

Lecture Notes on Data Engineering
and Communications Technologies 275

Andrii Semenov
Iryna Yepifanova
Jana Kajanová *Editors*



Data-Centric Business and Applications

Modern Trends in Financial and
Innovation Data Processes 2025.
Volume 1

Lecture Notes on Data Engineering and Communications Technologies

Volume 275

Series Editors

Fatos Xhafa , Technical University of Catalonia, Barcelona, Spain

Rolando Herrero, Northeastern University, Boston, MA, USA

The aim of the book series is to present cutting edge engineering approaches to data technologies and communications. It will publish latest advances on the engineering task of building and deploying distributed, scalable and reliable data infrastructures and communication systems.

The series will have a prominent applied focus on data technologies and communications with aim to promote the bridging from fundamental research on data science and networking to data engineering and communications that lead to industry products, business knowledge and standardisation.

Indexed by SCOPUS, INSPEC, EI Compendex.

All books published in the series are submitted for consideration in Web of Science.

Andrii Semenov · Iryna Yepifanova · Jana Kajanová
Editors

Data-Centric Business and Applications

Modern Trends in Financial and Innovation
Data Processes 2025. Volume 1

Editors

Andrii Semenov 
Faculty of Information Electronic Systems
Vinnytsia National Technical University
Vinnytsia, Ukraine

Iryna Yepifanova 
Faculty of Management and Information
Security
Vinnytsia National Technical University
Vinnytsia, Ukraine

Jana Kajanová
Faculty of Management
Department of Economics and Finance
Comenius University Bratislava
Bratislava, Slovakia

ISSN 2367-4512 ISSN 2367-4520 (electronic)
Lecture Notes on Data Engineering and Communications Technologies
ISBN 978-3-032-10152-5 ISBN 978-3-032-10153-2 (eBook)
<https://doi.org/10.1007/978-3-032-10153-2>

© The Editor(s) (if applicable) and The Author(s), under exclusive license to Springer Nature
Switzerland AG 2026

This work is subject to copyright. All rights are solely and exclusively licensed by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, expressed or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

This Springer imprint is published by the registered company Springer Nature Switzerland AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

If disposing of this product, please recycle the paper.

Preface

This volume presents a comprehensive exploration of innovative approaches and data-centric solutions that support sustainable development across diverse economic and technological sectors. Each chapter contributes to the growing body of knowledge on how enterprises, industries, communities, and ecosystems can adapt to the dynamic challenges of the modern world. The authors offer valuable insights grounded in interdisciplinary research and practical applications from strategic development in renewable energy and responsible tourism to digital innovation in agriculture and environmental, social, and governance (ESG) reporting. A particular emphasis is placed on Ukraine's socio-economic context, where the war, decentralisation, and resilience-building efforts highlight the need for adaptive and sustainable strategies. Methodological advances, such as tokenisation of real-world assets, logistic regression for bank stability, and synthetic control methods for investment analysis, enrich the analytical foundation of the book. Several chapters delve into sector-specific innovations—ranging from biomedicine and environmental monitoring to education and scientific research financing—demonstrating the crucial role of data and technology in strategic planning. The inclusion of mathematical modelling and engineering-based studies broadens the monograph's impact, bridging gaps between economics, technology, and applied sciences. Collectively, the research presented here offers both theoretical insights and practical tools for academics, policymakers, and industry practitioners committed to sustainable transformation. We hope this volume will inspire further dialogue and action toward resilient, knowledge-driven development at both local and global levels.

In the first chapter titled “[Innovative Potential in Ensuring Sustainable Development of the Enterprise](#)”, the authors propose to examine the existing approaches in Ukraine to calculating innovation potential and its application to the sustainable development of enterprises. An analysis of approaches used to determine the innovation potential of an enterprise was carried out, and the features of forming a model of the innovative potential for sustainable development were described. The main prerequisites for developing such a model were also identified. As an example of practical application, the chapter developed a model of the innovative potential of

sustainable development of the Private Agricultural Firm «VATAL» and the Agricultural Limited Liability Company «Slavutych». Quantitative indicators for assessing the innovative potential of sustainable development were provided, and based on these, projected indicators of innovation potential were calculated using individual innovations in the production sector of these firms. This chapter may be of particular interest to foreign companies planning to engage in financial and innovative activities in Ukraine.

