, K., Datsii, O., Lavruk, O., Dmytrenko, R., Kutashev, I., Vinichenko, I. et al. (2021). Development of a matrix of food industry capacity for making management decisions in the formation of sustainable development of agroecosystems. *Eastern-European Journal of Enterprise Technologies*, 2 (13 (110)), 16–27. <https://doi.org/10.15587/1729-4061.2021.227805>
39. Tago, M., Hirata, R., Shikino, K., Watari, T., Takahashi, H., Nishi, T. et al. (2025). A Classification Method for General Medicine Physicians to Advance Field Research in Japan. *International Journal of General Medicine*, 18, 5033–5038. <https://doi.org/10.2147/ijgm.s540846>
40. Tseng, C.-Y., Li, J., Lin, L.-H., Wang, K., White III, C. C., Wang, B. (2023). Deep reinforcement learning approach for dynamic capacity planning in decentralised regenerative medicine supply chains. *International Journal of Production Research*, 63 (2), 555–570. <https://doi.org/10.1080/00207543.2023.2262043>
41. Shalko, M., Domina, O., Korobko, I., Melnyk, D., Andriushchenko, A. (2024). The transformative impact of large language models in healthcare. *Technology Audit and Production Reserves*, 6 (4 (80)), 32–42. <https://doi.org/10.15587/2706-5448.2024.319006>
42. Kommalur, A., Ramalingam, D., Manjunath, N., Venkatesh, P., Bidaremane Junjappa, S. et al. (2026). Successful perinatal management of a large placental chorio-angioma: a case report demonstrating the effectiveness of a public-private partnership model. *Paediatrics and International Child Health*, 1–7. <https://doi.org/10.1080/20469047.2025.2609525>
43. Sahithya, V., Sivanantham, P., Anandraj, J., Parameswaran, S., Sekhar Kar, S. (2024). Economic cost of hemodialysis and peritoneal dialysis under public-private partnership in a public tertiary care centre of Puducherry, India. *Expert Review of Pharmacoeconomics & Outcomes Research*, 25 (3), 415–421. <https://doi.org/10.1080/14737167.2024.2439515>
44. Domina, O., Andriushchenko, K., Liezina, A., Tsybalenko, Y., Titova, O., Kyrlyuk, O., Vylgin, Y. (2025). The Impact of Artificial Intelligence on the Formation of a Teacher's Digital Twin in the Metaverse. *Journal of Vasyl Stefanyk Precarpathian National University*, 12 (3), 169–185. <https://doi.org/10.15330/jpnu.12.3.169-185>
45. Nauenberg, E., Yurga, E. (2023). Public-private partnership alternative for a national pharmacare program in Canada. *Journal of Pharmaceutical Policy and Practice*, 16 (1). <https://doi.org/10.1186/s40545-023-00526-3>
46. Zainal, H., Xiaohui, X., Thumboo, J., Kok Yong, F. (2023). Digital competencies for Singapore's national medical school curriculum: a qualitative study. *Medical Education Online*, 28 (1). <https://doi.org/10.1080/10872981.2023.2211820>
47. Pokataiev, P., Teteruk, K., Andriushchenko, A. (2023). A biotechnological role-business incubator as an instrument of innovation entrepreneurship. *Recent Trends in Business and Entrepreneurial Ventures*. Available at: <https://novapublishers.com/shop/recent-trends-in-business-and-entrepreneurial-ventures/>
48. Anaya, J.-M., Herrán, M., Pino, L. E. (2025). Challenges and opportunities for precision medicine in developing nations. *Expert Review of Precision Medicine and Drug Development*, 10 (1), 1–15. <https://doi.org/10.1080/23808993.2025.2505796>
49. Kohler, J. C., Castro-Arteaga, M., Panjwani, S., Mukanga, D., Lumpkin, M. M., Fundafunda, B. et al. (2025). Understanding the regulatory-procurement interface for medicines in Africa via publicly available information on standards, implementation, and enforcement in five countries. *Journal of Pharmaceutical Policy and Practice*, 18 (1). <https://doi.org/10.1080/20523211.2024.2436898>
50. *Global Health Expenditure Database*. Available at: <https://apps.who.int/nha/database/>
51. *The Digital Economy and Society Index (DESI)*. Available at: <https://digital-strategy.ec.europa.eu/en/policies/desi>
52. Liezina, A., Lavruk, A., Matviienko, H., Ivanets, I., Tseluiko, O., Kuchai, O. (2023). Impact of econometric modeling and perspectives of economic security of the cross-industry complex. *Acta Innovations*, 47, 73–83. <https://doi.org/10.32933/actainnovations.47.7>
53. Williamson, J., Hasan, S. S., Gc, V. S. (2025). Economic and developmental impacts of FDA designations: a systematic review and meta-analysis. *Expert Review of Pharmacoeconomics & Outcomes Research*, 25 (7), 1051–1061. <https://doi.org/10.1080/14737167.2025.2507426>
54. Wu, J., Ma, Y., Wang, J., Xiao, M. (2024). The Application of ChatGPT in Medicine: A Scoping Review and Bibliometric Analysis. *Journal of Multidisciplinary Healthcare*, 17, 1681–1692. <https://doi.org/10.2147/jmdh.s463128>
55. Andriushchenko, K., Khaletska, A., Ushenko, N., Zholnerchuk, H., Ivanets, I., Petrychuk, S., Uliganets, S. (2021). Education process digitalization and its impact on human capital of an enterprise. *Journal of Management Information and Decision Sciences*, 24 (5), 1–9. Available at: <https://www.abacademies.org/articles/Education-process-digitalization-and-its-impact-on-human-capital-of-an-enterprise-1532-5806-24-5-271.pdf>
56. Alemu, A. B., Ibrahim, N. A., Argaw, K. W. (2023). Magnitude of Medicine Waste and Perceived Contributing Factors Among Public Health Facilities in Dire-Dawa City Administration, in Mid COVID-19 Pandemic in Ethiopia: Retrospective, Cross-Sectional Study. *Integrated Pharmacy Research and Practice*, 12, 61–75. <https://doi.org/10.2147/ijpr.s395102>

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IMPROVEMENT OF METHODOLOGY FOR ASSESSING THE DYNAMICS OF DEGRADATION AND DIRECT ECONOMIC LOSSES OF THE AGRICULTURAL SECTOR IN THE CONDITIONS OF MODERN CHALLENGES CAUSED BY MILITARY ACTIONS

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The object of research is the process of assessing the dynamics of degradation and direct economic losses of the agricultural sector. The hypothesis of research is based on the assumption that the regression model is able to provide a reliable short-term assessment (with a lag of 1 year) of the actual state of land use.

