

МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
КИЇВСЬКИЙ НАЦІОНАЛЬНИЙ УНІВЕРСИТЕТ
ТЕХНОЛОГІЙ ТА ДИЗАЙНУ

МЕНЕДЖМЕНТ

№ 1 (39), 2024

DOI: 10.30857/2415-3206.2024.1

Наукове видання

Періодичність виходу журналу: 2 рази на рік

Київ 2024

Журнал «Менеджмент» є науковим виданням Київського національного університету технологій та дизайну як правонаступника Державного вищого навчального закладу «Міжгалузева академія управління» (наказ Міністерства освіти і науки України від 19.06.2015 р. №661 «Про реорганізацію державного вищого навчального закладу «Міжгалузева академія управління»)

№ 1 (39) 2024	Свідоцтво про державну реєстрацію друкованого засобу масової інформації: серія KB №22130–12030 ПР від 16.05.2016 р. Свідоцтво суб'єкта видавничої справи: ДК № 993 від 24.07.2002 р.
	Журнал входить до переліку наукових фахових видань. Наказ МОН України від 18.12.2018 № 1412 (додаток 10, рішення щодо присвоєння Категорії Б) – фаховість із економічних наук. Спеціальності: 051, 071, 072, 073, 075, 076, 241, 281.
ISSN 2415-3206	Журнал зареєстровано в Міжнародному центрі періодичних видань (ISSN International Centre, Париж, Франція) 24.03.2016 р. Журнал реферується та індексується у наступних міжнародних базах даних: International DOI Foundation, CrossRef, WorldCat, Google Scholar, Національна бібліотека України імені В.І. Вернадського, Інституційний репозитарій Київського національного університету технологій та дизайну
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Рекомендовано до друку Вченою радою Київського національного університету технологій та дизайну, протокол № 11 від 19.06.2024 р.

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MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
KYIV NATIONAL UNIVERSITY
of TECHNOLOGIES and DESIGN

MANAGEMENT

Issue 1 (39), 2024

DOI: 10.30857/2415-3206.2024.1

Scientific publications

Issued: 2 times a year

Kyiv 2024

Journal "Management" is a scientific edition of Kyiv National University of Technologies and Design as a successor of State higher educational institution "Interbranch Management Academy" (order of Ministry of Education and Science of Ukraine from 06.19.2015 №661 «About reorganization of state higher educational institution" Interbranch Management Academy")

**Issue 1 (39)
2024**

**Certificate of print media registration: KV series №22130–12030 PR from 16.05.2016
License for publishing activity is DK №993, originating date 24.07.2002**

The journal is listed & reregistered in Higher Attestation Commission of Ukraine: № 1412, originating date 18.12.2018. Fields: economical. Specialties: 051, 071, 072, 073, 075, 076, 241, 281.

ISSN 2415-3206

The journal is registered in the International Center of periodicals (ISSN International Centre, Paris, France) 03.24.2016
The journal is abstracted and indexed by International DOI Foundation, CrossRef, WorldCat, Google Scholar, The Vernadsky National Library of Ukraine, Kyiv National University of Technologies and Design Institutional Repository

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**Kyiv National University of Technologies and Design
Ukraine, 01011, Kyiv, str. Mala Shyianovska, 2**

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Recommended for publication by the Academic Council of Kyiv National University of Technologies and Design, protocol № 11 from 19.06.2024

Printed materials mixed languages: English, Polish. Responsibility for the translation, the accuracy of the facts, quotations, proper names, geographical names, names of companies, organizations, institutions, and other information are authors of articles. Reprints and translations of articles permitted only with the consent of the author (-s) and the publisher.

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DOI: 10.30857/2415-3206.2024.1

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DOI: 10.30857/2415-3206.2024.1

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JEL Classification:
M21

UDC 339

DOI: 10.30857/2415-
3206.2024.1.1

THE LOGISTICS PROCESS AND ITS ROLE IN THE ACTIVITIES OF MODERN ENTERPRISES

Zoryna SHATSKA, Oleksandr STUZHNYI
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Ukraine*

THE PURPOSE OF THIS ARTICLE is to study the peculiarities of the logistics process in the activities of domestic enterprises.

RESEARCH METHODS. In the process of writing the article, general scientific and special methods of researching the logistics process at the enterprise were used, including: epistemological analysis, theoretical generalization, analysis, synthesis, tabular and graphic.

PRESENTATION OF THE MAIN RESEARCH MATERIAL. The article defines that at a modern enterprise, the organization of production, supply and sales processes is ensured with the help of logistics. The essence of the concept of "logistics" from the point of view of foreign and domestic scientists is summarized. It was found that the logistics process is the basis of logistics. The main and auxiliary logistics processes at the enterprise, which consist of separate logistics operations and functions, are summarized. A diagram of the logistics process at the enterprise, which occurs simultaneously with material and information flows, has been formed.

Logistics operations with material flow in the logistics process of the enterprise are systematized, which include: supply, transportation, storage, production and sales. Logistics operations with information flow in the logistics process of the enterprise include: information collection; accumulation and storage of information; data processing; transmission of information. A descriptive description of the specified logistics operations is given. It has been proven that the complexity of the logistics process at the enterprise depends on the specifics of its activity and the technological process of manufacturing products.

CONCLUSIONS FROM THE CONDUCTED RESEARCH. Under the influence of modern digital technologies, the enterprise's logistics process will continue to undergo transformations that will affect its duration, the change in the number of logistics operations and functions, the transition to automation, and the level of cost effectiveness.

KEYWORDS: logistics; logistics process; logistics operations; logistics functions; enterprise; digitalization.

NUMBER OF REFERENCES 22	NUMBER OF FIGURES 1	NUMBER OF TABLES 1
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JEL Classification:
M21

УДК 339

DOI: 10.30857/2415-
3206.2024.1.1

ЛОГІСТИЧНИЙ ПРОЦЕС ТА ЙОГО РОЛЬ В ДІЯЛЬНОСТІ СУЧАСНИХ ПІДПРИЄМСТВ

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МЕТОЮ ДАНОЇ СТАТТІ є дослідження особливостей з матеріальним потоком в логістичного процесу в діяльності вітчизняних підприємств. Систематизовано логістичні операції

МЕТОДИ ДОСЛІДЖЕННЯ. В процесі написання статті використано загальнонаукові та спеціальні методи дослідження логістичного процесу на підприємстві, серед яких: до яких віднесено: постачання, транспортування, складування, виробництво і збут. До логістичних операцій з інформаційним потоком в логістичному процесі підприємства віднесено: збору інформації; накопичення та зберігання інформації; обробка інформації; передача інформації. Надана описова характеристика зазначених логістичних операцій. Доведено, що складність логістичного процесу на підприємстві залежить від специфіки його діяльності та технологічного процесу виготовлення продукції.

ВИКЛАД ОСНОВНОГО МАТЕРІАЛУ ДОСЛІДЖЕННЯ. В статті визначено, що на сучасному підприємстві організація процесів виробництва, постачання та збуту забезпечується з допомогою логістики. Узагальнено сутність поняття «логістика» з точки зору закордонних та вітчизняних науковців. З'ясовано, що логістичний процес є основою логістики. Узагальнено основні та допоміжні логістичні процеси на підприємстві, які складаються з окремих логістичних операцій та функцій. Сформовано схему логістичного процесу на підприємстві, який відбувається одночасно з матеріальним та інформаційним потоками. **ВИСНОВКИ З ПРОВЕДЕНОГО ДОСЛІДЖЕННЯ.** Під впливом сучасних цифрових технологій логістичний процес підприємства і надалі зазнаватиме трансформацій, які впливатимуть на його тривалість, зміну кількості логістичних операцій і функцій, переходу до автоматизації, рівень витратності.

КЛЮЧОВІ СЛОВА: логістика; логістичний процес; логістичні операції; логістичні функції; підприємство; цифровізація.

Statement of the problem. World globalization and integration processes are changing the traditional channels of distribution of goods and services, the rational organization of which is provided by logistics. Today, logistics has become the main driving force of enterprise activity, as it ensures effective management of flows of material, information and financial resources from the producer to the consumer. The basis of logistics activity at the enterprise is the logistics process, which is undergoing transformation under the influence of digital technologies.

Analysis of recent publications on the problem. The work of leading foreign scientists, including: J. Busher, Donald F. Wood, O. Oaklander, J. Heskett and others, is dedicated to the study of the problems of implementing logistics at enterprises. Among domestic scientists, A. Butov, I. M. Karp, A. G. Kalchenko, E. V. Krykavskiy, A. V. Kruk and K. V. Tserkovna are studying the problems of implementing logistics at enterprises. and other. Their work is devoted to defining the essence of the concept of logistics, defining its role in the activities of enterprises, describing the tools of logistics management from the point of view of a systemic approach. However, the problems of the formation of the logistics process and its transformation under the influence of modern digital technologies are still insufficiently described and require further in-depth research.

Statement of the main results and rationale. The main goal of the activity of a modern enterprise is the organization of uninterrupted production of products, performance of works, provision of services. The implementation of the production process is not possible without ensuring the rhythmic arrival of raw materials and materials for production, as well as the delivery of finished products to the final consumer. At a modern enterprise, logistics helps to organize these processes.

Logistics, "as a science that has existed for many years and emerged as a result of the integration of material, production management and marketing, still attracts increased attention from scientists, which is reflected in various aspects of the use of the term "logistics" (Butov, 2012). The definition of the essence of the concept of "logistics" by domestic and foreign scientists is summarized in the table 1.

At every enterprise, logistics is manifested through logistics activities, as a practical implementation of complex logistics functions and elementary logistics operations (Logistics activity). Logistics processes are the basis of the company's logistics activities. A logistics process is a time-organized sequence of logistics operations that allows you to achieve a set goal (Logistics activity). The logistics process is a mutually determined, purposeful movement of a set of resource flows and their transformation in the process of meeting the solvent demand for the finished product (Korolenko, 2013). Some scientists equate the

concepts of logistics process and logistics business process, understanding by it "an interconnected set of operations and functions that translate the company's resources in the flow management process into the result determined by its logistics strategy" (Chuyeshov, Sagaydak-Nikityuk and Kozyreva, 2015).

Table 1

Definition of the essence of the concept of "logistics"

Authors (organizations)	Essence
Logistics as a planning process	
American Logistics Society "Logistics Management Council" (Coyle, Bardi and Langley, 2002)	the process of planning, implementing and controlling the cost-effective movement and storage of raw materials, work-in-progress stocks, finished products and related services and relevant information from the place of origin to the place of consumption to ensure compliance with consumer requirements
Donald F. Wood (https://www.britannica.com)	the process of planning, implementing and controlling the efficient, effective material flow and storage of goods, services and related information from the point of origin to the point of consumption in order to meet customer requirements
J. Busher and G. Tyndall (1987)	the process of planning, implementation and management of efficient, economical movement and preservation of raw materials, work in progress, finished products, related information from the point of origin to the point of consumption in order to ensure compliance with consumer requirements
Logistix Partners Oy, Helsinki, FI (Kumar and Chia, 1996)	the basics of business planning for managing goods, services, information and capital flows. It includes complex information, communication and management systems necessary in the modern business environment
Logistics as a science	
ECRC University of Scranton / Defense Logistics Agency Included with permission (http://www.logisticsworld.com)	the science of planning, implementation, and the acquisition and use of resources necessary to support the operation of the system
MDC, LogLink / LogisticsWorld (http://www.logisticsworld.com)	the science of planning, organizing, and managing activities that ensure the delivery of goods or services

Continuation of Table 1

Authors (organizations)	Essence
E. V. Krykavskiy (2004, p. 12)	the science of planning, control and management of transportation, warehousing and other material and non-material operations carried out in the process of bringing raw materials and materials to the production enterprise, in-plant processing of raw materials, materials and semi-finished products, bringing finished products to the consumer in accordance with the interests and requirements of the latter, and as well as transmission, storage and processing of relevant information
I. M. Karp (2006, p. 7–8)	the science of rational thinking and practical activity in the field of research, design, development, production, supply and sale of the necessary, specific product or service from the initial moment to the final, with minimal costs of material, informational, financial, technological, labor resources and time interval for micro-, macro-, meso-, mega- or meta levels with mandatory control of all operations
A. Butov (2012, p. 162)	a scientific and practical tool for the joint management of many economically independent market structures, which allows achieving a rational organization of flow processes that occur in a spatio-temporal sequence, with the aim of identifying and realizing potential management reserves and obtaining, ultimately, additional income and profit by these structures mainly at the expense of socially useful, mainly production factors and sources
Logistics as a direction of management	
J. L. Heskett (1977)	a set of activities for managing product flows, coordinating production and sales markets at a set level of services with minimal costs
K. V. Tserkovna, A. V. Kruk (2018)	scientific and practical direction of management and optimization of logistics flows to achieve operational, tactical and strategic goals in a certain logistics system
M. A. Oklander (2008, p. 5)	concept, integrated function of material flow management in microeconomic systems
A. G. Kalchenko (2003)	the art of managing the flow of materials and products from an external source to a consumer

Source: compiled by the authors.

The key logistics processes at the enterprise, as defined by D. V. Borysenko, are: customer service; movement and transportation; warehousing and storage; inventory management; order processing; logistic communications; procurement; processing of materials; packaging; demand forecasting; return of goods (Borysenko, 2022).

The logistics process at any enterprise, as noted by A. S. Zaitseva, has a rather complex structure and can be considered at different levels of detail (Zaitseva, 2023).

In the most general form, the logistics process at the enterprise is divided into main and auxiliary processes, which consist of separate logistics operations and functions. Logistics operation is an independent part of the logistics process, which is a separate set of actions aimed at the generation, transformation or absorption of the main – material and accompanying – information, financial, service, personnel flows (Tserkovna and Kruk, 2018). The main logistics processes include:

- planning of goods movement;
- resource process (delivery of materials from suppliers);
- organization of warehouse processes and accounting of products in warehouses;
- product sales process;
- performance of service logistics functions (Shishkin, 2016).