In the next chapter, “[RWA Tokenization Mechanisms as a Tool for Sustainable Economic Development of Local Hromadas in Ukraine](#)”, the authors argue that the relevance of the study of (RWA—Real World Assets) tokenization mechanisms in the context of local community development is due to the following important factors. Local communities in Ukraine face the problem of limited financial resources for the implementation of infrastructure development and modernization projects. Tokenization of real assets can become a tool for attracting additional investments by creating liquid digital assets secured by real municipal property. Authors develop the mechanisms of the impact of RWA tokenization on sustainable economic development and restoration of local communities in Ukraine. Also, the implementation of RWA tokenization mechanisms provides increased transparency in the management of community assets and reduced transaction costs when carrying out operations with them. The use of this mechanism may become a key factor in the sustainable development of local communities in Ukraine, especially in the process of post-war reconstruction. The methods and mechanisms proposed in the chapter can be useful both for shaping the economic development of communities in developed countries and for managing international investment processes during the post-war development of Ukraine.

In the subsequent chapter, “[Methodology for Assessing the State of Business Processes in Terms of Their Impact on the Economic Security of the Enterprise](#)”, the authors built a mathematical model to optimize decision-making for manufacturing enterprises in an unstable environment. The components of the model are part of the expenses for wages (including taxes), procurement of material resources (raw materials), and payment for electricity used in production. The model is significantly nonlinear and therefore exhibits different behavior for large and small enterprises. The model also takes into account the possibility of self-generation of electricity. As a result, the model’s advantage is the ability to take into account parameters that affect the cost of production, as well as the identification of threats in forecasting the consequences of their implementation. This creates a basis for the development of preventive measures, which is critically important in various conditions in the environment. Thus, the results of the section may be important for the development of effective decision support systems for manufacturing enterprises in modern conditions.

In the next chapter, “[The Strategic Potential of Renewable Energy Microgrids: Global Transformations and Determinants of Sustainable Development](#)” the authors adopt a mixed-methods approach combining conceptual systems analysis and empirical econometric modeling. To overcome the challenges of the renewable energy

source development in Ukraine, a forward-looking solution is to create small electricity generation grids or microgrids that ensure decentralized and stable energy production and distribution at a local level. Structural elements of the microgrid ecosystem and the value system in the context of achieving sustainable development and its sustainable development goals were constructed in the chapter. In support of these conclusions, an empirical regression model was constructed using national-level data from 2015 to 2024. The results reveal that the strongest positive determinant of renewable energy share in electricity capacity is GDP per capita, highlighting the critical role of economic capacity in enabling energy transition. The ICT Development Index also demonstrates a moderate positive correlation with renewable energy penetration, confirming that digital transformation supports decentralized energy infrastructure. Conversely, institutional policy support showed a negative correlation over time, suggesting that the effectiveness of policies may be context-dependent or delayed in impact.

In the next chapter, “[Competency-Based Approach as a Tool for Forming Sustainable Business Ecosystems: Case Studies on the Quality of Education Towards Sustainable Development of Territories](#)”, the authors study the application of the competency-based approach to the problem of forming sustainable business ecosystems in the context of distance education in Ukraine. The quality of education received is studied. For this purpose, a sample of 46 employers (35% female and 65% male aged 35–55 years) and 174 undergraduate and graduate students (55% female and 45% male aged 17–35 years from Lutsk National Technical University, Ukraine) was studied. As a result of the study, 4 main factors were identified that determine the presence of competence in candidates and are important to employers in the context of Ukraine. These are digital competence (F1), language competence (F2), competence in sciences, technologies, engineering, and mathematics (F3), and personal, social, and learning competence (F4). These factors explain 79.4% of the variance of the indicators for level of competence (1st factor—15.5%, 2nd—15.6%, 3rd—32.1%, 4th—12.2%). The results of this chapter will be important for building business processes in creating international companies at the stage of reconstruction of Ukraine after the end of the war.