Improved methodology for assessing the dynamics of degradation and direct economic losses in the agricultural sector, which, unlike the known ones, involves the following stages:

- analysis of the dynamics of the Red and NIR channels within the study area to identify patterns of degradation of agrophytocenoses;
- determination of a statistical criterion of landscape structural order (OSI) to differentiate target crops from ruderal vegetation;
- conducting a linear regression analysis to determine the areas of active production based on the spectral characteristics of satellite data.

Experimental studies have been conducted to assess the volume of direct economic losses in the agricultural sector for the period 2022–2025. Analysis of the dynamics of spectral channels for 2016–2025 showed that starting from 2022, a “scissors” effect has been observed – a steady increase in the average in the Red channel and a decrease in NDVI, which is a sign of land withdrawal from cultivation. In the pre-war period, OSI values were in the range of 0.3–0.7, and starting from 2022 they became negative (about –1.5), which corresponds to the loss of structural integrity of the agricultural landscape. The calculated direct economic losses in the agricultural sector of the Kyiv region (Ukraine) for 2022–2025 are 491.7–548.11 million USD, depending on the calculation method. The gap between official statistics and the calculation method (37.26 million USD) corresponds to the crop that was sown but not harvested due to military threats.

Keywords: dynamics of agricultural sector degradation, satellite data, vegetation indices, “scissors” effect, structural order index, direct economic losses.

References

1. Mkrtchian, A., Müller, D. (2024). *Assessing the impact of the Russian invasion on crop production in Ukraine with open satellite data*. Ukrainian Analytical Digest, 5, 8–14. Available at: <https://www.ssoar.info/ssoar/handle/document/94116>
2. Kussul, N., Yailymova, H., Drozd, S. (2022). Detection of War-Damaged Agricultural Fields of Ukraine Based on Vegetation Indices Using Sentinel-2 Data. *2022 12th International Conference on Dependable Systems, Services and Technologies (DESSERT)*. Athens: IEEE, 1–5. <https://doi.org/10.1109/dessert58054.2022.10018739>
3. *Sentinel-2. Copernicus Data Space Ecosystem*. Available at: <https://surl.li/ghfgxu>
4. Shumilo, L., Drozd, S., Kussul, N. (2025). *Satellite data aids the study of the war's environmental and economic consequences for Ukraine's agriculture sector*. Ukraine War Environmental Consequences Work Group. Available at: <https://surl.li/ojfaoi>
5. Khudov, H., Makovechuk, O., Tokarev, S., Andriushchenko, A., Pukhovyi, O., Rohulia, O. et al. (2026). Improving a method for filtering images acquired from a space-based radar observation system based on the Kuan algorithm. *Eastern-European Journal of Enterprise Technologies*, 1 (9 (139)), 40–46. <https://doi.org/10.15587/1729-4061.2026.352347>
6. Xu, N., Zhuang, H., Chen, Y., Wu, S., Liu, R. (2025). Mapping Multi-Crop Cropland Abandonment in Conflict-Affected Ukraine Based on MODIS Time Series Analysis. *Land*, 14 (8), 1548. <https://doi.org/10.3390/land14081548>
7. Kussul, N., Shelestov, A., Yailymov, B., Yailymova, H., Lemoine, G., Deininger, K. (2025). Assessment of war-induced agricultural land use changes in Ukraine using machine learning applied to Sentinel satellite data. *International Journal of Applied Earth Observation and Geoinformation*, 140, 104551. <https://doi.org/10.1016/j.jag.2025.104551>
8. Losses and damages of the agricultural sector of Ukraine amount to more than \$80 billion – KSE Agrocenter (2024). *Kyiv School of Economics*. Available at: <https://kse.ua/about-the-school/news/losses-and-damages-of-the-agricultural-sector-of-ukraine-amount-to-more-than-80-billion-kse-agrocenter/> Last accessed: 23.02.2026
9. *Ukraine – Third Rapid Damage and Needs Assessment (RDNA3): February 2022 – December 2023* (2024). Washington: World Bank. Available at: <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/099021324115085807>
10. Ukraine Emergency and Early Recovery Response Plan 2025–2026 (2025). *FAO*. Available at: <https://openknowledge.fao.org/items/9616d132-b487-41ed-a778-9ec2eb0689d0> Last accessed: 23.02.2026
11. Strapchuk, O., Manaloor, V., Strapchuk, S. (2026). Assessment of the impact of factors on the yield of strategic crops in Ukraine under climate change. *Agricultural and Resource Economics: International Scientific E-Journal*, 12 (1), 247–278. <https://doi.org/10.51599/are.2026.12.01.09>
12. Report on Damages to Ukraine's Infrastructure from the Russian Invasion (2024). *Kyiv School of Economics*. Available at: https://kse.ua/wp-content/uploads/2025/02/KSE_Damages_Report-November-2024---ENG.pdf
13. Becker-Reshef, I., Barker, B., Humber, M., Puricelli, E., Sanchez, A., Sahajpal, R. et al. (2019). The GEOGLAM crop monitor for AMIS: Assessing crop conditions in the context of global markets. *Global Food Security*, 23, 173–181. <https://doi.org/10.1016/j.gfs.2019.04.010>
14. Weldegebriel, L., Negash, E., Nyssen, J., Lobell, D. B. (2024). Eyes in the sky on Tigray, Ethiopia – Monitoring the impact of armed conflict on cultivated highlands using satellite imagery. *Science of Remote Sensing*, 9, 100133. <https://doi.org/10.1016/j.srs.2024.100133>
15. Hazaymeh, K., Sahwan, W., Al Shogoor, S., Schütt, B. (2022). A Remote Sensing-Based Analysis of the Impact of Syrian Crisis on Agricultural Land Abandonment in Yarmouk River Basin. *Sensors*, 22 (10), 3931. <https://doi.org/10.3390/s22103931>
16. Asrat, D., Anteneh, A. (2020). Status of food insecurity in dryland areas of Ethiopia: A review. *Cogent Food & Agriculture*, 6 (1), 1853868. <https://doi.org/10.1080/23311932.2020.1853868>
17. Campbell, J.B., Wynne, R. H., Thomas, V.A. (2022). *Introduction to remote sensing*. New York: Guilford Press, 634. Available at: <https://www.guilford.com/books/Introduction-to-Remote-Sensing/Campbell-Wynne-Thomas/9781462549405?rsId=AfmBOOpXHjBkb4xEEQKsSxvSEjt1cwGc3y5-Kc0QY4a5P-wN8uQIqi9u>
18. Baumann, M., Kuemmerle, T. (2016). The impacts of warfare and armed conflict on land systems. *Journal of Land Use Science*, 11 (6), 672–688. <https://doi.org/10.1080/1747423x.2016.1241317>
19. He, S., Shao, H., Xian, W., Yin, Z., You, M., Zhong, J. et al. (2022). Monitoring Cropland Abandonment in Hilly Areas with Sentinel-1 and Sentinel-2 Time-series. *Remote Sensing*, 14 (15), 3806. <https://doi.org/10.3390/rs14153806>
20. Sourav, Kaur, N., Kaur, B. (2024). Crop Classification using Sentinel-1 and Sentinel-2: A Machine Learning Method. *2024 Second International Conference on Data Science and Information System (ICDSIS)*. Hassan: IEEE, 1–6. <https://doi.org/10.1109/icdsis61070.2024.10594331>
21. Sakuma, A., Yamano, H. (2020). Satellite Constellation Reveals Crop Growth Patterns and Improves Mapping Accuracy of Cropping Practices for Sub-tropical Small-Scale Fields in Japan. *Remote Sensing*, 12 (15), 2419. <https://doi.org/10.3390/rs12152419>
22. Kolotii, A., Shelestov, A., Zhdanova, O., Volkova, Ye. (2026). The Impact of War on Economic Activity in Ukraine: Using Nighttime Light Satellite Data to Assess the State of the Economy. *Cybernetics and Systems Analysis*, 62 (1), 165–180. <https://doi.org/10.1007/s10559-026-00855-6>
23. Kogan, F., Kussul, N., Adamenko, T., Skakun, S., Kravchenko, O., Kryvobok, O. et al. (2013). Winter wheat yield forecasting in Ukraine based on Earth observation, meteorological data and biophysical models. *International Journal of Applied Earth Observation and Geoinformation*, 23, 192–203. <https://doi.org/10.1016/j.jag.2013.01.002>
24. Berger, K., Hostert, P., Schlerf, M., Immitzer, M., Szantoi, Z., Okujeni, A. et al. (2026). Advancing optical earth observation for EU policies: needs, opportunities, recommendations. *Environmental Sciences Europe*, 38 (1). <https://doi.org/10.1186/s12302-026-01346-3>
25. Filho, W. L., Fedoruk, M., Paulino Pires Eustachio, J. H., Splodytel, A., Smalychuk, A., Szykowska-Jóźwik, M. I. (2024). The environment as the first victim: The impacts of the war on the preservation areas in Ukraine. *Journal of Environmental Management*, 364, 121399. <https://doi.org/10.1016/j.jenvman.2024.121399>
26. Chen, B., Tu, Y., An, J., Wu, S., Lin, C., Gong, P. (2024). Quantification of losses in agriculture production in eastern Ukraine due to the Russia-Ukraine war. *Communications Earth & Environment*, 5 (1). <https://doi.org/10.1038/s43247-024-01488-3>
27. Li, Y., Yao, K., Meng, Q., Wang, Y., Xiao, R., Liu, Y. et al. (2026). Dynamic patterns and driving factors of productive cropland in Ukraine before and after Russia-Ukraine conflict. *Geography and Sustainability*, 7 (1), 100401. <https://doi.org/10.1016/j.geosus.2025.100401>