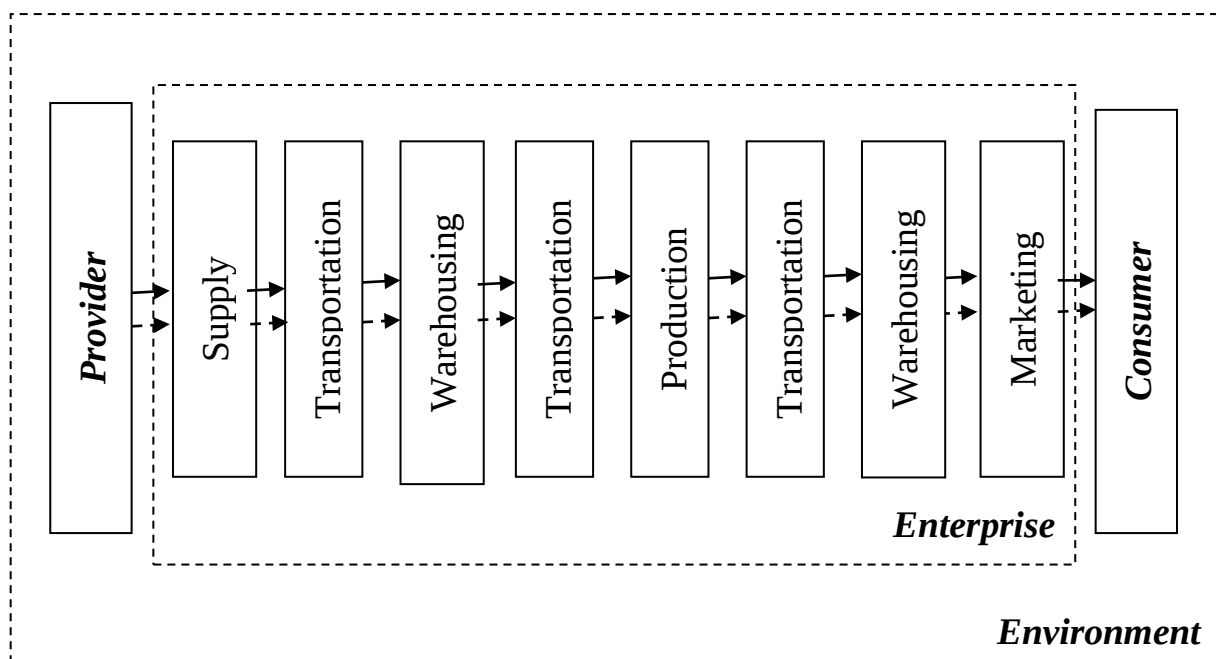
Auxiliary logistics processes include project-organizational processes; financial and fiscal; economic and legal; marketing; processes of economic and technological development (Cherchata and Matveeva, 2011).

Based on the fact that "a perfect logistics system at an enterprise should ensure the achievement of goals and objectives of any complexity, provided that the multi-level nature of decision-making processes under the pressure of numerous factors is taken into account" (Trifonova and Kravets, 2019), the logistics process of the enterprise can be depicted as follows: fig. 1.

The logistics process at the enterprise occurs simultaneously with material and information flows. The logistics process with material flow includes logistics operations with:

- supply of raw materials, materials or components from the supplier to the enterprise;
- transportation of raw materials, materials or components to the warehouse of the enterprise;
- storage of raw materials, materials or components at the enterprise (unloading, assembly, storage);
- transportation (internal movement) of raw materials, materials or components for production;

- production process;
- transportation (internal movement) at the stage of unfinished production in the production process;
- transportation of finished products to the warehouse of finished products of the enterprise;
- storage of finished products (unloading, assembly, labeling, packaging, storage);
- the process of selling finished products (packing cargo; consolidating cargo units; loading).



Legend:

→ Material flow

-> Information flow

Source: compiled by the authors

Fig. 1. Logistic process at the enterprise

The logistics process with information flow includes logistics operations with:

- information gathering;
- accumulation and storage of information;
- information processing;
- information transfer.

The complexity of the logistics process at the enterprise depends on the specifics of the enterprise's activity and the technological process of manufacturing products, which determines the required number of logistics operations with material and information flows.

At the current stage, further introduction of information and communication technologies is taking place in all spheres of the company's activity, including in the sphere of logistics. Digitization of logistics leads to the transformation of the logistics process at the enterprise, which:

- accelerates as a result of accelerating the processing of material and information flows;
- is reduced due to a reduction in the number or consolidation of individual operations;
- is automated and requires the involvement of a smaller number of human resources;
- becomes less costly due to acceleration, reduction and automation.

In the future, digital technologies will radically change the logistics processes at the enterprise already in the near future, as noted by all managers of enterprises in the field of logistics. At the same time, most of them claim that they do not currently have a formed strategy for the development of their enterprises taking into account new digital technologies, which makes their use less effective both for an individual enterprise and for the country's economy as a whole (Shatska and Stuzhnyi, 2023).

Conclusions and prospects for further research. The logistics process is one of the main processes at the enterprise, which ensures the process of production of products and their delivery to the consumer. In modern conditions, under the influence of digital technologies, this process is transformed and undergoes radical changes that contribute to its acceleration, reduction, automation, and cost reduction.

Further research in this direction will be aimed at the development of models and mechanisms of digitalization of the enterprise's logistics process, the formation of new indicators for evaluating its effectiveness.

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What is logistics? Logistics means having the right thing, at the right place, at the right time. URL: <http://www.logisticsworld.com/logistics.htm>.

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HOW TO CITE THIS ARTICLE

Shatska, Z., Stuzhnyi, O. (2024). The logistics process and its role in the activities of modern enterprises. *Management*, 1(39): 9–18. <https://doi.org/10.30857/2415-3206.2024.1.1>.

JEL Classification:
R53, H54

UDC 330:332

DOI: 10.30857/
2415-3206.
2024.1.2

METHODOLOGICAL APPROACHES TO ASSESSING AND REALIZING THE INVESTMENT POTENTIAL OF THE COUNTRY'S ECONOMY IN THE CONTEXT OF SUSTAINABLE DEVELOPMENT

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THE PURPOSE OF THE ARTICLE is to study methodological approaches to assessing and realizing the investment potential of the country's economy in the context of sustainable development.

RESEARCH METHODS. In writing the article, the following research methods were used: analytical method – to study the indicators of the country's investment potential, study trends and previous studies in this area; theoretical analysis – in analyzing modern theoretical approaches to assessing and realizing investment potential in the context of sustainable development; method of empirical research and comparative analysis – to identify advantages and disadvantages; case study – to identify factors of successful realization of investment potential, taking into account the principles of sustainable development.

PRESENTING MAIN MATERIAL. In the context of globalization and increasing environmental risks, the issue of rational use of investment potential in the context of sustainable development is of particular relevance, where investments are becoming a key element that ensures economic growth, improvement of social welfare and environmental protection. The investment potential of a national economy is a set of resources and conditions that enable the attraction and efficient use of investments in various sectors of the economy, including: economic resources; social resources; natural resources; and institutional resources. Among the methodological approaches to assessing investment potential, the most popular is the classical approach, where the assessment of investment potential is based on the analysis of such indicators as the level of domestic and foreign investment, GDP structure, level of savings and investment activity of enterprises. In the context of sustainable development, the assessment of investment potential takes into account additional factors such as environmental risks, the level of social responsibility, and the availability of green investment projects. Innovations and the introduction of green technologies are key elements in the context of sustainable development, where government support is directed to funding research and supporting green investments. Countries that have succeeded in realizing their investment potential in the context of sustainable

development are characterized by: a developed institutional framework (availability of effective institutions that support investment activities), a high level of innovation activity (active implementation of innovations in various sectors of the economy), and effective environmental policy (active state support for environmentally friendly technologies and projects). Therefore, approaches to assessing and realizing investment potential take into account the main aspects of innovative development and the introduction of green technologies, where the state helps to create a favorable investment climate and support sustainable development by stimulating investment, developing infrastructure and supporting innovation.

CONCLUSIONS. In today's world, the concept of sustainable development is central to the economic development strategies of countries, where one of the key aspects is the effective use of investment potential to ensure sustainable economic growth. The main approaches to realizing investment potential include: creating a favorable investment climate (legislative regulation that stimulates investment in low-carbon sectors; reducing bureaucratic barriers for foreign and domestic investors; developing infrastructure that supports sustainable production and consumption); integrating sustainable development principles into investment projects (assessing the impact of projects on the environment and social aspects; implementing investments in energy efficiency and renewable energy). It has been established that the realization of the country's investment potential in the context of sustainable development requires an integrated approach and systematic integration of economic, social and environmental requirements, which requires active cooperation between government, business, academia and the public to achieve common goals of sustainable development and provide future generations with a stable and environmentally friendly living environment.

KEYWORDS: investment potential; national economy; sustainable development; methodological approaches; economic development of the country; economic growth; assessment and implementation; investment climate; investment projects; financing; infrastructure.

NUMBER OF REFERENCES	NUMBER OF FIGURES	NUMBER OF TABLES
29	2	1

JEL Classification:
R53, H54

УДК 330:332

DOI: 10.30857/
2415-3206.
2024.1.2

МЕТОДИЧНІ ПІДХОДИ ДО ОЦІНКИ ТА РЕАЛІЗАЦІЇ ІНВЕСТИЦІЙНОГО ПОТЕНЦІАЛУ ЕКОНОМІКИ КРАЇНИ В КОНТЕКСТІ СТАЛОГО РОЗВИТКУ

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МЕТОЮ СТАТТІ є дослідження методичних підходів до оцінки та реалізації інвестиційного потенціалу економіки країни в контексті сталого розвитку.

МЕТОДИ ДОСЛІДЖЕННЯ. При написанні статті було використано такі методи дослідження: аналітичний метод – для дослідження показників інвестиційного потенціалу країни, вивчення тенденцій та попередніх досліджень у цій галузі; теоретичний аналіз – при аналізі сучасних теоретичних підходів до оцінки та реалізації інвестиційного потенціалу в умовах сталого розвитку; метод емпіричних досліджень та порівняльного аналізу – для виявлення переваг і недоліків; Кейс-стаді – для виявлення чинників успішної реалізації інвестиційного потенціалу з урахуванням принципів сталого розвитку; стратегічне планування – для розробки рекомендацій щодо підвищення інвестиційного потенціалу в контексті сталого розвитку; графічний метод, метод структурного та логічного аналізу та ін.

ВИКЛАД ОСНОВНОГО МАТЕРІАЛУ. В умовах глобалізації та посилення екологічних ризиків, питання раціонального використання інвестиційного потенціалу в контексті сталого розвитку набуває особливої актуальності, де інвестиції стають ключовим елементом, що забезпечує економічне зростання, покращення соціального благополуччя та збереження навколишнього середовища. Інвестиційний потенціал національної економіки – це сукупність ресурсів та умов, які забезпечують можливість залучення та ефективного використання інвестицій у різні галузі економіки, до складу якого входять: економічні ресурси; соціальні ресурси; природні ресурси; інституційні ресурси. Серед методичних підходів до оцінки інвестиційного потенціалу найбільш затребуваним є класичний підхід, де оцінка інвестиційного потенціалу ґрунтується на аналізі таких показників, як рівень внутрішніх та зовнішніх інвестицій, структура ВВП, рівень заощаджень та інвестиційної активності підприємств. В умовах сталого розвитку оцінка інвестиційного потенціалу враховує додаткові чинники, такі як екологічні ризики, рівень соціальної відповідальності, наявність «зелених» інвестиційних проектів. Інновації та впровадження «зелених» технологій є ключовими елементами в контексті сталого розвитку, де державна підтримка спрямовується на фінансування наукових досліджень та підтримку «зелених» інвестицій. Країни, які досягли успіху в реалізації свого інвестиційного потенціалу в контексті сталого розвитку, характеризуються: розвинутою інституційною базою (наявність ефективних інститутів, що підтримують

інвестиційну діяльність), високим рівнем інноваційної активності (активне впровадження інновацій у різні сектори економіки), ефективною екологічною політикою (активна державна підтримка екологічно чистих технологій та проектів). Отже, підходи до оцінки та реалізації інвестиційного потенціалу враховують головні аспекти інноваційного розвитку та впровадження «зелених» технологій, де держава допомагає у створенні сприятливого інвестиційного клімату та підтримці сталого розвитку через стимулювання інвестицій, розвиток інфраструктури та підтримку інновацій.

ВИСНОВКИ. У сучасному світі концепція сталого розвитку займає центральне місце в стратегіях економічного розвитку країн, де одним із ключових аспектів є ефективне використання інвестиційного потенціалу для забезпечення сталого зростання економіки. Серед основних підходів до реалізації інвестиційного потенціалу було визначено: створення сприятливого інвестиційного клімату (законодавче регулювання, що стимулює інвестиції в сектори з низьким вуглецевим викидом; зниження бюрократичних бар'єрів для іноземних та внутрішніх інвесторів; розвиток інфраструктури, що підтримує стале виробництво та споживання); інтеграція принципів сталого розвитку в інвестиційні проекти (оцінка впливу проектів на навколишнє середовище та соціальні аспекти; впровадження інвестицій в енергоефективність та відновлювані джерела енергії; підтримка ініціатив, спрямованих на зменшення вуглецевого сліду та збереження природних ресурсів); фінансування інноваційних технологій (створення фондів та програм підтримки інноваційних стартапів; інвестування у дослідження та розвиток нових технологій для зменшення впливу на довкілля та підвищення ефективності використання ресурсів). Було встановлено, що реалізація інвестиційного потенціалу країни в контексті сталого розвитку потребує комплексного підходу та системної інтеграції економічних, соціальних та екологічних вимог, що вимагає активної співпраці між урядом, бізнесом, академічними колами та громадянськістю для досягнення спільних цілей сталого розвитку і забезпечення майбутніх поколінь стабільним та екологічно безпечним життєвим середовищем.

КЛЮЧОВІ СЛОВА: інвестиційний потенціал; національна економіка; сталий розвиток; методичні підходи; економічний розвиток країни; зростання економіки; оцінка та реалізація; інвестиційний клімат; інвестиційні проекти; фінансування; інфраструктура.

Statement of the problem. A country's investment potential is a key factor in its economic development and prosperity. For Ukraine, this issue is particularly relevant in the current environment due to numerous challenges, such as military actions, economic instability, changes in legislation and other factors that affect the attractiveness for investors. Sustainable development has become one of the main directions of modern economic policy in many countries. In the context of globalization and growing environmental challenges, the issue of rational use of investment potential in the context of sustainable development is of particular relevance. Investments are a key element in ensuring economic growth, improving social welfare and preserving the environment.