The next chapter, “[Financial Health Assessment of Ukrainian Banks: A Logistic Regression Model for Bankruptcy Prediction](#)”, explores the use of statistical models to evaluate the financial health of Ukrainian banks. A large number of statistical models developed by Ukrainian scientists were analysed. This part of the paper may be of interest to foreign scientists. The analysis led the authors to conclude that logistic regression is a universal and statistically reliable technique for analysing binary dependent variables. To construct the logistic regression model, 22 indicators were initially calculated and distributed into groups such as liquidity, solvency, financial stability, profitability and business activity (data taken from the official website of the National Bank of Ukraine). Of these, only two relative indicators are critical: (1) administrative and other operating expenses/assets and (2) interest income/assets. This chapter provides a statistically correct mathematical formula for calculating the level of a given bank’s health. The results could be significant for foreign companies planning to engage in financial and innovation activities in Ukraine.

Further chapter “[Development of ESG Reporting Under the Influence of Theoretical Concepts](#)” draws attention to the impact of the theoretical context change on the structure and content of ESG enterprises’ reporting. Within the framework of the sustainable development paradigm, such reporting informs stakeholders about the potential and actual consequences of the enterprise’s activities for the environment and society. The authors analyzed sustainable development reports and identified their universal components. They proposed a set to be considered as central to the concept of sustainable development. The interests of potential stakeholders of the enterprise, which are focused on individual aspects of ESG reports, are described, which may be interesting for participants in the relevant negotiations. The authors make propositions for the life cycle of legitimacy in the context of ESG reporting, characteristics of types of institutional isomorphism, influencing factors on ESG reporting according to stakeholder, legitimacy, and institutional theories, and criteria for evaluating the ESG reporting process. The results of the chapter may be interesting for the formation of databases for relevant reports and developers of analytical tools.

The next chapter “[Strategies for the Development of Responsible Tourism to Support a Sustainable Tourism Ecosystem](#)” aims to identify current trends in the development of responsible tourism and assess the effectiveness of its impact on the preservation of a sustainable tourism ecosystem. The authors draw attention to the fact that the organization of the Ukrainian tourism industry in the post-war period should be reformed using modern methods. Having analyzed the existing systems of tourism organizations in developed countries, the authors developed a business process that takes into account the existing capabilities of Ukraine. The databases involved in the implementation of this business process are highlighted. The results may be important for Ukrainian and international financial investors, start-ups, and developers of information products that support activities in the field of responsible tourism and the sustainable tourism ecosystem.

The subsequent chapter, “[Digital Agro-Innovations as a Strategic Tool for Agricultural Adaptation](#)”, explores directions for forming a practical and conceptual basis for national strategies, digital transformation programs, and agricultural adaptation policies in the context of climate change and post-war economic reconstruction. Particular attention is given to agrodrones due to their high precision, operational flexibility under variable climate conditions, and multifunctionality in monitoring, spraying, and geospatial mapping. The proposed integrated digital agroecosystem framework establishes a foundation for building climate-resilient, resource-efficient, and environmentally balanced agricultural models. Importantly, this study introduces a novel systems-based approach by conceptualizing the synergistic interaction between digital tools as a comprehensive system. The chapter may be of considerable interest to researchers and developers in Europe, the USA, and other developed countries. Here, a projection of the unique experience gained in Ukraine in the use of drones in wartime conditions onto the conditions of agricultural production is presented. Therefore, the results of this chapter will be important for intensifying the formation of a system of innovative start-ups in agriculture in developed countries.

The next chapter, “[The Impact of War on Foreign Direct Investment in Ukraine: An Empirical Assessment Using the Synthetic Control Method](#)”, explores the use of the synthetic control method to estimate the causal impact of the war against Ukraine on foreign direct investment inflows between 2014 and 2021. The period covered was the one in which limited military actions took place in Ukraine (which served in a certain sense as a backdrop), and national political and economic processes also had a significant impact. The paper compares foreign direct investment inflows between Ukraine and 27 countries using 33 predictors (for the placebo test). The comparison of actual and projected trajectories of foreign direct investment inflows indicates heightened sensitivity of foreign investors to the social, political, and economic stability of the country, with investment patterns responding to perceived instability in Ukraine. The results obtained may be important for the formation of databases for foreign direct investment inflows to study the impact of national social and economic processes on them.