28. Cao, C., Dragičević, S., Li, S. (2019). Short-Term Forecasting of Land Use Change Using Recurrent Neural Network Models. *Sustainability*, 11 (19), 5376. <https://doi.org/10.3390/su11195376>
29. *Post-disaster needs assessments guidelines: Volume B – Agriculture, Livestock, Fisheries and Forestry* (2017). The World Bank. Available at: <https://www.preventionweb.net/publication/documents-and-publications/post-disaster-needs-assessments-guidelines-volume-b>
30. Kucher, A. (2022). Methodology for assessing damages and losses caused by the armed aggression to the land fund and soils: problems and directions of improvement. *Journal of Innovations and Sustainability*, 6 (2), 10. <https://doi.org/10.51599/is.2022.06.02.10>
31. Datsko, O., Melnyk, O., Kovalenko, I., Butenko, A., Zakharchenko, E., Ilchenko, V. et al. (2025). Estimation of the content of trace metals in Ukrainian military-affected soils. *Notulae Botanicae Horti Agrobotanici Cluj-Napoca*, 53 (1), 14328. <https://doi.org/10.15835/nbha53114328>
32. Silske gospodarstvo Ukrainy za 2024 rik. *Derzhavna sluzhba statystyky Ukrainy*. Available at: https://www.ukrstat.gov.ua/operativ/menu/menu_u/cg.htm
33. Martyshev, P., Bogonos, M., Nivievskiy, O., Neyter, R., Litvinov, V., Kolodiazhyi, I. et al. (2025). AgroDigest Ukraine. *Kyiv School of Economics*. Available at: https://kse.ua/AgroDigest_Ukraine_January_2025.pdf
34. Harvest-2024: The Ministry of Agrarian Policy forecasts 74 million tonnes of grains and oilseeds, – the Committee on Agrarian and Land Policy (2024). *Verkhovna Rada of Ukraine*. Available at: <https://www.rada.gov.ua/en/news/News/248628.html>
35. Kravchenko, S., Malik, M., Shpykuliak, O. (2024). Development of integration structures in the agricultural sector of the economy in wartime conditions. *Ekonomika APK*, 32 (2), 10–27. <https://doi.org/10.32317/ekon.apk/2.2025.10>
36. Khudov, H., Makoveichuk, O., Butko, I., Butko, M., Khudolei, V., Kukhtyk, S. (2022). The development of a management decision-making method based on the analysis of information from space observation systems. *Eastern-European Journal of Enterprise Technologies*, 6 (9 (120)), 59–69. <https://doi.org/10.15587/1729-4061.2022.269027>
37. Khudov, H., Makoveichuk, O., Khizhnyak, I., Varvarov, V., Zots, F. (2025). Experimental studies of the image segmentation method quality from unmanned aerial vehicles based on the Ant Colony Optimization algorithm under the influence of additive Gaussian noise. *Advanced Information Systems*, 9 (3), 14–21. <https://doi.org/10.20998/2522-9052.2025.3.02>

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IMPROVEMENT OF THE TYPOLOGY OF TOKENIZED FINANCIAL INSTRUMENTS

pages 88–97

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The object of research is the process of issuance and circulation of tokenized real-world assets (RWA), as the basis for the formation of digital financial instruments. The problem is the gaps in the typology of digital financial instruments, as a basis for expanding their issuance and circulation. Methods of content analysis of scientific literature and descriptive statistics of panel data, as well as methods of comparison and synthesis, typology and clustering serve as the methodological basis of this research, implemented on the basis of statistical data from the Statista and Market cap databases. The dynamics and changes in the structure of the tokenized real assets market are analyzed, clusters of related theoretical studies are identified. The rapid growth of the tokenized digital financial instruments market, which is moving from the "acceptance" stage to the "formation" stage, is substantiated. Two classes are distinguished in their structure: payment and investment. Payments are undergoing a stage of expo-

ponential growth and have already overtaken traditional payment systems in terms of total turnover. Investment is only being introduced in the financial market. The generalization of theoretical research allowed to identify the following contours of tokenization of real assets: legal, technological, informational. This became the basis for the allocation of the stages of emission and circulation of tokenized real assets and the formation of their topology. The practical significance of the results lies in determining the typology of tokenized RWA, which allows for their standardization, the formation of a regulatory framework and the personalization of financial instruments and payment services. The proposed typology connects real assets of different classes, takes into account the legal features of the functioning of financial markets, technological standards and identifies key participants in digital ecosystems. This approach allows to adapt/synchronize key elements of the formed digital financial architecture and regulatory and normative support.