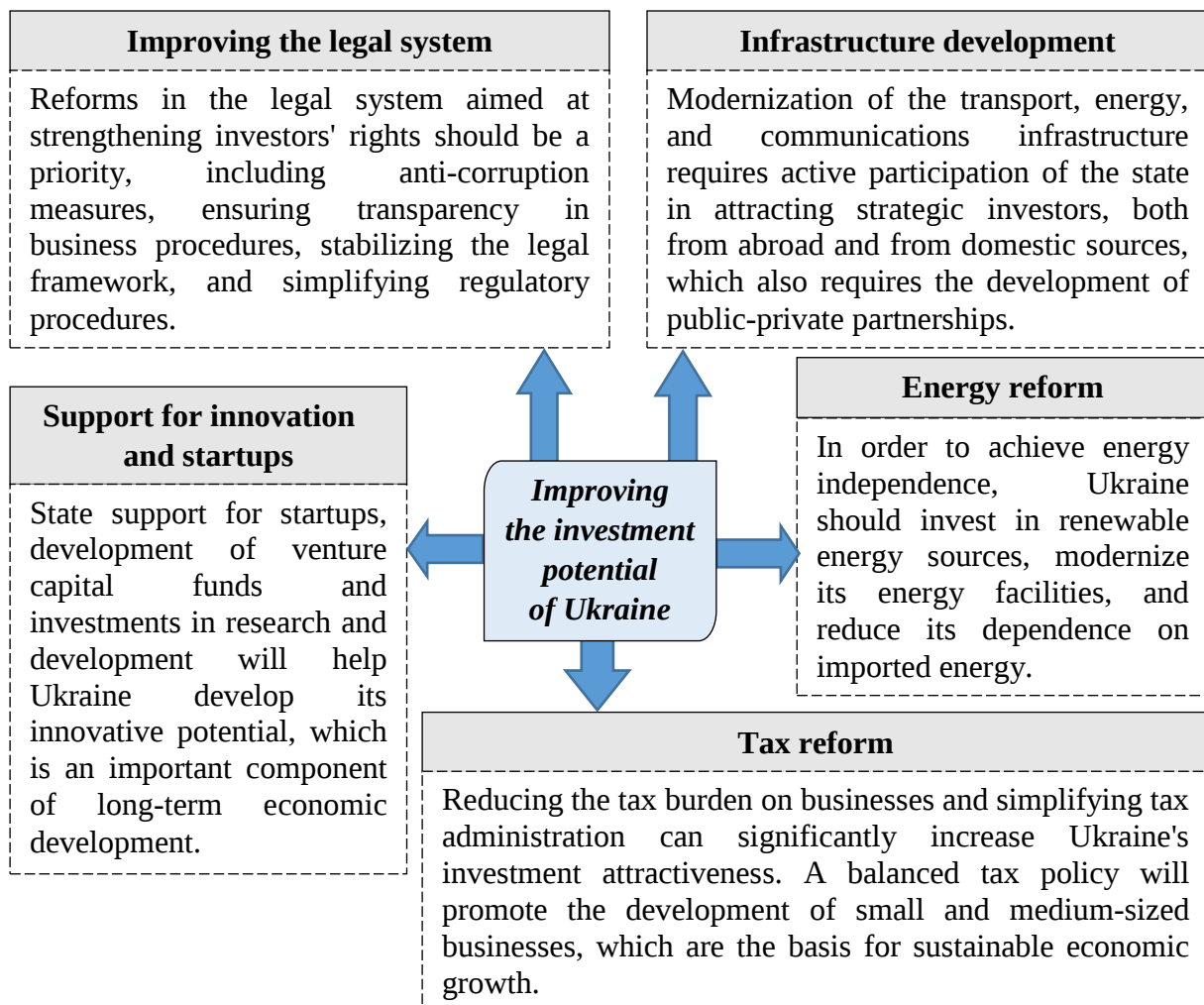
Analysis of publications on the problem. The actual aspects of defining the concept of investment potential of the national economy, determining the patterns of formation, assessment and realization are in the focus of attention of many researchers: O.A. Bilovodska, K.V. Shebeda, V.H. Hnoievyi, O.M. Koren, A.O. Lapan, I.F. Lorvi, M.S. Mudra, Ts. Tszin, N.V. Proskurnina, I.L. Reshetnikova, L.V. Romanova and others. The scientific heritage of these researchers is enormous, which is manifested in detailed studies of the mechanisms of investment potential formation, identification of factors influencing the investment process, and the proposal of scientifically based tools for assessing the level of investment opportunities in the economy. However, a number of theoretical and methodological issues related to the formation, assessment and realization of the investment potential of the national economy still remain open. In particular, this concerns the definition of the essence of investment potential, systematization of the factors of its formation, assessment and realization in the context of sustainable development.

Statement of the main results. The political situation in Ukraine has a significant impact on the investment climate. The war in eastern Ukraine, the annexation of Crimea and Russia's full-scale invasion of Ukraine have caused an economic downturn and created risks for investors, which in turn has led to a decline in foreign direct investment. In addition, the imperfection of the legal system, corruption, lack of transparency in procedures and frequent changes in legislation are all factors that reduce investor confidence in the Ukrainian market (Bilyk, 2019; Haidutskyi, 2014; Komaretska, 2003; Zhuravel, 2013; Komaretska, 2006).

The investment potential of a country is a set of resources and conditions that ensure the possibility of attracting and efficiently using investments in various sectors of the economy, which includes: economic resources (availability of capital, level of financial market development, economic stability); social resources (level of education of the population, social stability, quality of life); natural resources (availability of natural resources, environmental sustainability); institutional resources (legal system, level of development of institutions, public

policy) (Zakharchenko and Aliksieichuk, 2019; Zaiats and Puzyrova, 2021; Komaretska, 2004). Investment attractiveness depends on the state of the country's infrastructure. Ukraine needs significant investments in transportation, energy, and communications infrastructure to improve its competitiveness. One of the key factors for attracting investment is energy independence and sustainability. Ukraine is actively working to diversify its energy sources, but the energy sector still requires significant investment in modernization (Kramarenko, 2019; Krakhmalova, Puzyrova, 2020; Komaretska, 2005).

Ukraine's potential in the field of innovation and technology is significant, in particular due to its talented workforce in the IT sector and research. However, the underfunding of science and the outflow of personnel abroad pose additional risks to the sustainable development of this industry. The main ways to increase Ukraine's investment potential include the following (Fig. 1).



Source: built by the authors on the basis of (Zakharchenko and Aliksieichuk, 2019; Zaiats and Puzyrova, 2021; Kramarenko, 2019; Krakhmalova and Puzyrova, 2020).

Fig. 1. The key ways to increase the investment potential of Ukraine

Investments in infrastructure, new technologies and innovations, development of the legal framework and stabilization of the economy create the basis for sustainable economic development in Ukraine. Attracting foreign direct investment can be a key factor in economic recovery and overcoming current challenges. Institutional reforms, transparency, and a favorable business environment will contribute to long-term stability and growth (Kryshtal, Lahler and Pidvalna, 2018; Puzyrova, Irnazarov and Khaliliaieva, 2023; Puzyrova, 2020); Sukach, 2018; Olshanska and Puzyrova, 2022). To ensure sustainable economic development, Ukraine should focus on strengthening its institutional framework, improving the investment climate, and fostering innovation. Only a comprehensive approach that combines reforms, infrastructure investments and support for new technologies will allow Ukraine to realize its potential and become an attractive country for investors.

Sustainable development involves meeting the needs of the present generation without compromising the ability of future generations to meet their own needs. This is achieved through a balance between economic growth, social well-being and environmental protection. (Lisniak, Khaliliaieva and Koval, 2024; Puzyrova, 2022; Skorokhod and Zozulia, 2021; Shatska and Khaliliaieva, 2022; Puzyrova and Kovalska, 2012). The main principles of sustainable development include:

- economic efficiency: rational use of resources to ensure sustainable economic growth;
- social justice: ensuring equal opportunities and social integration for all segments of the population;
- environmental responsibility: preservation of natural resources and reduction of negative environmental impact.

Among the methodological approaches to assessing investment potential, the most popular are the classical approach, where the assessment of investment potential is usually based on the analysis of such indicators as the level of domestic and foreign investment, GDP structure, level of savings and investment activity of the enterprise, and the innovative approach (Table 1) (Lisniak, Khaustova and Puzyrova, 2024; Smirnov, 2010; Olshanska and Puzyrova, 2021; Sukach, 2018).

In the conditions of sustainable development, the assessment of investment potential should take into account additional factors, such as environmental risks, the level of social responsibility of enterprises, and the availability of “green” investment projects. Also, public policy plays an important role in the realization of investment potential, namely, public policy should be aimed at creating a favorable investment climate through:

- regulatory reform – simplifying procedures for doing business, ensuring transparency and stability of the legal environment;

- fiscal policy – stimulating investment through tax benefits, subsidies and other financial instruments;
- infrastructure development – ensuring access to quality infrastructure, which is an important factor for attracting investment.

Table 1

**Methodological approaches to assessing investment potential
in the context of sustainable development**

№	Approaches	Types
1.	Classical approaches	Financial flows analysis – assessment of capital flows into the economy, which allows to determine the investment attractiveness of the country.
		Analysis of the economic structure – study of the sectoral structure of the economy, which allows to identify key sectors for attracting investment.
		Risk analysis – assessment of economic, political and environmental risks that may affect investment activity.
2.	Innovative approaches	Integral approach – includes economic, social and environmental indicators that allow to assess investment potential taking into account the principles of sustainable development.
		Environmental audit – assessment of environmental risks and environmental impact of investment projects.
		Social audit – assessment of the impact of investments on social welfare and human capital development.

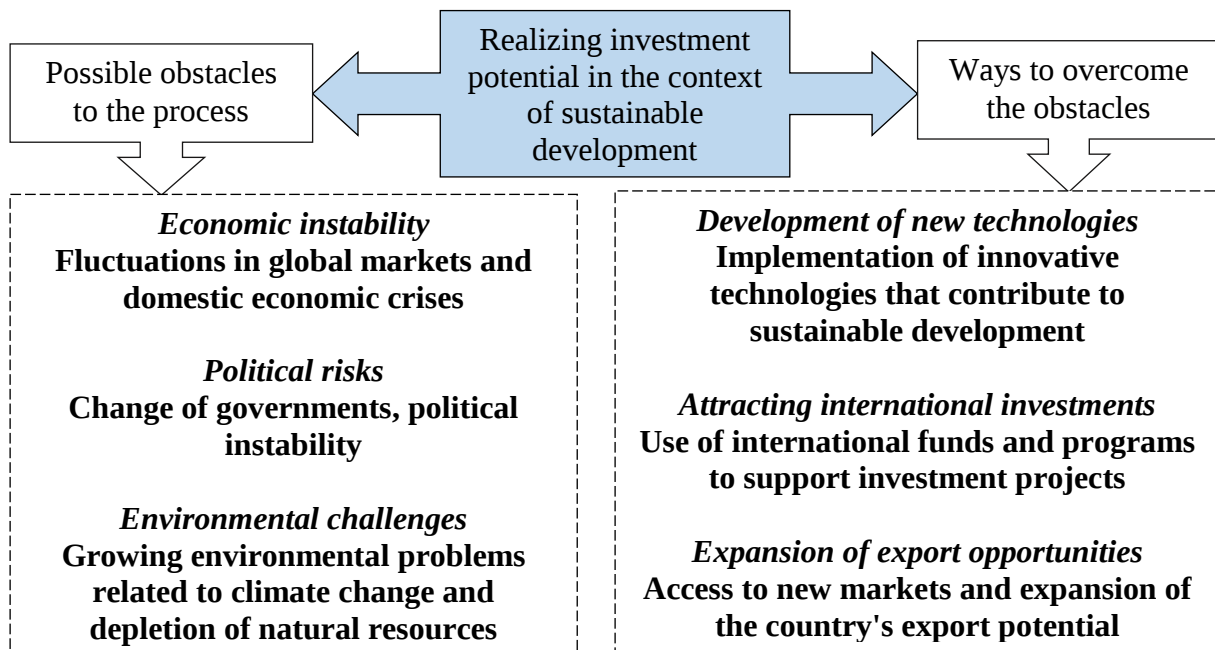
Source: built by the authors on the basis of (Lisniak, Khaustova and Puzyrova, 2024; Smirnov, 2010; Olshanska and Puzyrova, 2021; Sukach, 2018).

Innovations and the introduction of “green” technologies are key elements in the context of sustainable development, where state support is directed to:

- funding of scientific research – state funding of scientific research in the field of environmentally friendly technologies;
- support for green investments – creation of special investment funds and programs to support green projects;
- educational programs – promoting human capital development through educational programs aimed at developing environmental awareness and entrepreneurship.

Countries that have succeeded in realizing their investment potential in the context of sustainable development are usually characterized by: a developed institutional framework (availability of effective institutions that support investment activities), a high level of innovation activity (active introduction of innovations in various sectors of the economy), and effective environmental

policy (active government support for environmentally friendly technologies and projects). However, there are also obstacles and possible ways to overcome these obstacles to the realization of investment potential in the context of sustainable development (Fig. 2).



Source: built by the authors on the basis of (Nifatova and Puzyrova, 2020; Rudyk and Puzyrova, 2019; Yaryst and Puzyrova, 2012; Olshanska, Milinov, Puzyrova and Mitkov, 2024).

Fig. 2. Obstacles and possible ways to overcome them on the way to realizing the investment potential in the context of sustainable development

Therefore, the realization of the country's investment potential in the context of sustainable development requires a comprehensive approach that includes economic, social and environmental aspects (Nifatova and Puzyrova, 2020; Rudyk and Puzyrova, 2019; Yaryst and Puzyrova, 2012; Olshanska, Milinov, Puzyrova and Mitkov, 2024).

Methodical approaches to the assessment and management of investment potential should take into account modern challenges and opportunities, in particular innovative development and implementation of "green" technologies, where public policy plays a key role in creating a favorable investment climate and supporting sustainable development through investment stimulation, infrastructure development and innovation support.