The chapter, “[Modelling the Socio-economic Impacts for the Coal Mining: Forecast of Hazardous Properties of Coal Seams](#)”, examines strategic directions for the development of coal mining management technologies that minimize environmental impact and enable a substantial reduction in environmental costs. The chapter proves that the current regulatory framework requires substantial revisions to accommodate the integration of modern coal mining technologies. Particular emphasis is placed on the necessity of enhancing safety standards in mining operations. The introduction of new methods for forecasting the hazardous properties of coal seams and improving the regulatory framework for safe mining operations will increase the socio-economic efficiency of investments in improving the miners’ working conditions. The introduction of an investment support mechanism for the innovative development of coal enterprises, together with open innovation systems and the growth of social capital, will foster partnership relationships between public and private organizations in the innovation sphere, enabling coal industry enterprises to reach a qualitatively higher stage of development.

In the chapter titled “[Managing the Transition Phase Between Stages of the Manufacturing Enterprise Lifecycle as a Key Growth Driver](#)”, the authors developed a model for managing the transition phase between stages of the manufacturing enterprise life cycle. An objective function of the model is an optimization problem based on four key factors of the transition phase, including capital intensity (cost), duration, system ability to change, and external conditions under which the transition is carried out. The model also includes three management parameters. The model is designed to identify optimal conditions for starting the transition phase between stages of the life cycle. The nature of changes in the management system as a response to increasing loads associated with the transition is analyzed in detail. A decision-making model is described to determine the optimal conditions for starting the transition phase based on key influencing factors. The results obtained will be important for the development of analytical information technologies focused on the formation of databases for optimizing business management in a turbulent environment.

In the chapter, “[Method for Competitive Funding Optimization of Scientific Research and Development in Universities and Scientific Institutes \(with Discussion for Ukraine\)](#)”, the authors propose methods for competitively optimization in state funding of higher education institutions and scientific institutions. The optimization for scientific institutions is performed based on indicators of the effectiveness of their scientific activity. The number of citations of scientists actively working at this institution was chosen as an objective indicator for the results of scientific activity. For this, the authors used the Scopus and WoS databases, which have powerful analytical apparatus. Methods have also been developed for cleaning indicators of scientific activity from deception. The optimization of higher education institutions additionally includes indicators of the effectiveness of graduate training, namely the number of graduates who are involved in participating in the economic activity of the state within six months after graduation. The system of conditions for evaluating the optimality of state financing is proposed. The application of the obtained results will allow the Government of Ukraine to make decisions considering a system of objective indicators for the contribution to international science and national economy made by higher education and scientific institutions.

In the context of accelerating digital transformation in agriculture, the chapter “[Mathematical Models of the Milking Processes Duration](#)” presents a significant advancement in modelling the duration of machine milking processes across various technological setups. By analysing real-world data from dairy farms in Ukraine, the authors introduce refined mathematical models that capture the stochastic nature of milking and preparation durations using chi-square and gamma distributions. These models enhance the accuracy of productivity assessment for milking equipment and support the development of intelligent information systems for dairy farm management. Special attention is given to integrating both deterministic and random variables, reflecting the operational realities of manual, semi-automated, and robotic milking systems. The chapter contributes to the broader goals of smart agriculture by offering data-driven tools that optimise farm processes and decision-making. Thus, it provides valuable insights for researchers, engineers, and agrotechnology developers working on the next generation of precision livestock systems.

The chapter titled “[Innovative Magnetosensitive Frequency Microsensors Based on Transistor Structures for Monitoring Systems in Biomedicine](#)” addresses a critical technological challenge at the intersection of microelectronics, sensor design, and biomedical monitoring—developing high-sensitivity magnetic field transducers tailored for miniaturised and data-driven systems. The authors present a novel class of magnetosensitive frequency microsensors based on double-collector transistor structures, capable of accurately converting weak magnetic fields into frequency-modulated signals. By integrating mathematical modelling with experimental validation, the study demonstrates significant improvements in sensor sensitivity, linearity, and thermal stability compared to conventional solutions. The research highlights how semiconductor physics and analogue circuit innovation can enhance data acquisition at the hardware level, crucial for real-time biomedical diagnostics and neurophysiological monitoring. Particularly notable is the compatibility of these sensors with digital signal processing systems, enabling robust performance in compact,

low-power environments such as wearable and implantable medical devices. The chapter contributes to the broader goal of building intelligent, data-centric monitoring infrastructures by ensuring that the signal chain begins with precise and reliable sensing. Through its interdisciplinary approach, this work offers valuable guidance for engineers, researchers, and system designers engaged in the development of next-generation medical and IoT sensor technologies.