Keywords: finance, digital financial ecosystem, tokenized financial instruments, financial technologies, digital transformation, tokenization.

References

1. Lavayssière, X. (2025). Legal Structures of Tokenised Assets. *European Journal of Risk Regulation*, 1–13. <https://doi.org/10.1017/err.2024.88>
2. Lavayssière, X. (2024). Research Note on the Heterogeneity of the Tokenization of Financial Assets. *2024 6th Conference on Blockchain Research & Applications for Innovative Networks and Services (BRAINS)*. Berlin: IEEE, 1–2. <https://doi.org/10.1109/brains63024.2024.10732456>
3. Arrieta-Sevilla, L. J. (2025). La inversión inmobiliaria directa a través de tokens. *Revista de Derecho Civil*, 12 (2), 77–115. Available at: <https://hdl.handle.net/10171/116945>
4. Benedetti, H., Smith, S. S.; Baker, H. K., Filbeck, G., Black, K. (Eds.) (2024). Cryptoassets and Fintech. *The Emerald Handbook of Fintech*. Emerald Publishing, 267–281. <https://doi.org/10.1108/978-1-83753-608-520241034>
5. Boreiko, D., Ferrarini, G., Giudici, P. (2019). Blockchain Startups and Prospectus Regulation. *European Business Organization Law Review*, 20 (4), 665–694. <https://doi.org/10.1007/s40804-019-00168-6>
6. Momtaz, P. P.; Baker, H. K., Benedetti, H., Nikbakht, E., Stein Smith, S. (Eds.) (2023). Security Tokens. *The Emerald Handbook on Cryptoassets: Investment Opportunities and Challenges*. Emerald Publishing, 61–78. <https://doi.org/10.1108/978-1-80455-320-620221005>
7. Nowak, K. A., Wiśniewski, M., Litwiński, M. (2024). Is It Worth Investing in Tokens? Investment Performance of Digital Tokens in Financial and Axiological Contexts. *Journal of the Knowledge Economy*, 16 (1), 663–690. <https://doi.org/10.1007/s13132-024-01962-5>
8. Yatsyk, T., Shvets, V. (2020). Cryptoassets as an emerging class of digital assets in the financial accounting. *Economic Annals-XXI*, 183 (5–6), 106–115. <https://doi.org/10.21003/eav183-10>
9. Parrondo, L. (2020). DLT-based Tokens Classification towards Accounting Regulation. *Proceedings of the 2nd International Conference on Finance, Economics, Management and IT Business*. SciTePress, 15–26. <https://doi.org/10.5220/0008937600150026>
10. Herschaft, J. A., Gitlitz, M. A. (2019). Heads or tails? Making sense of crypto-tokens issued by emerging blockchain companies. *The Banking Law Journal*, 136 (6). Available at: <https://www.blankrome.com/publications/heads-or-tails-making-sense-crypto-tokens-issued-emerging-blockchain-companies>
11. Subramanian, H. (2019). Security tokens: architecture, smart contract applications and illustrations using SAFE. *Managerial Finance*, 46 (6), 735–748. <https://doi.org/10.1108/mf-09-2018-0467>
12. Mirdala, R. (2025). Tokenization of Real-World Assets: Legal Frameworks, Market Dynamics, and Policy Pathways for a Decentralized Financial Future. *Journal of Applied Economic Sciences (JAES)*, 20 (16), 285. [https://doi.org/10.57017/jaes.v20.2\(88\).09](https://doi.org/10.57017/jaes.v20.2(88).09)
13. Pramudya, H., Alamsyah, A., Tricahyono, D. (2024). Blockchain-Based Tokenization for Green Bonds: A Model for Transparency and Compliance in Sustainable Finance. *2024 IEEE Asia-Pacific Conference on Geoscience, Electronics and Remote Sensing Technology (AGERS)*. Manado: IEEE, 64–69. <https://doi.org/10.1109/agers65212.2024.10932908>

14. El Jaouhari, A., Samadhiya, A., Kumar, A., Chokshi, H., Šešplaukis, A., Raslanas, S. (2025). Tokenization and the future of property investment: A new paradigm for real estate. *International Journal of Strategic Property Management*, 29 (4), 297–315. <https://doi.org/10.3846/ijspm.2025.24814>
15. Bhatia Sarin, A.; Vardari, L., Qabrati, I. (Eds.) (2024). Understanding of Decentralized Finance and Tokenization in FinTech. *Decentralized Finance and Tokenization in FinTech*. IGI Global Scientific Publishing, 285–309. <https://doi.org/10.4018/979-8-3693-3346-4.ch016>
16. Statista. Available at: <https://www.statista.com/>
17. Historical cryptocurrency market capitalizations. *CoinMarketCap*. Available at: <https://coinmarketcap.com/>
18. Wheatley, S., Sornette, D., Huber, T., Reppen, M., Gantner, R. N. (2019). Are Bitcoin bubbles predictable? Combining a generalized Metcalf's Law and the Log-Periodic Power Law Singularity model. *Royal Society Open Science*, 6 (6), 180538. <https://doi.org/10.1098/rsos.180538>
19. Visualizing scientific landscapes. *VOSviewer*. Available at: <https://wwwvosviewer.com/>
20. Analytics on Tokenized Real-World Assets. *RWA.xyz*. Available at: <https://app.rwa.xyz/>
21. Suresh, R., Kumar, S., Liu, D., Kronfellner, B., Kaul, A. (2022). Relevance of On-Chain Asset Tokenization in "Crypto Winter". *Boston Consulting Group*. Available at: <https://www.bcg.com/publications/2022/relevance-of-on-chain-asset-tokenization>
22. *ForkLog*. Available at: <https://forklog.com/>

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**FORMATION OF AN ESG MANAGEMENT SYSTEM
BASED ON DIGITAL ANALYTICS**

pages 98–111

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The object of research is the process of forming an ESG management system based on digital analytics (DA). The research addresses the issue of implementing value-based sustainable development guidelines in the agricultural sector through ESG-oriented resource management mechanisms using DA tools. The theoretical and applied parts of the research are based on a combination of a systemic vision of the problem under study, analytical procedures, comparative analysis, and economic-mathematical tools. The empirical basis of the research was formed through the analysis of data for 2020–2024. The research incorporates reports of agri-food companies, materials from international institutions, as well as EU documents regulating digitalization in food supply chains. On this basis, an economic and statistical analysis was conducted to assess the role of DA in shaping the ESG management system in the agricultural sector. Economic and mathematical modeling was applied to identify relationships between the efficiency of resource use by enterprises

and their performance according to ESG criteria. The obtained results made it possible to establish that, in the process of forming ESG-oriented management, DA can serve as an important tool for transforming primary information on the use of natural resources into a system of measurable ESG indicators. Such indicators can be used both in internal enterprise management and during auditing or comparison of performance results across different periods. The model developed in the research was tested using data from the agricultural sector of Ukraine. The results of its application confirmed the existence of a stable relationship between the level of resource efficiency in production, economic performance, and environmental parameters included in the ESG framework.