Conclusions. In today's world, the concept of sustainable development occupies a central place in the strategies of economic development of countries, where one of the key aspects is the effective use of investment potential to ensure sustainable economic growth. Among the main approaches to the realization of investment potential, the following were identified: creation of a favorable investment climate (legislative regulation that stimulates investment in

low-carbon sectors; reduction of bureaucratic barriers for foreign and domestic investors; development of infrastructure supporting sustainable production and consumption); integration of sustainable development principles into investment projects (assessment of the impact of projects on the environment and social aspects; implementation of investments in energy efficiency and renewable energy sources; support of initiatives aimed at reducing the carbon footprint and preserving natural resources); financing of innovative technologies (creating funds and programs to support innovative startups; investing in research and development of new technologies to reduce the impact on the environment and increase the efficiency of resource use). Therefore, it was established that the realization of the country's investment potential in the context of sustainable development requires a comprehensive approach and systematic integration of economic, social and environmental requirements, which requires active cooperation between the government, business, academic circles and the public to achieve common goals of sustainable development and provide for future generations stable and ecologically safe living environment.

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HOW TO CITE THIS ARTICLE

Lisniak, S. (2024). Methodological approaches to assessing and realizing the investment potential of the country's economy in the context of sustainable development. *Management*, 1(39): 19–29. <https://doi.org/10.30857/2415-3206.2024.1.2>.

JEL Classification:
H52, I25

UDC 378:338

DOI: 10.30857/
2415-3206.
2024.1.3

EXPERIENCE OF THE WORLD'S LEADING COUNTRIES IN THE CONTEXT OF SUSTAINABLE DEVELOPMENT OF HIGHER EDUCATION INSTITUTIONS

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THE PURPOSE OF THE ARTICLE is to study the experience of the world's leading countries in the field of sustainable development of higher education institutions in order to identify best practices and opportunities for their implementation in Ukrainian higher education institutions.

RESEARCH METHODS. The following methods were used in the study: literature analysis (analysis of global practices, policies and strategies for sustainable development in higher education institutions); comparative analysis (identification of differences and commonalities in approaches to sustainable development in different countries); case studies (in-depth study of specific cases of successful implementation of sustainable development in higher education institutions); expert assessments (obtaining assessments and opinions of experts in the field of sustainable development and education); content analysis (analysis of the content of documents, reports, strategies, publications of universities and other institutions).

PRESENTING MAIN MATERIAL. The concept of sustainable development is an integral part of the development strategy of both different sectors of the economy and education. The current challenge for higher education institutions is not only to provide quality knowledge, but also to ensure their own sustainability in the financial, social and environmental vectors. The world's leading countries have developed unique approaches to implementing sustainable development in their universities, including the integration of sustainable development principles into educational programs and effective resource management. Countries with developed higher education systems are actively implementing sustainability initiatives, including energy efficiency of buildings, use of renewable energy sources, reduction of air emissions, innovations in educational processes, such as the use of technology to improve the quality of education, distance learning and e-administration. Sustainable development of a higher education institution involves the integration of three aspects (economic, social, and environmental) into the management and development of the institution. Sustainable development in education is focused on the "triangle of sustainable development", which forms the basis for strategies to ensure the long-term sustainability of higher education institutions and promote the creation of conditions for the development of modern knowledge and competencies. The experience of

leading countries in the field of sustainable development of higher education institutions was analyzed: The European Union, the United States of America, Australia, Norway, Sweden, Finland, Japan, Canada, and Australia. As part of the adaptation and further implementation of international experience in sustainable development of higher education institutions in Ukraine, the following conditions need to be met: diversify funding sources through cooperation with the private sector and international organizations; start introducing green technologies on campuses to reduce energy consumption and environmental impact; integrate the principles of sustainable development into educational programs to train specialists capable of promoting sustainable development in various sectors of the economy; adhere to the principles of social inclusiveness and sustainability.

CONCLUSIONS. The experience of the world's leading countries demonstrates the importance of a comprehensive approach to ensuring the sustainable development of higher education institutions. Economic sustainability, social inclusiveness, and environmental responsibility are integral elements of this process. Ukrainian higher education institutions can use the best international practices to formulate their own sustainability strategies: to strengthen the importance of integrating sustainable development; to use innovative approaches in education; to strengthen international cooperation and exchange of experience, which will allow for more effective adaptation of global sustainability standards to local conditions; to increase financial and political support through government grants, research programs and partnerships with private companies, which stimulates the implementation of sustainable solutions; to increase the globalization of processes that manifest themselves in the In general, the experience of leading countries in the context of sustainable development of higher education institutions serves as an important benchmark for other countries seeking to achieve a sustainable future through education and research.

KEYWORDS: higher education institutions; sustainable development; leading countries of the world; implementation; quality of education; development strategy; concept; higher education; universities; sustainable development initiatives; innovations; green technologies; sustainable development triangle.

NUMBER OF REFERENCES	NUMBER OF FIGURES	NUMBER OF TABLES
32	2	0

JEL Classification:
H52, I25

УДК 378:338

DOI: 10.30857/
2415-3206.
2024.1.3

ДОСВІД ПРОВІДНИХ КРАЇН СВІТУ В КОНТЕКСТІ СТАЛОГО РОЗВИТКУ ЗАКЛАДІВ ВИЩОЇ ОСВІТИ

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МЕТОЮ СТАТТІ є дослідження досвіду провідних країн світу у сфері сталого розвитку закладів вищої освіти, з метою визначення найкращих практик та можливостей їх імплементації в українських ЗВО.

МЕТОДИ ДОСЛІДЖЕННЯ. При дослідженні було використано методи: літературного аналізу (аналіз світових практик, політик та стратегій сталого розвитку в закладах вищої освіти); порівняльного аналізу (виявлення відмінностей та спільних рис у підходах до сталого розвитку в різних країнах); Кейс-стаді (глибоке вивчення конкретних випадків успішної реалізації сталого розвитку в закладах вищої освіти); експертних оцінок (отримання оцінок та думок експертів у сфері сталого розвитку та освіти); контент-аналіз (аналіз змісту документів, звітів, стратегій, публікацій університетів та інших організацій); бенчмаркінг (вивчення та запозичення кращих практик з інших університетів та країн); графічно-табличний метод.

ВИКЛАД ОСНОВНОГО МАТЕРІАЛУ. Концепція сталого розвитку є складовою стратегії розвитку, як різних секторів економіки, так і освіти. Сучасний виклик для закладів вищої освіти полягає не лише у наданні якісних знань, але й у забезпеченні власної стійкості у фінансовому, соціальному та екологічному векторах. Провідні країни світу розробили унікальні підходи до впровадження сталого розвитку у своїх університетах, що включає в себе інтеграцію принципів сталого розвитку в освітні програми та ефективне управління ресурсами. Країни з розвинутою системою вищої освіти активно впроваджують ініціативи щодо сталого розвитку, що включає енергоефективність будівель, використання відновлюваних джерел енергії, зменшення викидів в атмосферу, інновації в освітні процеси, такі як використання технологій для підвищення якості навчання, здійснення дистанційного навчання та електронної адміністрації. Сталий розвиток ЗВО передбачає інтеграцію трьох аспектів (економічний, соціальний, екологічний) у процес управління та розвитку закладу вищої освіти. Сталий розвиток в освіті орієнтується на «трикутник сталого розвитку», який утворює основу для стратегій забезпечення довгострокової стійкості ЗВО та сприяння створенню умов для розвитку сучасних знань і компетенцій. Досліджуючи досвід провідних країн світу у сфері сталого розвитку ЗВО було проаналізовано досвід

країн: Європейського Союзу, Сполучені Штати Америки, Австралія, Норвегія, Швеція, Фінляндія, Японія, Канада, Австралія. В рамках адаптації та подальшої імплементації міжнародного досвіду сталого розвитку ЗВО в Україні необхідне виконання наступних умов: провести диверсифікацію джерел фінансування через співпрацю з приватним сектором та міжнародними організаціями; почати впроваджувати «зелені» технології у кампусах для зменшення енергоспоживання та екологічного впливу; інтегрувати принципи сталого розвитку в освітні програми для підготовки фахівців, здатних сприяти стійкому розвитку в різних галузях економіки; дотримання принципів соціальної інклюзивності і забезпечення рівного доступу до освітніх можливостей для всіх студентів незалежно від їхнього соціального статусу.

ВИСНОВКИ. Досвід провідних країн світу демонструє важливість комплексного підходу до забезпечення сталого розвитку закладів вищої освіти. Економічна стійкість, соціальна інклюзивність та екологічна відповідальність є невід'ємними елементами цього процесу. Українські ЗВО можуть використати найкращі міжнародні практики для формування власних стратегій сталого розвитку: посилити значення інтеграції сталого розвитку; використовувати інноваційні підходи в освіті; посилювати міжнародну співпрацю та обмін досвідом, що дозволить більш ефективно адаптувати глобальні стандарти сталого розвитку до локальних умов; збільшити фінансову та політичну підтримку через державні гранти, наукові програми та партнерства з приватними компаніями, що стимулює впровадження сталих рішень; глобалізація процесів, що проявляється в підготовці фахівців, здатних вирішувати екологічні, економічні та соціальні проблеми на світовому рівні. Загалом, досвід провідних країн у контексті сталого розвитку закладів вищої освіти слугує важливим орієнтиром для інших держав, що прагнуть досягти сталого майбутнього через освітню діяльність та науково-дослідницьку діяльність.

КЛЮЧОВІ СЛОВА: заклади вищої освіти; сталий розвиток; провідні країни світу; імплементація; якість навчання; стратегія розвитку; концепція; вища освіта; університети; ініціативи сталого розвитку; інновації; «зелені» технології; трикутник сталого розвитку.

Statement of the problem. Sustainable development of higher education institutions (HEIs) is one of the key topics of modern educational management. In a world where globalization and climate change affect all aspects of life, the role of higher education institutions in ensuring sustainable development is becoming increasingly important. Higher education institutions not only provide knowledge and skills, but also act as catalysts for social and economic change that promote sustainable development. The concept of sustainable development is an integral part of the development strategy of both different sectors of the economy and education. The current challenge for higher education institutions is not only to provide quality knowledge, but also to ensure their own sustainability in the financial, social and environmental dimensions. The world's leading countries have developed unique approaches to implementing sustainable development in their universities, including the integration of sustainable development principles into educational programs, resource management, and facilities.

Countries with developed higher education systems are actively implementing sustainability initiatives, including energy efficiency of buildings, use of renewable energy sources, reduction of air emissions and other measures. The world's leading countries are actively introducing innovations in educational processes, such as the use of technology to improve the quality of education, distance learning and electronic administration. They also actively cooperate at the international level, which facilitates the exchange of experience in the field of sustainable development and innovation and attracts significant financial resources to support sustainable development in higher education through public and private investment. Thus, the experience of leading countries in this area is important for the development of modern educational systems around the world aimed at achieving sustainable development.

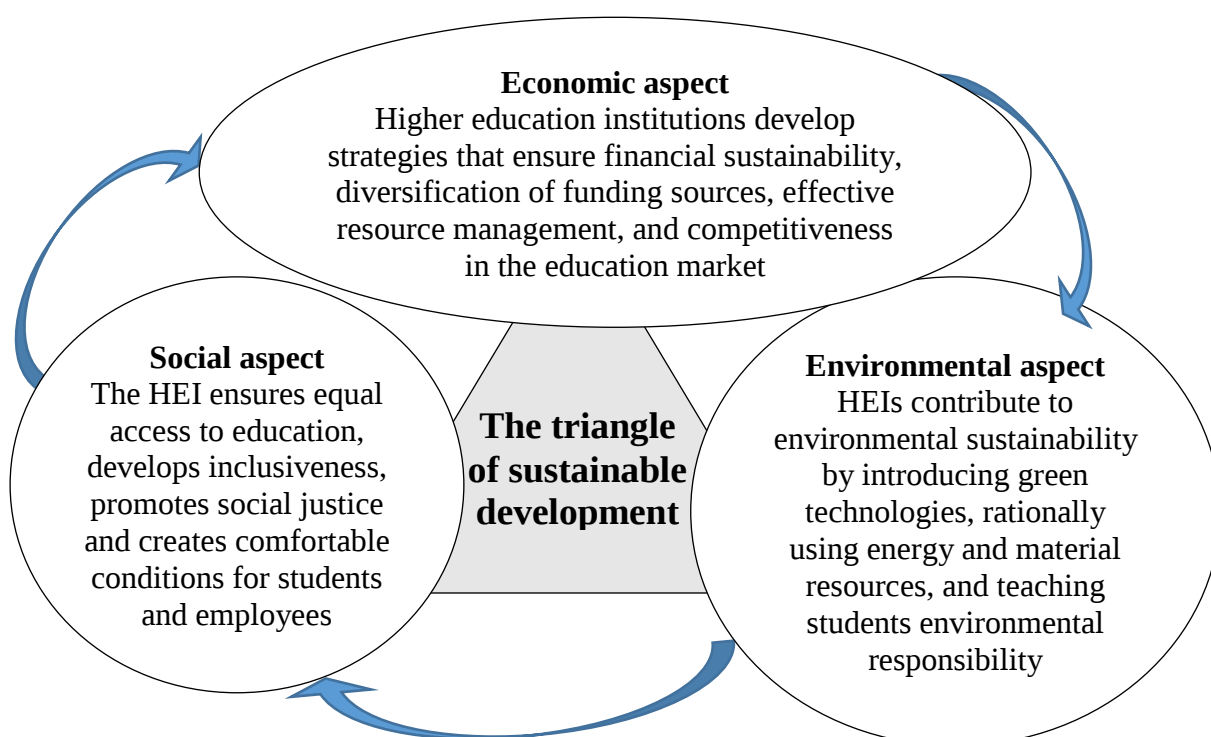
Analysis of publications on the problem. The issues of sustainable development of higher education institutions have always been in the focus of attention of many leading economists, including: I. Bodnaruk, P. Boichuk, O. Fast, M. Borovyk, G. Brundtland, M. Bublyk, L. Zhuk, Kh. Drymalovska, I. Didenko, N. Kholiavko, L. Hanushchak-Iefimenko, D. Karamyshev, Ye. Khaustova, N. Kholiavko, A. Samoilovych, I. Olyfirenko, V. Kovalchuk, V. Dankevych, O. Liashenko, O. Olshanska, A. Polianska, D. Tymoshenko, O. Popelo, A. Zhavoronok, T. Vlasiuk, M. Skydan, N. Stebliuk, Ye. Volosova and others. However, it is the process of studying the experience of leading countries in the context of sustainable development of higher education institutions and the choice of the best methodology for its implementation in domestic higher education institutions that requires further attention.