The chapter “[Formation of the Concept of Investment Decision-Making in the European Tourism Sector Using Economic Indicators](#)” provides a timely, data-driven analysis of the complexities involved in investment decision-making within the European tourism sector. Through the integration of macroeconomic indicators, regional development metrics, and risk assessment models, the authors present a robust conceptual framework for evaluating tourism investments in various EU contexts. The study emphasises the importance of combining quantitative data with institutional and geopolitical factors in order to inform resilient and adaptive investment strategies. The flexible classification system for decision-making variables is particularly relevant, as it enables scenario modelling under uncertain economic and environmental conditions. This work contributes to the monograph’s broader focus on data-centric approaches, illustrating how structured economic analysis can enhance strategic planning and sustainable development in one of Europe’s most vital service industries.

The chapter “[Optical Measurement Converter “Gas Concentration–Voltage” for Environmental Monitoring of Aggressive Atmospheric Environments](#)” presents an innovative approach to environmental monitoring. This approach involves developing an optical-electronic converter that transforms gas concentration data into voltage signals for real-time analysis. Designed for application in a chemically aggressive or corrosive atmosphere, the proposed system integrates the principles of optical absorption and sensor engineering to enable the accurate, selective and durable detection of gases. Through a combination of physical modelling and experimental validation, the authors demonstrate the converter’s reliability and suitability for deployment in smart environmental infrastructure. Its compact design and long-term stability make it ideal for integration into autonomous monitoring stations, industrial safety systems and smart cities.

In the next chapter “[Formation of Pharmaceutical Enterprises’ Strategy Based on the Development of Operational Capabilities](#)”, the authors present a practical and analytically grounded approach to strategic planning in the pharmaceutical sector. They focus on the development of operational capabilities as a core driver of business resilience. Using EFAS analysis, interrelationship diagrams and ABC analysis, the authors identify external threats, such as supplier instability and competitive pressures, as well as internal inefficiencies relating to low-demand product assortments. The study proposes a structured inventory management model that optimises resource allocation and aligns product offerings with market demand by integrating these insights. The methodological toolkit outlined in this study enables pharmaceutical enterprises to formulate strategies based on objective data, thereby improving

their adaptability and cost-effectiveness. This work exemplifies the value of data-centric decision-making in a sector that is subject to dynamic regulatory, economic and consumer challenges.

In the chapter titled “[Data-Centric Innovations for Psychological Support: Integrating LLMs and Vector Search in Professional Web Applications](#)”, the authors explore the intersection of artificial intelligence and mental health by presenting an innovative digital solution designed to enhance psychological support services. The authors introduce the ‘Smart Psychologist’s Assistant’—a professional web application integrating large language models (LLMs), vector search and modern client-server technologies to support psychologists in clinical decision-making and patient communication. By combining ethical AI deployment with robust system architecture, the project ensures high functionality and strict data protection. Seamless integration of GPT-based models and PostgreSQL vector search enable real-time, context-aware support, preserving the sensitivity required in psychological practice. By aligning data-centric innovations with the needs of mental health professionals, this work offers a forward-looking model for intelligent, secure and ethically grounded digital tools in behavioural health care. It represents a meaningful step towards the development of scalable and responsible AI applications in human-centred domains.

The last chapter “[Cyber Security Manager After NIS2 Directive](#)” discusses the critical role of cybersecurity management in the era of digital transformation, emphasizing the integration of the NIS2 Directive into organizational practices. As organizations increasingly embrace digital transformation, the complexity and frequency of cyber threats have surged, necessitating a proactive and holistic approach to cybersecurity. The authors explored the evolving threat landscape, highlighting the rise of AI-driven attacks, ransomware, and Cybercrime-as-a-Service, which demand adaptive and proactive defense strategies. By focusing on the human factor, the study underscores the importance of structured, mandatory, and role-based training to address persistent gaps in cybersecurity education and awareness. Fostering a proactive security culture, enhancing communication, and embedding cybersecurity into organizational values and leadership accountability are suggested. By exploring real-world case studies, emerging trends, and actionable recommendations, this chapter provides a comprehensive roadmap for organizations to enhance resilience and align with regulatory requirements. Ultimately, this work aims to inspire a shift in organizational priorities, ensuring that cybersecurity becomes a shared responsibility and a cornerstone of sustainable digital growth.