Keywords: sustainable development, agricultural sector, ESG management, digital analytics, CSR.

References

1. Freeman, R. E. (1984). *Strategic management: a stakeholder approach*. Boston: Pitman. Available at: <https://archive.org/details/strategicmanagem00free>
2. *Our common future* (1987). World Commission on Environment and Development. Oxford: Oxford University Press, 383. Available at: https://www.academia.edu/10711693/Our_common_future_By_World_commission_on_environment_and_development_London_Oxford_University_Press_1987_pp_383_5_95_
3. Porter, M. E., Linde, C. (1995). Toward a New Conception of the Environment-Competitiveness Relationship. *Journal of Economic Perspectives*, 9 (4), 97–118. <https://doi.org/10.1257/jep.9.4.97>
4. Elkington, J. (1997). *Cannibals with forks: The triple bottom line of 21st century business*. Oxford: Capstone. Available at: <https://www.scirp.org/reference/referencpapers?referenceid=2092269>
5. Sustainability reporting guidelines (2000). *Global Reporting Initiative*. Available at: <https://www.globalreporting.org/standards/gri-standards-download-center>
6. Porter, M. E., Kramer, M. R. (2011). Creating shared value. *Harvard Business Review*, 89 (1–2), 62–77. Available at: <https://hbr.org/2011/01/the-big-idea-creating-shared-value>
7. Kniaz, S., Kosovska, V., Shayda, O., Novosad, Z., Yaremko, L., Fedyuk, V. (2021). Method of Selection of Indicators in the Context of Information and Analytical Support of Evaluation of Development of Foreign Economic Activity of Enterprises. *2021 11th International Conference on Advanced Computer Information Technologies (ACIT)*. Deggendorf: IEEE, 389–392. <https://doi.org/10.1109/acit52158.2021.9548613>
8. Mysiuk, R. V., Yuzevych, V. M., Yasynskiy, M. F., Kniaz, S. V., Duriagina, Z. A., Kulyk, V. V. (2022). Determination of conditions for loss of bearing capacity of underground ammonia pipelines based on the monitoring data and flexible search algorithms. *Archives of Materials Science and Engineering*, 115 (1), 13–20. <https://doi.org/10.5604/01.3001.0016.0671>
9. Kniaz, S., Brych, V., Marhasova, V., Tyrkalo, Y., Skrynkovskyy, R., Sumets, A. (2022). Modeling of the Information System of Environmental Risk Management of an Enterprise. *2022 12th International Conference on Advanced Computer Information Technologies (ACIT)*. Ruzomberok: IEEE, 215–218. <https://doi.org/10.1109/acit54803.2022.9912743>
10. Yap, C. K., Leow, C. S. (2023). Environment, social and governance in sustainable agricultural practices in developing countries: A short note. *Sustainable Social Development*, 1 (3). <https://doi.org/10.54517/ssdv1i3.2337>
11. Julkovski, D. J., Sehnem, S., Stenger, E. A. F. (2023). ESG guidelines for agribusiness. *Revista Pensamento Contemporâneo Em Administração*, 17 (4), 74–89. <https://doi.org/10.12712/rpca.v17i4.60261>
12. Kniaz, S., Podolchack, N., Dziurakh, Y., Karkovska, V., Kucher, A. (2023). Development of government regulation on investment activities in agriculture of Ukraine. *Economic Studies*, 32 (2), 136–150. Available at: <https://ideas.repec.org/a/bas/econst/y2023i2p136-150.html>
13. Annosi, M. C., Appio, F. P., Brenes, E. R., Brunetta, F. (2024). Exploring the nexus of digital transformation and sustainability in agribusiness: Advancing a research agenda. *Technological Forecasting and Social Change*, 206, 123587. <https://doi.org/10.1016/j.techfore.2024.123587>