Statement of the main results. The concept of sustainable development, first proposed in the report "Our Common Future" (1987) by the UN Commission on Environment and Development, includes three main aspects:

economic, social and environmental. These aspects form the so-called "triangle of sustainable development", which must be balanced to achieve the long-term well-being of humanity (Bublyk, Zhuk and Drymalovska, 2018; Bodnaruk, 2022; Borovyk, 2017; Puzyrova and Hryshchenko, 2020; Hanushchak-Iefimenko and Puzyrova, 2024).

Sustainable development of higher education institutions involves the integration of three aspects (economic, social, and environmental) into the management and development of the institution. Since higher education institutions play an important role in training specialists who are able to solve complex problems of sustainable development, they (HEIs) are also centers of research and innovation that contribute to the creation of new knowledge and technologies to support sustainable development. In addition, HEIs should be examples of sustainable management of their own resources and infrastructure (Boichuk, Fast, 2021; Borovyk, 2018; Didenko, Kholiavko, 2023; European Commission, 2019; Khodakovska, Puzyrova, 2020; Olshanska, 2020; Skydan, 2023).

Sustainable development in education is focused on the "triangle of sustainable development", which forms the basis for strategies to ensure the long-term sustainability of higher education institutions and promote the creation of conditions for the development of modern knowledge and competencies (Fig. 1).



Source: built by the authors on the basis of (Boichuk and Fast, 2021; Borovyk, 2018; Didenko and Kholiavko, 2023; European Commission, 2019; Khodakovska and Puzyrova, 2020; Olshanska, 2020; Skydan, 2023).

Fig. 1. Vectoring of higher education institutions in the context of sustainable development

Studying the experience of the world's leading countries in the field of sustainable development of higher education institutions, we can note the following:

The European Union (EU) is one of the leaders in implementing sustainable development in higher education institutions. The EU actively supports programs on education for sustainable development through initiatives such as the Erasmus+ Program and Horizon Europe, which promote cooperation between higher education institutions from different countries, exchange of best practices and implementation of new approaches to sustainable development. Many European universities, such as the University of Copenhagen (Denmark) and Lund University (Sweden), have integrated sustainability as a key element of their strategy. European HEIs are actively engaged in the development of infrastructure aimed at energy efficiency and reducing environmental impact. Countries such as Germany, the Netherlands, and Sweden have leading universities implementing projects on renewable energy, CO₂ reduction, and sustainable waste management. Universities in Sweden, for example, apply sustainability management systems that include energy-saving technologies and training programs aimed at developing environmental competencies among students.

In the United States of America, sustainability in higher education is also an important area of focus. Many American universities, such as Harvard University and Stanford University, incorporate sustainability into their curricula, research, and management practices. Particularly noteworthy is the LEED building certification system, which is widely used to ensure the sustainable development of the infrastructure of higher education institutions. Harvard University, for example, has implemented a policy requiring all new buildings to meet LEED Gold standards and is actively implementing strategies to reduce energy and water consumption, greenhouse gas emissions, and waste management. Also in the US, one of the most recognized approaches to sustainable development in higher education is the creation of green campus initiatives. In addition, American universities emphasize teaching the principles of sustainable development by including relevant courses in their educational programs. For example, the University of California has specialized courses in environmental engineering and sustainability policy (Harvard University, 2021; UNESCO, 2020; Stanford University, 2020).

Australia is making significant progress in the field of sustainable development of HEIs by integrating environmental and social initiatives into its higher education system. Australian universities, such as the University of Melbourne and the Australian National University, are actively working to reduce their environmental footprint by optimizing energy consumption, waste management, and water conservation. An important aspect of the Australian

experience is also active cooperation with local communities to achieve social sustainability (University of Melbourne, 2021).

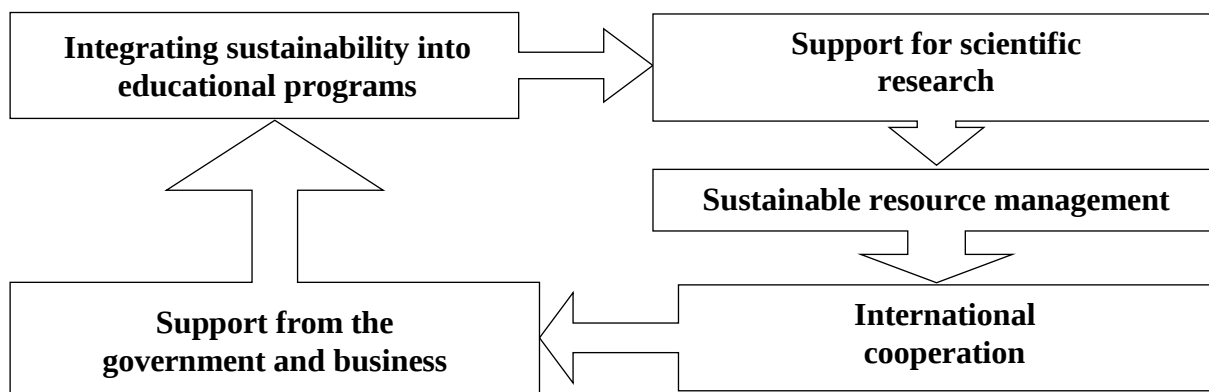
Scandinavian countries such as Norway, Sweden, and Finland have traditionally been at the forefront of implementing sustainable development principles. Universities in these countries actively incorporate sustainability into their curricula, research, and management strategies. For example, the University of Oslo (Norway) has created a special center for sustainability research, and Finland has implemented a national program to support sustainable development in higher education, which includes financial incentives for higher education institutions to achieve sustainability goals. (University of Oslo, 2021).

In Japan, sustainability has become a key element of the national higher education strategy. Universities such as the University of Tokyo and Kyoto University play an active role in developing new technologies and approaches to support sustainable development. Japanese universities also work closely with business and government to create innovative solutions in the field of environmental sustainability. In Japan, the concept of sustainable development is part of the national strategy for educational reforms. Kyoto University is a leader in sustainability research, particularly in the areas of renewable energy, waste management, and climate change mitigation. Japanese universities are also working to train specialists who will have the necessary knowledge to implement sustainable development in various sectors of the economy (Tokyo University, 2022).

Canadian universities, in particular the University of British Columbia (UBC), are among the leaders in the field of sustainable development. UBC was the first university in the world to be recognized as a Living Lab for its innovative approaches to sustainable energy management. The university has implemented numerous projects to utilize renewable energy sources, reduce water and energy consumption, and recycle waste. UBC also implements inclusive approaches to education, supporting students from different social groups and ensuring equal access to educational opportunities (UBC Sustainability, 2020).

Australia pays great attention to sustainable development in the education sector, especially in the area of environmental sustainability. Universities in the country, such as the University of Melbourne, are actively implementing measures to reduce the environmental impact of their campuses. One of the key initiatives is to achieve carbon neutrality by 2030, which includes the use of renewable energy sources, reducing resource consumption, and developing innovative technologies for environmentally sustainable management. Australian higher education institutions are also noted for their active involvement of students in projects to develop sustainable thinking and environmental responsibility.

Based on the experience of the world's leading countries, several key aspects can be identified that contribute to the successful implementation of sustainable development in higher education institutions (Fig. 2).



Source: built by the authors on the basis of (Brundtland, 1987; Karamyshev, 2019; Khaustova, 2019; Liashenko, 2020; Popelo, Zhavoronok and Popelo, 2023; Puzyrova and Vlasiuk, 2024; Stebliuk and Volosova, 2015).

Fig. 2. Key aspects of influence on the successful implementation of sustainable development in higher education institutions

First, universities in successful countries actively include sustainability issues in their curricula, providing training for specialists capable of solving complex problems of sustainable development. Also, leading universities are actively engaged in research in the field of sustainable development, developing new approaches and technologies that can be applied both in education and in other areas. Effective management of energy, water, and other resources plays an important role in the sustainable development of higher education institutions. Universities in many countries actively cooperate with each other in the field of sustainable development, sharing best practices and jointly developing new solutions. Successful implementation of sustainability programs requires active support from the government and the private sector, which provides additional resources and encourages HEIs to implement new approaches (Borovyk, 2018; European Commission, 2020; Kholiavko, Samoilovych, Olyfirenko, 2023; Kovalchuk, Dankevych, 2018; Korzhuk, Puzyrova, 2021; Polianska, Tymoshenko, 2019).

As part of the adaptation and further implementation of international experience in sustainable development of higher education institutions in Ukraine, the following conditions need to be met: diversify funding sources through cooperation with the private sector and international organizations; start introducing green technologies on campuses to reduce energy consumption and environmental impact; integrate the principles of sustainable development into educational programs to train specialists capable of promoting sustainable

development in various sectors of the economy; adhere to the principles of social inclusiveness and sustainability (Brundtland, 1987; Karamyshev, 2019; Khaustova, 2019; Liashenko, 2020; Popelo, Zhavoronok, Popelo, 2023; Puzyrova, Vlasiuk, 2024; Stebliuk, Volosova, 2015).

Conclusions. The experience of the world's leading countries demonstrates the importance of a comprehensive approach to ensuring the sustainable development of higher education institutions. Economic sustainability, social inclusiveness, and environmental responsibility are integral elements of this process. Ukrainian higher education institutions can use the best international practices to formulate their own sustainability strategies: to strengthen the importance of integrating sustainable development; to use innovative approaches in education; to strengthen international cooperation and exchange of experience, which will allow for more effective adaptation of global sustainability standards to local conditions; to increase financial and political support through government grants, research programs and partnerships with private companies, which stimulates the implementation of sustainable solutions; to increase the globalization of processes that manifest themselves in the In general, the experience of leading countries in the context of sustainable development of higher education institutions serves as an important benchmark for other countries seeking to achieve a sustainable future through education and research.

Implementation of the best practices of universities in leading countries in the context of sustainable development will allow Ukrainian higher education institutions to function successfully in the modern global environment and be competitive at the national and international levels.

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HOW TO CITE THIS ARTICLE

Puzyrova, P. (2024). Experience of the world's leading countries in the context of sustainable development of higher education institutions. *Management*, 1(39): 30–40. <https://doi.org/10.30857/2415-3206.2024.1.3>.

JEL Classification:
H54, O33

UDC 339:13

DOI: 10.30857/
2415-3206.
2024.1.4

SPECIFICITIES OF THE FORMATION AND STAGES OF DEVELOPMENT OF IT-SECTOR INNOVATION CLUSTERS IN THE CONTEXT OF MARTIAL LAW

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THE PURPOSE OF THE ARTICLE is to study the peculiarities of formation and stages of development of innovation clusters in the IT sphere under martial law, to identify possible obstacles faced by IT clusters during military conflicts, as well as ways to overcome them.

RESEARCH METHODS. The following special and general scientific methods were used in the article: socio-economic analysis, scenario analysis, SWOT analysis, expert assessments, monitoring and evaluation of results, tabular and graphical, induction and deduction, etc.

PRESENTING MAIN MATERIAL. The development of innovation clusters is one of the key drivers of economic growth in a globally competitive environment. Clusters bring together companies, research institutions and government agencies to jointly develop innovative solutions. Innovation clusters are important elements of the modern economy that stimulate technological progress and economic growth, which are formed on the basis of a concentration of interconnected enterprises, institutions and organisations that interact and support each other. Innovation clusters in the IT sector not only ensure technological progress but also create new economic opportunities. Economic, social, technological, and institutional factors are important factors in the formation and development of innovation clusters. In the context of martial law, when economic stability and access to resources become limited, innovation clusters must adapt to new challenges, ensuring not only development but also the sustainability and security of their members. The war started by Russia in 2022 and the introduction of martial law have dramatically changed the conditions for the development of IT clusters, where the main obstacles are security threats, displacement of personnel, limited access to finance, supply chain disruption, and reduced demand for IT services. Among the main factors influencing the process of forming innovation clusters in the IT sector, economic, social, technological and institutional factors were

identified. The formation of innovation clusters in the IT sector includes the following stages: initiation and initial stage; infrastructure creation; development and consolidation; maturity stage and internationalisation. Thus, innovation clusters become a platform for developing products and solutions aimed at supporting government agencies and ensuring public safety. In particular, new approaches to data protection and communications are being developed in the IT sector, programmes are being created to coordinate humanitarian aid, and technologies for monitoring and forecasting crisis situations are being introduced.

CONCLUSIONS. In the context of martial law, innovation clusters face numerous challenges, but at the same time they demonstrate significant adaptability and ability to innovate. The process of formation and stages of development of innovation clusters in the IT sector is characterised by the main steps from initiation to international expansion, and requires the integration of various elements, such as infrastructure, innovation culture and cooperation with educational institutions. The successful formation and development of innovation clusters is critical to stimulating technological progress and increasing competitiveness at the global level, where further research in this area can help identify new approaches and strategies to support and develop innovation ecosystems. The main strategies to ensure the sustainability and further development of IT clusters were identified as the introduction of remote work, diversification of financing, creation of backup infrastructures, search for new markets and close cooperation with government agencies. Thus, martial law can stimulate the development of innovations in certain areas, such as cybersecurity, communications and information security, and IT clusters that are able to adapt to new realities can become key elements of national security and resilience under martial law.

KEYWORDS: innovation clusters; IT-sphere; formation and development; martial law; technological progress; integration; infrastructure; strategy; security; economic stability.

NUMBER OF REFERENCES	NUMBER OF FIGURES	NUMBER OF TABLES
27	2	1

JEL Classification:
H54, O33

УДК 339:13

DOI: 10.30857/
2415-3206.
2024.1.4

ОСОБЛИВОСТІ ФОРМУВАННЯ ТА ЕТАПИ РОЗВИТКУ ІННОВАЦІЙНИХ КЛАСТЕРІВ ІТ-СФЕРИ В КОНТЕКСТІ ВОЄННОГО СТАНУ

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МЕТОЮ СТАТТІ є дослідження особливостей формування та етапів розвитку інноваційних кластерів в ІТ-сфері в умовах воєнного стану, визначення можливих перешкод, з якими стикаються ІТ-кластери під час військових конфліктів, а також шляхів їх подолання.