Vinnytsia, Ukraine

Andrii Semenov
semenov.a.o@vntu.edu.ua

Vinnytsia, Ukraine

Iryna Yepifanova
yepifanova@vntu.edu.ua

Bratislava, Slovakia

Jana Kajanová
jana.kajanova@fm.uniba.sk

Contents

Innovative Potential in Ensuring Sustainable Development of the Enterprise	1
Yana Kotko, Ruslana Levkina, Oksana Kulinich, and Dmytro Levkin	
RWA Tokenization Mechanisms as a Tool for Sustainable Economic Development of Local Hromadas in Ukraine	23
Maryna Riabokin, Yevgen Kotukh, Dmytro Nikolaievskyi, and Yuliia Yefimenko	
Methodology for Assessing the State of Business Processes in Terms of Their Impact on the Economic Security of the Enterprise	43
Nataliia Havlovska, Serhii Matiukh, Mykhailo Kryvdyk, and Yevhenii Rudnichenko	
The Strategic Potential of Renewable Energy Microgrids: Global Transformations and Determinants of Sustainable Development	67
Volodymyr Lypov, Natalya Ushenko, Viktoriia Hurochkina, Tomasz Szapiro, Larysa Shaulska, and Viacheslav Dzhedzhula	
Competency-Based Approach as a Tool for Forming Sustainable Business Ecosystems: Case Studies on the Quality of Education Towards Sustainable Development of Territories	99
Oksana Polinkevych, Olena Kuzmak, Vira Shpylova, and Ryszard Kamiński	
Financial Health Assessment of Ukrainian Banks: A Logistic Regression Model for Bankruptcy Prediction	121
Larysa Zomchak and Andriana Seniv	
Development of ESG Reporting Under the Influence of Theoretical Concepts	137
Iryna Zamula, Daria Seletska, Olha Fedorova, and Maryna Tanasiieva	

The Strategic Potential of Renewable Energy Microgrids: Global Transformations and Determinants of Sustainable Development



Volodymyr Lypov , Natalya Ushenko , Viktoriia Hurochkina ,
Tomasz Szapiro , Larysa Shaulska , and Viacheslav Dzhezdzhula

Abstract The study presents the results of a study aimed at determining the strategic potential of implementing digitization technology in renewable energy production through the creation of renewable energy microgrids and the impact of such technology on the processes of evolutionary globalization. Renewable energy is a key element in ensuring sustainable development. The variety of alternative energy sources and the large number of producers capable of offering electricity highlight the need for small microgrids. The smart grid business model considered in the study can stimulate the restructuring of the production system and electricity distribution markets. The study carried out structural, functional, systemic and institutional analysis. The features of digital platforms as an organizational form are discussed. These

V. Lypov

State Organization “Institute for Economics and Forecasting of the National Academy of Sciences of Ukraine”, Kyiv, Ukraine

e-mail: lypov_vl@ukr.net

N. Ushenko

Borys Grinchenko Kyiv Metropolitan University, Kyiv, Ukraine

e-mail: ushenko_nv@ukr.net

N. Ushenko · V. Hurochkina · T. Szapiro

Warsaw School of Economics, Warsaw, Poland

e-mail: viktoriia.hurochkina@sggw.waw.pl

T. Szapiro

e-mail: tszapiro@sggw.waw.pl

V. Hurochkina

Kyiv Institute of Business and Technology, Kyiv, Ukraine

L. Shaulska

Taras Shevchenko National University of Kyiv, Kyiv, Ukraine

e-mail: shaulska@knu.ua

V. Dzhezdzhula (✉)

Vinnitsia National Technical University, Vinnitsia, Ukraine

e-mail: djedzula@vntu.edu.ua

platforms provide synergies by connecting small renewable energy producers in microgrids, leading to a two-sector model for the energy industry. The mechanism of building energy systems based on the principles of “Industry 5.0” and aspects of accelerating global sustainable development goals is being analyzed.

Keywords Renewable energy sources · Microgrids · Energy · Sustainable development goals · Model · Ecosystem · Digital platform