14. Huseynli, J., Huseynov, Y., Totubaeva, N., Guliyev, M., Azizova, G. (2024). The role of ESG in the adaptation of the agro-industrial sector to climate change. *Scientific Horizons*, 27 (5), 131–142. <https://doi.org/10.48077/scihor5.2024.131>
15. Hopka, M., Kovtun, O. (2024). Features of implementation of ESG management criteria in Ukrainian agriculture in the context of global challenges and EU integration. *Biological Systems: Theory and Innovation*, 15 (3), 87–99. <https://doi.org/10.31548/economics/3.2024.87>
16. Yap, C. K., Al-Mutairi, K. A. (2024). A Conceptual Model Relationship between Industry 4.0 – Food-Agriculture Nexus and Agroecosystem: A Literature Review and Knowledge Gaps. *Foods*, 13 (1), 150. <https://doi.org/10.3390/foods13010150>
17. Kniaz, S., Brych, V., Heorhiadi, N., Shevchenko, S., Dzvonyk, R., Skrynkovskyy, R. (2024). Enhancing the Informativeness of Managing Mentoring Activities based on Simulation Modeling. *2024 14th International Conference on Advanced Computer Information Technologies (ACIT)*. Ceske Budejovice: IEEE, 8, 384–388. <https://doi.org/10.1109/acit62333.2024.10712547>
18. Kniaz, S., Brych, V., Heorhiadi, N., Shevchenko, S., Dzvonyk, R., Skrynkovskyy, R. (2024). Informational-Reflective Management of Mentoring Activities Development in the Enterprise. *2024 14th International Conference on Advanced Computer Information Technologies (ACIT)*. Ceske Budejovice: IEEE, 13, 389–392. <https://doi.org/10.1109/acit62333.2024.10712601>
19. Witt, N., Thorsøe, M. H., Graversgaard, M. (2025). ESG reporting meets farmer – implications of the European corporate sustainability reporting directive for the agrifood sector. *British Food Journal*, 127 (13), 264–283. <https://doi.org/10.1108/bfj-01-2024-0110>
20. Mutswiri, P. (2025). ESG integration and sustainability in African agribusiness: A review of challenges, practices and impacts. *The Dyke*, 19 (1), 667–687. <https://doi.org/10.64754/thedykev19i1.490>
21. Alsanhani, A. N., Al-Shayaa, M. S., Dabiah, A. T., Alfridi, J. S. (2025). Advancing Sustainable Agriculture Through Digital Technology: The Role of the Agricultural Guide App in Improving Olive Farming Practices in Saudi Arabia. *Sustainability*, 17 (6), 2340. <https://doi.org/10.3390/su17062340>
22. Greenhouse gas emissions from agrifood systems: Global, regional and country trends 2000–2022 (2024). *Food and Agriculture Organization of the United Nations*. Available at: <https://www.fao.org/statistics/highlights-archive/highlights-detail/greenhouse-gas-emissions-from-agrifood-systems.-global-regional-and-country-trends-2000-2022/en>
23. Deforestation Regulation implementation: Traceability and geolocation of commodities subject to EUDR (2024). *European Commission*. Available at: https://green-forum.ec.europa.eu/nature-and-biodiversity/deforestation-regulation-implementation/traceability-and-geolocation-commodities-subject-eudr_en
24. *Strategy Report: Annual Report 2021* (2021). Olam Group Limited. Available at: https://www.olamgroup.com/content/dam/olamgroup/investor-relations/ir-library/annual-reports/annual-reports-pdfs/2021/olam_strategy_report_2021.pdf
25. *Impact Report 2024* (2024). *Cargill*. Available at: <https://www.cargill.com/sustainability/doc/1432271051366/2024-impact-report-summary.pdf>
26. *Bayer Sustainability Report 2022* (2023). *Bayer*. Available at: <https://www.bayer.com/sites/default/files/2023-02/Bayer-Sustainability-Report-2022.pdf>
27. DATA-DRIVEN DIGITAL AGRICULTURE. (2021). *World Bank*. Available at: <https://thedocs.worldbank.org/en/doc/1a163904ccb86646b2e5d3d6f427f3d-0090012023/related/WB-DDAG-FA-web.pdf>
28. Use of inorganic and organic fertilizers, use of pesticides (1990–2024). (2024). *State Statistics Service of Ukraine*. Available at: https://www.ukrstat.gov.ua/operativ/operativ2021/sg/vmod90_20ue.xls
29. Agricultural production in 2016 constant prices 2022. (2022). *State Statistics Service of Ukraine*. Available at: https://ukrstat.gov.ua/operativ/operativ2022/sg/psg_pc/pcg_pc_22_ue.xlsx
30. Agricultural production at constant prices. (2024). *State Statistics Service of Ukraine*. Available at: https://www.ukrstat.gov.ua/operativ/operativ2017/sg/pro_sg/arch_pro_sg_p_e.htm
31. *Indices of agricultural production (1991–2024)*. (2024). *State Statistics Service of Ukraine*. Available at: https://www.ukrstat.gov.ua/operativ/operativ2020/sg/sg_rik/arch_iosv_e.htm
32. Indices of agricultural production. (2024). *State Statistics Service of Ukraine*. https://www.ukrstat.gov.ua/operativ/operativ2020/sg/ivp/arch_ivp20e.htm
33. Food and Agriculture Organization of the United Nations. *FAOSTAT*. Available at: <https://www.fao.org/faostat/en/#data/RFN>
34. Common agricultural policy overview. *European Commission*. Available at: https://agriculture.ec.europa.eu/common-agricultural-policy/cap-overview_en
35. Indeksy sil'skohospodars'koyi produktsiyi (2010–2024). *Holovne upravlinnya statystyky u Kharkiv's'kiy oblasti*. Available at: <https://kh.ukrstat.gov.ua/indeksy-obshahu-silskohospodarskoho-vyrobnytstva>

DEVELOPMENT OF PRODUCTIVE FORCES AND REGIONAL ECONOMY

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PRODUCTION POTENTIAL AS A DETERMINANT OF ECONOMIC SECURITY IN THE AGRO-INDUSTRIAL COMPLEX: THEORETICAL FRAMEWORK AND EMPIRICAL VERIFICATION

pages 112–123

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The object of research is the processes of ensuring the security of the agro-industrial complex of Ukraine in a competitive environment. The paper addresses the problem of insufficient development of the mechanism of the relationship between production potential, the level of competition and the financial stability of the industry. In addition, attention is focused on the lack of a quantitative assessment of the impact of production factors on the level of financial vulnerability of the agro-industrial complex. The research was aimed at providing a theoretical substantiate the conceptual foundations of a comprehensive model of ensuring the security of the agro-industrial complex and to quantitatively determine the impact of indicators of production capabilities on the share of unprofitable enterprises in the industry during 2016–2023. The results show that the average financial vulnerability of the industry was 23.75%, with a maximum value of 35.9% in 2022, which indicates high instability of financial results. The regression analysis revealed an inverse relationship between investment activity and the share of unprofitable enterprises, which was reflected in the coefficients at the logarithm of investments ($\ln(\text{Inv})$) – 50.64 for the base model and – 32.64 for the lag model). This confirms the fundamental economic laws regarding

the stabilizing effect of the development of production potential. At the same time, the presence of a positive coefficient (1.63 and 2.10) in connection with yield indicators reveals a disparity between the level of physical productivity and financial stability of business entities. The defining characteristic of the results is the integration of a systemic conceptual model of ensuring the security of the agro-industrial complex with its empirical verification based on national statistical data and using multifactor regression analysis. The scope of practical application of the results covers the formation of investment policy, the development of mechanisms for modernization of production and instruments for strengthening the financial stability of the agro-industrial complex in conditions of heightened competition and potential geopolitical risks.

Keywords: security, agro-industrial complex, production potential, financial sustainability, competitive environment, productivity, financial security.