МЕТОДИ ДОСЛІДЖЕННЯ. В статті було використано такі спеціальні та загальнонаукові методи: соціально-економічного аналізу, сценарний аналіз, SWOT-аналіз, експертні оцінки, моніторинг і оцінка результатів, таблично-графічний, індукції та дедукції, та ін.

ВИКЛАД ОСНОВНОГО МАТЕРІАЛУ. Розвиток інноваційних кластерів є одним із ключових чинників економічного зростання в умовах глобальної конкуренції. Кластери об'єднують компанії, науково-дослідницькі установи та державні органи з метою спільного розвитку інноваційних рішень. Інноваційні кластери є важливими елементами сучасної економіки, що стимулюють технологічний прогрес і економічне зростання, які формуються на основі концентрації взаємозв'язаних підприємств, установ та організацій, що взаємодіють і підтримують один одного. Інноваційні кластери в ІТ-сфері забезпечують не лише технологічний прогрес, але й створюють нові економічні можливості. Важливими чинниками формування і розвитку інноваційних кластерів є економічні, соціальні, технологічні та інституційні чинники. В умовах воєнного стану, коли економічна стабільність та доступ до ресурсів стають обмеженими, інноваційні кластери мають адаптуватися до нових викликів, забезпечуючи не лише розвиток, але й стійкість та безпеку своїх учасників. Війна розпочата Росією у 2022 р. та запровадження воєнного стану кардинально змінили умови розвитку ІТ-кластерів, де основними перешкодами стали загроза безпеці, переміщення кадрів, обмежений доступ до фінансування, порушення ланцюгів постачання та зниження попиту на ІТ-послуги. Серед основних чинників впливу на процес формування інноваційних кластерів в ІТ-сфері було виокремлено економічні, соціальні, технологічні та інституційні чинники. Формування

інноваційних кластерів ІТ-сфери включає такі етапи: ініціація та початковий етап; створення інфраструктури; розвиток і консолідація; етап зрілості та інтернаціоналізація. Отже, інноваційні кластери стають платформою для розробки продуктів і рішень, які спрямовані на підтримку державних структур та забезпечення безпеки населення. Зокрема, в ІТ-сфері розвиваються нові підходи до захисту даних та комунікацій, створюються програми для координації гуманітарної допомоги, а також впроваджуються технології моніторингу та прогнозування кризових ситуацій.

ВИСНОВКИ. В умовах воєнного стану інноваційні кластери стикаються з численними викликами, але водночас вони демонструють значну адаптивність та здатність до інновацій. Процес формування та етапи розвитку інноваційних кластерів в ІТ-сфері характеризується основними кроками від ініціації до міжнародної експансії, і вимагає інтеграції різних елементів, таких як інфраструктура, інноваційна культура та співпраця з освітніми установами. Успішне формування та розвиток інноваційних кластерів є критичним для стимулювання технологічного прогресу та підвищення конкурентоспроможності на глобальному рівні, де подальші дослідження в цій сфері можуть допомогти виявити нові підходи та стратегії для підтримки і розвитку інноваційних екосистем. Основними стратегіями для забезпечення стійкості та подальшого розвитку ІТ-кластерів було визначено впровадження віддаленої роботи, диверсифікація фінансування, створення резервних інфраструктур, пошук нових ринків збуту та тісну співпрацю з державними органами. Отже, воєнний стан може стимулювати розвиток інновацій у певних сферах, таких як кібербезпека, комунікації та інформаційна безпека, причому ІТ-кластери, здатні адаптуватися до нових реалій і можуть стати ключовими елементами національної безпеки та стійкості в умовах воєнного стану.

КЛЮЧОВІ СЛОВА: інноваційні кластери; ІТ-сфера; формування та розвиток; воєнний стан; технологічний прогрес; інтеграція; інфраструктура; стратегія; безпека; економічна стабільність.

Statement of the problem. The development of innovation clusters has become one of the key drivers of economic growth in a globally competitive environment. Clusters bring together companies, research institutions and government agencies to jointly develop innovative solutions. This topic is particularly relevant in the IT sector, which has become a driving force behind the digital transformation of various sectors of the economy. Innovation clusters are also important elements of the modern economy, driving technological progress and economic growth. They are formed based on a concentration of interconnected enterprises, institutions and organisations that interact and support each other. In the IT sector, which is characterised by rapid development and a high level of innovation, clusters play a particularly important role due to the need for highly skilled personnel, investment in research and development, and rapid adaptation to changing technological trends. Innovation clusters in the IT sector not only drive technological progress but also create new economic opportunities. Clusters are geographically concentrated networks of businesses that interact with each other and with research institutions to stimulate innovation and increase competitiveness. Economic, social, technological, and institutional factors are important factors in the formation and development of such clusters. In the context of martial law, when economic stability and access to resources are limited, innovation clusters must adapt to new challenges, ensuring not only development but also the sustainability and security of their members.

Analysis of publications on the problem. The main aspects of the formation, development and stages of building innovative clusters in the IT sector are within the circle of scientific interests of such scientists: N. Abashkina, Yu. Nikolaiev, V. Andreieva, A. Bezus, N. Sychova, K. Shafranova, P. Bubenko, N. Dril, Ye. Buriak, P. Puzyrova, R. Hanushchak, I. Hnatenko, Ye. Snitko, R. Markov, V. Utkin, S. Kudyn, K. Lavrukhina, V. Melnykov, O. Nechyporenko, Yu. Nosenko, L. Sinelnyk, O. Olshanska, I. Tkachenko, A. Omelianska, A. Tolstova, V. Utkin, Z. Yanchenko, B. Yukhnov, D. Korsakov, Ya. Yukhman, Yu. Zaloznova, M. Soldak, Z. Zhyvko, I. Raikovska, O. Kovtun, L. Kurhuzenkova and others. However, the issue of martial law has not been studied to the fullest extent.

Statement of the main results. An innovation cluster can be defined as a geographically concentrated group of interconnected companies, suppliers, government agencies and other organisations that collaborate to create innovative products and services. Innovation clusters facilitate the exchange of knowledge, the creation of joint projects, and the improvement of the competitiveness of individual companies as well as entire regions or countries. Clusters play a special role in the IT sector, as this industry is driving digital innovation. Interaction between IT companies, start-ups, research institutions and governments creates a synergistic effect that fuels the rapid development of

new technologies such as artificial intelligence, big data, blockchain, etc. The key factors for the successful functioning of IT clusters are the availability of skilled personnel, access to finance, infrastructure development, and cooperation between cluster members. In a stable environment, these factors ensure the dynamic development of innovation clusters, but during martial law, they acquire new features as numerous barriers to their development arise (Abashkina and Nikolaiev, 2021; Nechyporenko, Nosenko and Sinelnyk, 2021; Puzyrova, 2019; Bezus, Sychova and Shafranova, 2019; Bubenko and Dril, 2023; Andreieva, 2015; Sadovskyi and Volodchenkov, 2024; Buriak, 2019).

The war started by Russia in 2022 and the introduction of martial law dramatically change the conditions for the development of IT clusters. Thus, the key obstacles for IT clusters under martial law are as follows (Table 1).

*Table 1***Key obstacles for IT clusters under martial law**

No	Type	Signs.
1	Threat to security	Hostilities pose a direct threat to the physical security of employees and infrastructure. The risk of destruction of production facilities, loss of information resources, limited access to energy resources and instability of communication networks – all these factors negatively affect the work of IT companies.
2	Displacement of staff	During military operations, skilled personnel may be forced to leave the region, which creates significant challenges for the retention and development of human capital. For many companies, attracting new staff becomes difficult due to internal migration or emigration of specialists.
3	Limited access to finance	Investments in wartime become less affordable due to increased risks. Many investors are refusing to invest in regions with an increased security threat, which significantly reduces financial resources for the development of innovative projects.
4	Supply chain disruption	Under martial law, supply chains can be severely disrupted by border closures, blockades of transport routes, and destruction of logistics facilities. This leads to delays in the supply of necessary equipment and materials for IT clusters.
5	Decreased demand for IT services	During martial law, the country's economy may experience a significant decline, which affects the demand for IT products and services. Companies may lose customers or face delays in payments, leading to financial difficulties.

Source: built by the authors on the basis of (Abashkina and Nikolaiev, 2021; Nechyporenko, Nosenko and Sinelnyk, 2021; Puzyrova, 2019; Bezus, Sychova and Shafranova, 2019; Bubenko and Dril, 2023; Andreieva, 2015; Sadovskyi and Volodchenkov, 2024; Buriak, 2019).

Among the main factors influencing the process of formation of innovation clusters in the IT sector are economic, social, technological and institutional.

Economic factors are critical for the formation of innovation clusters and consist of the following derivatives:

- financing – the availability of affordable financial resources, both from the state and private investors, is the basis for the development of start-ups and new technologies. Investments in research and development (R&D) contribute to the creation of innovative products and services;

- costs of innovation – high costs of innovation can be both a barrier and an incentive for cluster formation. Economic incentives to invest in innovation and research contribute to the development of new technologies and competitiveness;

- competition and co-operation – the level of competition and opportunities for co-operation between firms within a cluster are important factors. Competition can stimulate innovation, while cooperation can facilitate the exchange of knowledge and resources.

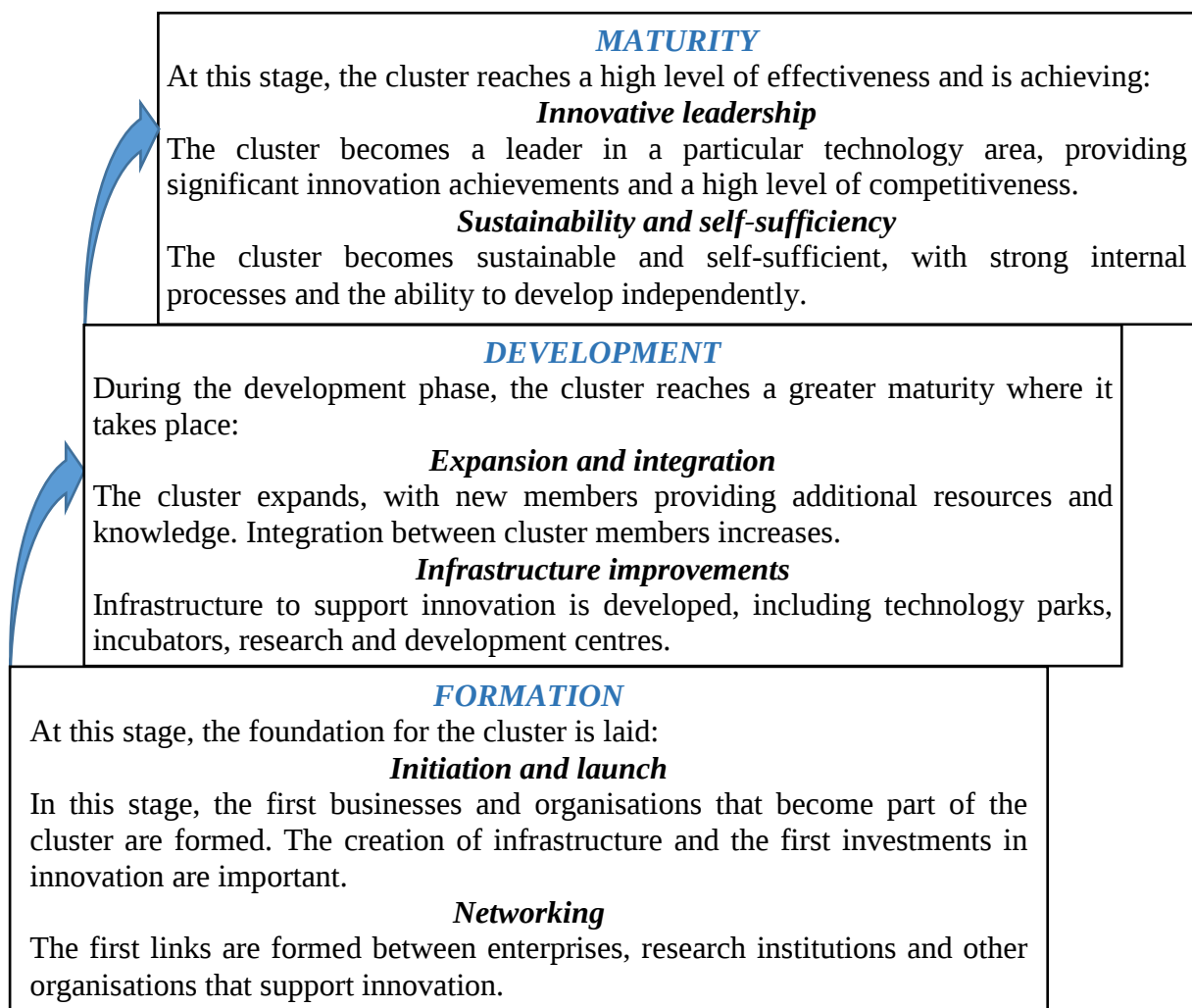
Among the social factors, the most important are skilled labour (availability of highly skilled IT professionals is an important factor for cluster development; educational institutions and training programmes that prepare personnel for the innovation sector support cluster formation); culture of innovation (a social culture that supports innovation, risk-taking and entrepreneurial spirit is an essential factor for cluster formation; a culture that promotes the adoption of new ideas and approaches promotes innovation).

Technological factors that form the infrastructure for the development of innovation clusters include technological and innovation infrastructure: technological infrastructure – implies the availability of a developed technological infrastructure, such as high-speed Internet connections and modern computer networks, which is critical for the development of IT clusters; innovation infrastructure – implies innovation centres, technology parks, laboratories, accelerators and incubators that provide the necessary resources for the development of new technologies and support for old ones.