References

- Pérez Gutiérrez, P. A., Garzon Baquero, J. E., Monsalve, D. B., Hernández Buitrago, A. K., Ortiz Orduz, F., Garavito Hernández, Y. (2025). A Competitive Model for Rural Agricultural Development: Insights from Family Farming in Lebrija, Santander, Colombia. *Agriculture*, 15 (5), 512. <https://doi.org/10.3390/agriculture15050512>
- Novoselets, A. (2024). Competitiveness of agricultural enterprises in the context of production and export of Ukrainian wheat. *Journal of Innovations and Sustainability*, 8 (3), 12. <https://doi.org/10.51599/is.2024.08.03.12>
- Muska, A., Pilvere, I., Nipers, A. (2025). Evaluation of the agricultural green competitiveness in the European Union. *Environmental Sciences Europe*, 37 (1). <https://doi.org/10.1186/s12302-025-01211-9>
- Charlebois, S., Music, J., Natali, N. G., Vezeau, J. (2025). Global Agri-Food Competitiveness: Assessing Food Security, Trade, Sustainability, and Innovation in the G20 Nations. *World*, 6 (3), 99. <https://doi.org/10.3390/world6030099>
- Montes Ninaquispe, J. C., Pantaleón Santa María, A. L., Ludeña Jugo, D. A., Castro Muñoz, W. T., Farias Rodriguez, J. C., Maco Elera, B. H. et al. (2024). Peruvian Agro-Exports' Competitiveness: An Assessment of the Export Development of Its Main Products. *Economies*, 12 (6), 156. <https://doi.org/10.3390/economies12060156>
- Novoselets, A. (2024). Comprehensive assessment of the competitiveness of agricultural enterprises of various sizes. *Journal of Innovations and Sustainability*, 8 (4), 06. <https://doi.org/10.51599/is.2024.08.04.06>
- Rudevska, V., Gutsul, T., Tesak, O., Kyselov, O. (2024). Investment Attractiveness of Agriculture in Ukraine: Factors and Prospects for the Future. *Futurity Economics & Law*, 4 (1), 22–37. <https://doi.org/10.57125/fel.2024.03.25.02>
- Mba, P. C., Njoku, J. N., Uyeh, D. D. (2025). Enhancing resilience in specialty crop production in a changing climate through smart systems adoption. *Smart Agricultural Technology*, 11, 100897. <https://doi.org/10.1016/j.atech.2025.100897>
- Harsanto, B., Kasumaningrum, Y., Arviansyah, M. R., Siregar, A. Y. M., Purnomo, D., Freddy, F. et al. (2025). Leveraging disruptive technologies for food security: A systematic review on agricultural supply chain resilience to climate change. *Current Research in Food Science*, 10, 101079. <https://doi.org/10.1016/j.crf.2025.101079>
- Mkumbukiy, A., Loghmani-Khouzani, T., Madani, K., Guenther, E. (2025). Agri-food systems' resilience for sustainable food security amid geopolitical tensions: a systematic literature review. *Frontiers in Sustainable Food Systems*, 9. <https://doi.org/10.3389/fsufs.2025.1546851>
- Hernandez-Romero, M., Coenders, G. (2025). Financial resilience of agricultural and food production companies in Spain: A compositional cluster analysis of the impact of the Ukraine–Russia war (2021–2023). arXiv. <https://doi.org/10.48550/arXiv.2504.05912>
- Ospanov, S. S., Kaliyeva, A. Y., Dulambaeva, R. T., Aubakirova, Z. Y., Tabeev, T. P. (2015). Competitiveness of the Agricultural Sector as a Factor in Improving Food Security in the Conditions of Globalization. *Review of European Studies*, 7 (7). <https://doi.org/10.5539/res.v7n7p307>
- Dutta, M., Gupta, D., Tharewal, S., Goyal, D., Sandhu, J. K., Kaur, M. et al. (2025). Internet of Things-based smart precision farming in soilless agriculture: Opportunities and challenges for global food security. arXiv. <https://doi.org/10.48550/arXiv.2503.13528>
- Gherțescu, C., Manta, A. G., Bădîrcea, R. M. (2025). Smart Agriculture and Technological Innovation: A Bibliometric Perspective on Digital Transformation and Sustainability. *Agriculture*, 15 (13), 1388. <https://doi.org/10.3390/agriculture15131388>
- Ratnajeewa, D., Bhaskar, P. (2025). Improving resilience of agrifood supply chains: a systematic literature review. *Modern Supply Chain Research and Applications*, 7 (4), 458–485. <https://doi.org/10.1108/mscra-03-2025-0019>
- The State of Food Security and Nutrition in the World 2022 (2022). FAO. Available at: <https://www.fao.org/publications/sofi/2022/en/>
- Agricultural Policy Monitoring and Evaluation 2023 (2023). OECD. Available at: https://www.oecd.org/en/publications/agricultural-policy-monitoring-and-evaluation-2023_b14de474-en.html
- Food Security Update (2022). World Bank Group. Available at: <https://www.worldbank.org/en/programs/food-security-update>
- Meuwissen, M. P. M., Feindt, P. H., Spiegel, A., Termeer, C. J. A. M., Mathijs, E., Mey, Y. et al. (2019). A framework to assess the resilience of farming systems. *Agricultural Systems*, 176, 102656. <https://doi.org/10.1016/j.agsy.2019.102656>
- Spiegel, A., Slijper, T., de Mey, Y., Meuwissen, M. P. M., Poortvliet, P. M., Rommel, J. et al. (2021). Resilience capacities as perceived by European farmers. *Agricultural Systems*, 193, 103224. <https://doi.org/10.1016/j.agsy.2021.103224>
- Vigani, M., Fellmann, T., Porcella Capkovicova, A., Ferrari, E. (2024). Harvesting resilience: adapting the EU agricultural system to global challenges. *Npj Sustainable Agriculture*, 2 (1). <https://doi.org/10.1038/s44264-024-00028-y>
- Wimmer, S., Finger, R. (2025). Productivity dispersion and persistence in European agriculture. *American Journal of Agricultural Economics*, 108 (1), 204–231. <https://doi.org/10.1111/ajae.12529>
- Dokić, D., Novaković, T., Tekić, D., Matkovski, B., Zekić, S., Milić, D. (2022). Technical Efficiency of Agriculture in the European Union and Western Balkans: SFA Method. *Agriculture*, 12 (12), 1992. <https://doi.org/10.3390/agriculture12121992>
- Barney, J. (1991). Firm Resources and Sustained Competitive Advantage. *Journal of Management*, 17 (1), 99–120. <https://doi.org/10.1177/014920639101700108>
- Zhang, D., Sun, Z. (2023). The Impact of Agricultural Global Value Chain Participation on Agricultural Total Factor Productivity. *Agriculture*, 13 (11), 2151. <https://doi.org/10.3390/agriculture13112151>
- Finansovi rezultaty do opodatkovannia pidprijemstv za vydamy ekonomichnoi diialnosti u 2018 rotsi (2018). Available at: https://od.ukrstat.gov.ua/arh/finance/finance12_2018.htm
- Financial Results Before Taxation of Enterprises by Types of Economic Activity in 2019 (2019). Available at: https://od.ukrstat.gov.ua/arh/finance/finance12_2019.htm
- Statistical Yearbook of Ukraine 2023 (2024). State Statistics Service of Ukraine. Available at: https://www.ukrstat.gov.ua/druk/publicat/kat_u/2023/zb/11/year_23_e.pdf

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ASSESSMENT OF THE IMPACT OF DIFFERENT TYPES OF LOYALTY PROGRAMS ON CUSTOMER RETENTION IN THE GEORGIAN CONSUMER MARKET

pages 124–129

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The object of research is the Georgian consumer market, the companies involved in it, and their customers who participate in various loyalty programs.

The problem of generalizing and systematizing the results of market research on customer retention through loyalty programs has been solved. It has been established that the main factors for the growth of loyal customers are the development of special programs and the effective use of them.