Institutional factors define the basis for the formation and development of clusters, namely: policy and regulation (government policy aimed at supporting innovation initiatives and creating a favourable business environment is a key factor for the formation of clusters); legislative initiatives (legislative initiatives that protect intellectual property and promote innovation are important for stimulating innovation) (Dovbush and Puzyrova, 2020; Puzyrova and Sadovskyi, 2024; Hanushchak, 2024; Hnatenko, Snitko, Markov and Utkin, 2021; Kudyn, 2023; Puzyrova and Sadovskyi, 2023).

The stages of innovation cluster development are shown in Fig. 1. The formation of innovation clusters in the IT sector is a complex and multifaceted process that includes several key stages:

1. Initiation and initial stage. The process of forming an innovation cluster begins with the emergence of an idea or concept that unites the interests of various participants. At this stage, it is important to identify the potential for creating a cluster, assess market needs, and identify key players such as businesses, universities, research institutions, and investors. The main task is to create a platform for the exchange of ideas and resources.



Source: built by the authors on the basis of (Dovbush and Puzyrova, 2020; Puzyrova and Sadovskiy, 2024; Hanushchak, 2024; Hnatenko, Snitko, Markov and Utkin, 2021; Kudyn, 2023; Puzyrova and Sadovskiy, 2023).

Fig. 1. Stages of development of innovation clusters in the economy

2. Creation of infrastructure. The second stage involves the creation of the necessary infrastructure that provides the physical and organisational basis for

the cluster to function, which may include technology parks, research laboratories, start-up incubators, and the development of innovation support policies. It is important to ensure access to the necessary resources and create conditions for active interaction between participants.

3. Development and consolidation. At this stage, the cluster begins to function in the mode of active interaction between the participants. Businesses, research institutes and other organisations work on joint projects, which contributes to the development of new technologies and business models. It is important to ensure the cluster's sustainability and adaptability, as well as to attract new members to expand its capabilities.

4. Maturity and internationalisation. In the last stage, the cluster reaches maturity and begins to interact with international markets. This may include expanding beyond national borders, participating in international projects, and attracting foreign investment. Mature clusters become globally competitive and can influence the development of the international innovation ecosystem.

Innovation clusters in the IT sector go through specific stages of development that may differ from other industries:

1. Formation of a critical mass. At the initial stages of IT cluster development, it is important to reach a critical mass of participants to ensure effective interaction and create a favourable environment for innovation. This may include start-ups, large technology companies, universities and research institutes.

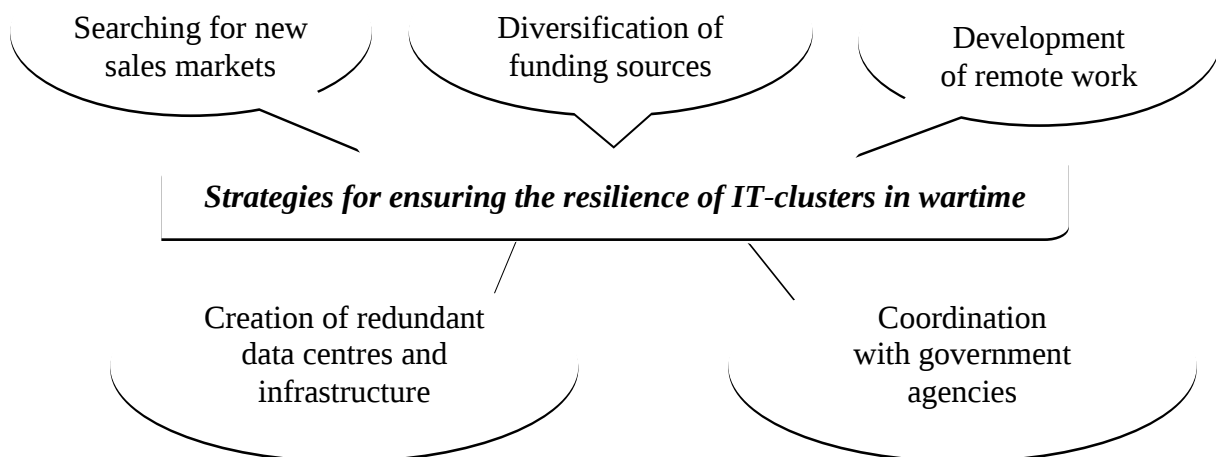
2. Cooperation with educational institutions. Since the IT sector requires highly qualified specialists, close cooperation with educational institutions is an important stage in the development of the cluster, including the creation of internship programmes, joint research, and the involvement of students in real projects.

3. Innovative culture and ecosystem. A successful IT cluster is formed through the development of an innovative culture that promotes the active exchange of ideas and experience. It is important to create an environment that supports risky innovation projects, fosters entrepreneurship, and provides access to finance.

Despite numerous challenges, innovation clusters in the IT sector demonstrate the ability to adapt even under martial law. The main strategies for ensuring the sustainability of IT clusters are as follows (Fig. 2).

Therefore, by switching to remote work, IT clusters can significantly reduce their dependence on physical infrastructure and ensure the safety of their employees. Remote work also allows them to attract specialists from different regions and countries, reducing the risk of losing human capital. To reduce dependence on traditional investors, companies within clusters can turn to alternative sources of funding, such as grants from international organisations,

crowdfunding, or cooperation with venture capital funds specialising in high-risk investments. To ensure the resilience of IT companies during the war, it is important to set up backup data centres in safe regions to minimise the risks of information loss and business continuity. With the shrinking domestic market, IT companies can expand their operations to international markets by using existing contacts with foreign partners and attracting new customers from abroad. In the context of martial law, close cooperation between innovation clusters and government agencies becomes important, particularly in terms of security, tax benefits and startup support. Joint programmes can also be created to ensure infrastructure resilience and help companies in times of crisis (Lavrukhina, 2023; Melnykov, 2021; Olshanska and Puzyrova, 2021; Onofriichuk, 2023; Puzyrova, 2021; Sadovskyi and Puzyrova, 2024; Tkachenko, Puzyrova and Omelianska, 2020).



Source: built by the authors on the basis of (Zakharchenko and Aliexsieichuk, 2019; Zaiats and Puzyrova, 2021; Kramarenko, 2019; Krakhmalova and Puzyrova, 2020).

Fig. 2. Strategies for ensuring the resilience of IT clusters in wartime

Despite all the negative consequences of martial law, it can also stimulate innovation in certain areas. Military conflicts tend to foster the development of new technologies in areas such as cybersecurity, military technology, communications and information security. Thus, innovation clusters can become a platform for the development of products and solutions aimed at supporting government structures and ensuring the security of the population. In particular, new approaches to data protection and communications are being developed in the IT sector, programmes are being created to coordinate humanitarian aid, and technologies for monitoring and forecasting crisis situations are being introduced (Tolstova, 2017; Utkin, 2022; Yanchenko, 2017; Yukhnov, Korsakov, Yukhman, 2021; Zaloznova, Soldak, 2021; Zhyvko, Raikovska, Kovtun, Kurhuzenkova, 2023).

Conclusions. Innovation clusters in the IT sector play a key role in the development of technology and the economy as a whole. In the context of martial law, innovation clusters face numerous challenges, but at the same time, they demonstrate considerable adaptability and ability to innovate. The process of formation and stages of development of innovation clusters in the IT sector covers the main steps from initiation to international expansion, and requires the integration of various elements, such as infrastructure, innovation culture and cooperation with educational institutions. The successful formation and development of innovation clusters is critical to stimulating technological progress and increasing competitiveness at the global level, where further research in this area can help identify new approaches and strategies to support and develop innovation ecosystems. The main strategies to ensure the sustainability and further development of IT clusters are the introduction of remote work, diversification of financing, creation of backup infrastructures, search for new markets and close cooperation with government agencies. Martial law can also stimulate innovation in certain areas, such as cybersecurity, communications and information security, where IT clusters that are able to adapt to new realities can become key elements of national security and resilience under martial law.

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HOW TO CITE THIS ARTICLE

Sadovskyi, Ie. (2024). Specificities of the formation and stages of development of IT-sector innovation clusters in the context of martial law. *Management*, 1(39): 41–52. <https://doi.org/10.30857/2415-3206.2024.1.4>.

JEL Classification:
G52

UDC 330:368

DOI: 10.30857/
2415-3206.
2024.1.5

INFLUENCE OF KEY FACTORS ON THE FORMATION OF INNOVATIVE STRATEGIES OF INSURANCE COMPANIES IN THE UKRAINIAN MARKET

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THE PURPOSE OF THE ARTICLE is concerned with studying the influence of key factors on the formation of innovative strategies of insurance companies in the Ukrainian market and determining their significance in the macro- and micro-environment.

RESEARCH METHODS. The article uses the following methods: case analysis, surveys, as well as analysis of internal documentation of insurance companies, tabular and graphical methods, methods of analysis and synthesis, literature research method, etc.

PRESENTING MAIN MATERIAL. In the current conditions of economic uncertainty and high competition in the market, Ukrainian insurance companies are forced to look for new approaches to improve their efficiency and competitiveness. Innovative strategies are becoming a key tool for adapting to rapid changes in the market and meeting customer needs. At the same time, a number of factors, both internal and external, influence the formation of such strategies. Important external factors include the digitalisation of the economy, regulatory changes, globalisation of financial markets and changes in consumer behaviour. Insurance companies face the need to adapt to new technologies, such as artificial intelligence, big data and blockchain, which can significantly increase the efficiency of business processes and improve customer service. In addition, Ukrainian insurance companies have to take into account the peculiarities of the domestic market, including macroeconomic instability, the legal framework and competition from international companies. Internal factors, such as corporate culture, management's strategic vision, investment in innovation and human capital development, also play an important role in shaping insurance companies' innovation strategies. Companies that fail to adapt to new conditions risk losing their market position. Given the importance of innovation for the sustainable

development of the insurance industry and the growing role of technology in the economy, a study of the key factors influencing the formation of innovation strategies of Ukrainian insurance companies is extremely relevant, which will help determine the optimal approaches to the development of insurance companies in the face of modern challenges.

CONCLUSIONS. The Ukrainian insurance market is undergoing active transformation due to growing competition, changes in regulatory policy, digitalisation of the economy, globalisation and martial law, which complicates all processes in the country's economy. Innovative strategies are becoming the main tool for increasing competitiveness, improving customer experience and optimising processes in insurance companies. The study has shown that among the macroeconomic factors, the main ones that influence the formation of innovative strategies of insurance companies in the Ukrainian market are: economic factors, technological factors, socio-cultural factors, regulatory factors and the competitive environment. It is also found that since the modern insurance market is characterised by high competitiveness and rapid changes in the technological environment, the successful implementation of innovative strategies depends not only on macro-environmental factors, but also on specific internal factors (micro-environment): corporate culture, organisational structure, management processes, human capital. Thus, the study of the influence of key factors on the formation of innovative strategies of insurance companies in Ukraine is important in terms of adaptation to changes, which can contribute to the sustainable development of this industry in the face of modern challenges.

KEYWORDS: innovation strategies; insurance companies; insurance market; key factors; formation; martial law; digitalisation; Ukrainian market; adaptation; sustainable development.

NUMBER OF REFERENCES	NUMBER OF FIGURES	NUMBER OF TABLES
25	1	1

JEL Classification:
G52

УДК 330:368

DOI: 10.30857/
2415-3206.
2024.1.5

ВПЛИВ КЛЮЧОВИХ ЧИННИКІВ НА ФОРМУВАННЯ ІННОВАЦІЙНИХ СТРАТЕГІЙ СТРАХОВИХ КОМПАНІЙ НА РИНКУ УКРАЇНИ

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МЕТОЮ СТАТТІ є дослідження впливу ключових чинників на формування інноваційних стратегій страхових компаній на ринку України та визначення їх вагомості у макро- та мікросередовищі.

МЕТОДИ ДОСЛІДЖЕННЯ. В статті було використано методи: кейс-аналізу, опитування, а також аналіз внутрішньої документації страхових компаній, таблично-графічні методи, методи аналізу та синтезу, літературно-дослідницький метод та ін.

ВИКЛАД ОСНОВНОГО МАТЕРІАЛУ. У сучасних умовах економічної невизначеності та високої конкуренції на ринку, страхові компанії України змушені шукати нові підходи для підвищення своєї ефективності та конкурентоспроможності. Інноваційні стратегії стають ключовим інструментом для адаптації до швидких змін на ринку та задоволення потреб клієнтів. Водночас на формування таких стратегій впливає низка чинників, як внутрішніх, так і зовнішніх. Серед важливих зовнішніх чинників варто виділити цифровізацію економіки, регуляторні зміни, глобалізацію фінансових ринків та зміни в поведінці споживачів. Страхові компанії стикаються з необхідністю адаптуватися до нових технологій, таких як штучний інтелект, великі дані та блокчейн, які можуть значно підвищити ефективність бізнес-процесів та покращити обслуговування клієнтів. Крім того, українські страхові компанії змушені враховувати особливості вітчизняного ринку, що включають макро-економічну нестабільність, правову базу та конкуренцію з боку міжнародних компаній. Внутрішні чинники, такі як корпоративна культура, стратегічне бачення керівництва, інвестиції в інновації та розвиток людського капіталу, також відіграють важливу роль у формуванні інноваційних стратегій страхових компаній. Компанії, які не встигають адаптуватися до нових умов, ризикують втратити свою ринкову позицію. Зважаючи на важливість інновацій для

сталого розвитку страхової індустрії та зростаючу роль технологій в економіці, дослідження ключових чинників, що впливають на формування інноваційних стратегій страхових компаній України, є вкрай актуальним, що дозволить визначити оптимальні підходи до розвитку страхових компаній в умовах сучасних викликів.

ВИСНОВКИ. Український страховий ринок знаходиться на етапі активних трансформацій через зростаючу конкуренцію, зміни в регуляторній політиці, цифровізацію економіки, глобалізацію та воєнний стан, що ускладнює всі процеси в економіці країни. Інноваційні стратегії стають основним інструментом для підвищення конкурентоспроможності, поліпшення клієнтського досвіду та оптимізації процесів у страхових компаніях. Дослідження показало, що серед чинників макросередовища основними, що здійснюють вплив на формування інноваційних стратегій страхових компаній на ринку України є: економічні чинники, технологічні чинники, соціально-культурні чинники, регуляторні чинники та конкурентне середовище. Також встановлено, що оскільки сучасний страховий ринок характеризується високою конкурентоздатністю та швидкими змінами в технологічному середовищі, то успішна реалізація інноваційних стратегій залежить не тільки від чинників макросередовища, але й від специфічних внутрішніх чинників (мікросередовища): корпоративна культура, організаційна структура, управлінські процеси, людський капітал. Таким чином, дослідження впливу ключових чинників на формування інноваційних стратегій страхових компаній в Україні являється важливим з точки зору адаптації до змін, що може сприяти стійкому розвитку цієї галузі в умовах сучасних викликів.