It has been shown that increasing the efficiency of spending on loyalty programs is challenge. Attracting new or more customers is expensive compared to retaining existing customers.

The research discusses the conceptual aspects of developing loyalty programs, analyzes the opinions of various scientists and specialists in this direction. Based on a reliable information source, a clear picture of the current situation in Georgia in this direction was created. A consumer survey was conducted.

It was determined that different types of loyalty programs have a significant impact on customer retention and the formation of brand loyalty. The types of loyalty programs that are currently the most effective were identified.

It is found that not only material incentives but also emotional motivators such as status, exclusivity, and personalization significantly influence consumer behavior.

It was determined that loyalty programs should be considered not only as a sales stimulation tool, but also as an integrated marketing platform that supports customer orientation. Taking into account the research results and recommendations, companies operating in the Georgian consumer market will be able to critically analyze their approaches to working with consumers in the market, identify their weaknesses in this regard, and then take real steps to improve the situation.

Keywords: loyalty programs, types of loyalty programs, customer retention, relationship marketing.

References

1. Malhotra, N. K., Agarwal, J. (2021). *Customer Relationship Marketing*. World Scientific Publishing, 372. <https://doi.org/10.1142/y0022>
2. Gronroos, C. (1990). Relationship approach to marketing in service contexts: The marketing and organizational behavior interface. *Journal of Business Research*, 20 (1), 3–11. [https://doi.org/10.1016/0148-2963\(90\)90037-e](https://doi.org/10.1016/0148-2963(90)90037-e)
3. Buttle, F. (2008). *Customer Relationship Management*. Routledge, 522. <https://doi.org/10.4324/9780080949611>
4. D'Arconte, C. (2023). *Customer Relationship Management (CRM): a conceptualization based on strategy to integrate different perspectives*. Available at: https://www.researchgate.net/publication/376398581_Customer_Relationship_Management_CRM_a_conceptualization_based_on_strategy_to_integrate_different_perspectives
5. Khan, A., Zehnder, B., Kossmann, D. (2016). Revenue maximization by viral marketing: A social network host's perspective. *2016 IEEE 32nd International Conference on Data Engineering (ICDE)*. Helsinki: IEEE, 37–48. <https://doi.org/10.1109/icde.2016.7498227>
6. Matin, A., Kululashvili, S., Todua, N., Khoshtaria, T. (2025). Brands and retailers as your friends: The impacts of social exclusion, crowding perception, and design density on conspicuous consumption. *Journal of Global Scholars of Marketing Science*, 35 (4), 562–579. <https://doi.org/10.1080/21639159.2025.2553564>
7. Kotler, P., Keller, K. L. (2016). *Marketing Management*. Pearson Education. Available at: https://www.academia.edu/41703874/Kotler_Keller_Marketing_Management_15th
8. Kumar, V., Reinartz, W. (2016). Creating Enduring Customer Value. *Journal of Marketing*, 80 (6), 36–68. <https://doi.org/10.1509/jm.15.0414>
9. Seturi, M. (2020). About customers attitude towards service in retail stores. *19-th International Conference: Economy & Business 2020*. Burgas: Economy & Business, 175–182. Available at: https://www.researchgate.net/publication/345180692_ABOUT_CUSTOMERS_ATTITUDE_TOWARDS_SERVICE_IN_RETAIL_STORES
10. Nasir, S. (2015). Customer Relationship Management Strategies in the Digital Era. *Advances in Marketing, Customer Relationship Management, and E-Services*. IGI Global. <https://doi.org/10.4018/978-1-4666-8231-3>
11. Baran, R. J., Galka, R. J. (2016). *Customer relationship management: the foundation of contemporary marketing strategy*. New York: Routledge, 456. <https://doi.org/10.4324/9781315687834>
12. Adams, K. (2023). *4 Reasons Why Building Customer Relationships is Especially Important Now*. Available at: <https://www.octaneai.com/blog/customer-relationships>
13. Futrell, C. M. (2011). *Fundamentals of Selling Customers for Life Through Service*. McGraw-Hill/Irwin, 688. Available at: <https://dokumen.pub/fundamentals-of-selling-12nbsped-0073529990-9780073529998.html>
14. Seturi, M. (2022). The role and importance of sales and sales promotion in the development of customer relations. *European Cooperation*, 2 (54), 64–71. Available at: <https://www.ceeol.com/search/article-detail?id=1100868>
15. Ingram, T. N., Avila, R. A., Schwepker, C. H., Williams, M. R., Shannahan, K. L. J. (2015). *Sell*. Nelson Education. Available at: <https://openlibrary.org/books/OL37755683M/Sell>
16. Sheth, J. N., Parvatiyar, A. (1995). The evolution of relationship marketing. *International Business Review*, 4 (4), 397–418. [https://doi.org/10.1016/0969-5931\(95\)00018-6](https://doi.org/10.1016/0969-5931(95)00018-6)
17. Seturi, M. (2022). Some views about sales and relationship marketing. *Journal of International Scientific Publications: Economy & Business*, 16, 452–458. Available at: <https://www.scientific-publications.net/en/article/1002453/>
18. Olariu, I. (2016). Personal selling in marketing. Studies and scientific researches. *Economics edition*, 95–101. <https://doi.org/10.29358/scceco.v0i0.348>
19. Seturi, M., Urotadze, E. (2020). Some opinions about sustainable development and tourism (case of Georgia). *Strategic Imperatives of Modern Management*. Kyiv: Kyiv National Economic University named after Vadym Hetman, 286–289. Available at: https://www.researchgate.net/publication/341279461_SOME_OPINIONS_ABOUT_SUSTAINABLE_DEVELOPMENT_AND_TOURISM_CASE_OF_GEORGIA
20. Rosário, A. T., Casaca, J. A. (2023). Marketing de relacionamento e satisfação do cliente: Uma revisão sistemática da Literatura. *Estudios Gerenciales*, 516–532. <https://doi.org/10.18046/j.estger.2023.169.6218>
21. Botchkarev, A., Andru, P. (2011). A Return on Investment as a Metric for Evaluating Information Systems: Taxonomy and Application. *Interdisciplinary Journal of Information, Knowledge, and Management*, 6, 245–269. <https://doi.org/10.28945/1535>
22. Sandborn, P. (2016). Return on Investment (ROI). *Cost Analysis of Electronic Systems*, 381–401. https://doi.org/10.1142/9789813148260_0017
23. Pal Bariha, P. (2021). Customer Loyalty Program and Retention Relationship. *Psychology and Education Journal*, 58 (1), 5069–5074. <https://doi.org/10.17762/paev58i1.2012>
24. Loyalty Program 2X2 terms and conditions (2022). *Ori Nabiji*. Available at: <https://file-api.orinabiji.ge/api/files/download/64f5a2fc2cf22f1ab2035090>