КЛЮЧОВІ СЛОВА: інноваційні стратегії; страхові компанії; страховий ринок; ключові чинники; формування; воєнний стан; цифровізація; ринок України; адаптація; стійкий розвиток.

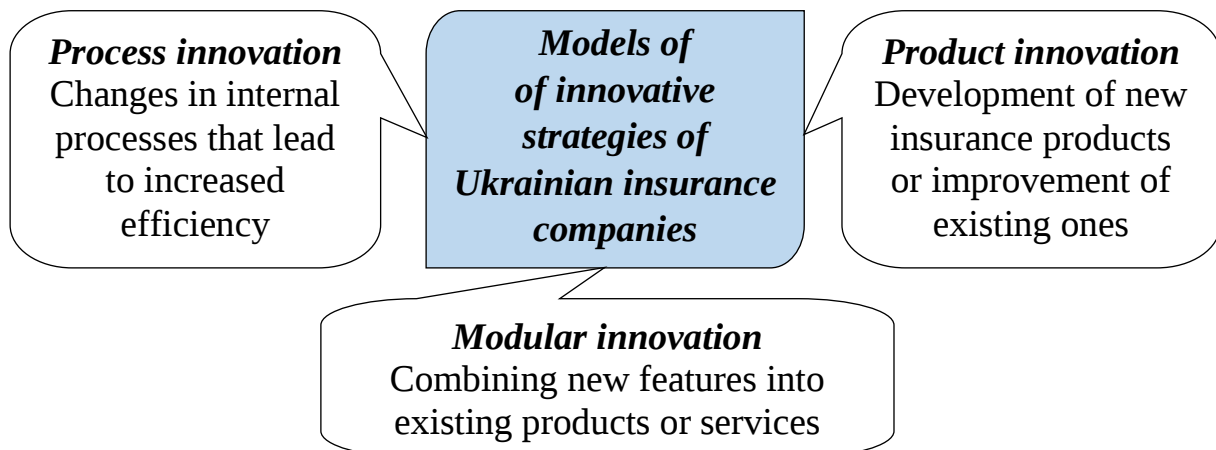
Statement of the problem. In today's environment of economic uncertainty and intense competition in the market, Ukrainian insurance companies are forced to look for new approaches to improve their efficiency and competitiveness. Innovative strategies are becoming a key tool for adapting to rapid changes in the market and meeting customer needs. At the same time, a number of factors, both internal and external, influence the formation of such strategies. Important external factors include the digitalisation of the economy, regulatory changes, globalisation of financial markets and changes in consumer behaviour. Insurance companies face the need to adapt to new technologies, such as artificial intelligence, big data and blockchain, which can significantly increase the efficiency of business processes and improve customer service. In addition, Ukrainian insurance companies have to take into account the peculiarities of the domestic market, including macroeconomic instability, the legal framework and competition from international companies. Internal factors, such as corporate culture, management's strategic vision, investment in innovation and human capital development, also play an important role in shaping insurance companies' innovation strategies. Companies that fail to adapt to new conditions risk losing their market position. Given the importance of innovation for the sustainable development of the insurance industry and the growing role of technology in the economy, a study of the key factors influencing the formation of innovation strategies of Ukrainian insurance companies is extremely relevant, which will help determine the optimal approaches to the development of insurance companies in the face of modern challenges.

Analysis of publications on the problem. The key factors influencing the formation of innovation strategies within the national market have been the subject of many studies by modern and leading scholars: O. Ahres, O. Hrytsyna, L. Syniavska, Ya. Cherniak, L. Klapkiv, I. Chunytska, A. Yasentiuk, V. Dranus, L. Dranus, N. Trushkina, V. Halushchak, O. Konarivska, M. Malovanyi, O. Prokopchuk, Yu. Ulianych, N. Miloshevych, L. Morozova, I. Mykytiuk, R. Pikus, V. Zakolodiazhnyi, P. Puzyrova, L. Kravtsova, V. Pokolodnyi, L. Popova, M. Fedyshyn, A. Biliavska, O. Prokofieva, Yu. Kovalska, A. Suprun, A. Ariienchuk, H. Tereshchenko, N. Lys, O. Vilenchuk, S. Yehorycheva, B. Taranets, V. Zakolodiazhnyi, L. Zavoloka, Ye. Koliesnik, I. Silina and others. However, in order to study in depth, the influence of certain macro and micro factors on the formation of innovative strategies of the insurance business, it is necessary to consider this topic in more detail.

Statement of the main results. Innovation strategies are a set of measures aimed at introducing innovations that can significantly improve the productivity and competitiveness of insurance companies, where innovations can take many forms, from new insurance products to improved technological processes and customer service (Ahres, Hrytsyna and Syniavska, 2022; Cherniak and Klapkiv,

2018; Suprun and Ariienchuk, 2019; Pokalchuk and Puzyrova, 2024; Chunytska and Yasentiuk, 2021).

There are several models of innovation strategies used in insurance companies (Fig. 1).



Source: author's construction.

Fig. 1. Main models of innovative strategies of Ukrainian insurance companies

The main factors of the macro environment (external factors) include economic factors, technological factors, socio-cultural factors, regulatory factors, and the competitive environment.

The economic situation in the country or at the international level affects the financial capacity of insurance companies to invest in innovation. For example, high inflation, market fluctuations and changes in tax policy may reduce the availability of resources for research and development. However, economic crises can also prompt the development of new products that meet changing consumer needs. Technological progress is one of the main drivers of innovation in insurance companies. New technologies, such as artificial intelligence, blockchain, big data and other digital tools, are creating new opportunities to improve products and services, optimise processes and enhance customer experience (Zakolodiazhnyi, 2017; Puzyrova and Pokalchuk, 2023; Dranus, Dranus and Trushkina, 2023; Tereshchenko and Lys, 2017; Yehorycheva and Taranets, 2020; Halushchak, 2019).

Social and cultural changes affect consumer preferences and requirements for insurance products. For example, increased awareness of environmental issues may drive demand for insurance related to environmental risks. Changes in lifestyles, such as increased mobility or remote working, also influence the development of new products. Legal and regulatory requirements have a significant impact on the innovation strategies of insurance companies. Changes in regulatory requirements can both hinder and stimulate innovation. For example,

new transparency or data protection requirements may require the introduction of new technologies and processes. Competition in the insurance market encourages companies to innovate to maintain their competitive advantage. Competitors' strategies, new market entries and changes in the competitive environment may require adaptation of innovation strategies to maintain leadership positions (Pokalchuk and Puzyrova, 2023; Konarivska, 2019; Puzyrova and Kovalska, 2021; Miloshevych, 2013; Morozova and Mykytiuk, 2023).

The influence of external environment factors on the innovation strategies of insurance companies: cases and analysis. Let's analyse the cases of successful innovations:

1. Case Study 1: Implementation of artificial intelligence to automate the process of signing insurance policies – a case study of successful companies that use AI to reduce the time for processing applications and improve the accuracy of risk assessment.

2. Case Study 2: Using Blockchain Technologies to Ensure Transparency and Security in Insurance Contracts – an analysis of companies that are implementing blockchain to reduce fraud risks and improve policy management.

Now let's look at the cases of failed innovations:

1. Case Study 3: Examination of examples of companies that failed due to insufficient adaptation to changes in the external environment or misdirected investments in innovation.

As the modern insurance market is characterised by high competitiveness and rapid changes in the technological environment, the successful implementation of innovation strategies depends not only on external factors but also on specific internal factors:

1. Corporate culture. Corporate culture plays an important role in shaping innovation strategies. A culture that encourages creativity and risk-taking contributes to a greater willingness to innovate. Analysis shows that companies with a culture that fosters innovation are more successful in implementing new strategies. Leaders who actively support innovation initiatives significantly improve the effectiveness of innovation.

2. Organisational structure. A flexible and dynamic organisational structure can enable faster innovation. Centralised structures can slow down innovation processes due to rigid procedures and management schemes. Flexible organisational structures allow for faster innovation than centralised structures. However, large insurance companies with a centralised structure can also be successful if they develop specialised innovation units.

3. Management processes. Effective management processes, including strategic planning, monitoring and evaluation of innovation projects, are critical to the successful implementation of innovations. Competent project management and clear planning are critical to the success of innovation

strategies. The absence of effective management processes can lead to failure in the implementation of innovations.

4. Human capital. Qualified staff capable of generating new ideas and implementing innovative projects is an important internal factor. The professional development and training of employees also affect their ability to innovate. A skilled workforce, especially one with experience in implementing innovations, has a positive impact on the development of innovation strategies. Investing in staff training and development is also important (Pikus and Zakolodiazhnyi, 2015; Zakolodiazhnyi, 2015; Pokalchuk, Zhuravlov and Kravtsova, 2024; Pokolodnyi, 2011; Popova, Fedyshyn and Biliavska, 2019).

On the recommendation side, we can offer the following basic steps for the formation of innovation strategies in the macro- and micro-environment (Table 1).

Table 1

Recommendations for the formation of innovative strategies of insurance companies at the level of macro- and micro-environment

№	Macro environment	Microenvironment
1	Strategies for adapting to economic changes: recommendations for developing strategies to adapt to economic fluctuations, including diversification of the product portfolio and flexibility in financial plans.	Developing an innovation culture: companies should actively create and maintain a corporate culture that encourages innovation and creativity.
2	Integration of new technologies: the phased integration of new technologies to reduce risks and maximise benefits. The importance of researching and testing new technologies before implementing them.	Optimisation of organisational structure: introduction of more flexible structures or creation of specialised units for innovation management is recommended.
3	Responding to socio-cultural changes: Developing products and services that are in line with current social and cultural trends. Incorporating customer feedback into the innovation process.	Improving management processes: Improving strategic planning and project management processes can significantly increase the effectiveness of innovation strategies.
4	Interaction with regulators: establishing effective communication with regulatory authorities to ensure that new products and processes comply with current requirements and standards.	Investing in human capital: Continuous training and professional development of employees is essential to ensure the company's innovation capability.

End Table 1

№	Macro environment	Microenvironment
5	Competitor analysis: continuous monitoring of the competitive environment and adaptation of innovation strategies based on competitive advantages and weaknesses.	Investing in human capital: Continuous training and professional development of employees is essential to ensure the company's innovation capability.

Source: (Prokofieva, 2023; Malovanyi, Prokopchuk and Ulianych, 2020; Vilenchuk, 2021; Zavoloka, Koliesnik and Silina, 2018).

Conclusions. The Ukrainian insurance market is undergoing active transformation due to growing competition, changes in regulatory policy, digitalisation of the economy, globalisation and martial law, which complicates all processes in the country's economy. Innovative strategies are becoming the main tool for increasing competitiveness, improving customer experience and optimising processes in insurance companies. Key factors, such as technological developments, changes in consumer behaviour, the introduction of new regulations and economic instability, are influencing how insurers are adapting their business models and strategies. In particular, the development of technologies such as artificial intelligence, blockchain, and big data analytics allows insurance companies to optimise processes, automate routine operations, and improve the quality of service delivery. At the same time, changing customer expectations require the introduction of new products and services that meet modern requirements and trends. The study has shown that among the macroeconomic factors, the main ones that influence the formation of innovative strategies of insurance companies in the Ukrainian market are: economic factors, technological factors, socio-cultural factors, regulatory factors and the competitive environment. It is also found that since the modern insurance market is characterised by high competitiveness and rapid changes in the technological environment, the successful implementation of innovative strategies depends not only on macro-environmental factors, but also on specific internal factors (micro-environment): corporate culture, organisational structure, management processes, human capital. Thus, the study of the influence of key factors on the formation of innovative strategies of insurance companies in Ukraine is important in terms of adaptation to changes, which can contribute to the sustainable development of this industry in the face of current challenges.

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HOW TO CITE THIS ARTICLE

Pokalchuk, O. (2024). Influence of key factors on the formation of innovative strategies of insurance companies in the Ukrainian market. *Management*, 1(39): 53–62. <https://doi.org/10.30857/2415-3206.2024.1.5>.

JEL Classification:
L26, M31

UDC 69.003

DOI: 10.30857/2415-
3206.2024.1.6

FORMATION OF MARKETING AUTOMATION SYSTEM

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PROBLEM STATEMENT. This article highlights the main problems and prospects for the development of a marketing automation system through the lens of academic research.

RESEARCH OBJECTIVE. The aim of the article is to conduct a comprehensive analysis of the main approaches to the formation of a marketing automation system through the lens of modern academic research, which will allow identifying the most promising approaches from the perspective of practical implementation.

RESEARCH HYPOTHESIS. It is hypothesized that the key method, regardless of the approach to the formation of a marketing automation system (MAS), is the approach known as project management.

METHODS. The author utilized general scientific and specialized research methods. Systematic method and content analysis were used to define the key concepts of the marketing automation process. Comparative analysis was used to identify differences between approaches to forming MAS in B2B and B2C sectors. Case study method was used to investigate specific examples of MAS formation in various business organizations.

RESULTS. It has been determined that scientists successfully highlight many of the key elements of of Marketing Automation Systems (MAS), particularly focusing on specific aspects of marketing automation functions. However, there remains a need for further research on the approaches, methods,

and tools for MAS development. Specifically, when considering the effect of implementing comprehensive, multifunctional, and integrated systems, the impact is undoubtedly extensive, especially in the case of leading martech companies, as documented by researchers. The study of their experience in developing of MAS, not only in the context of advancing technologies such as Artificial Intelligence (AI), Big Data, and others, but also the challenge of integrating the human component with the corresponding software in this process, should become one of the primary directions for future research.

CONCLUSIONS. It has been shown that the problem of forming a marketing automation system is gradually moving beyond the scope of business activities of companies and becoming the subject of academic research. At the same time, specialized studies still predominantly focus on specific aspects of the application of marketing automation (MA) functions, which are potentially considered as components of a holistic MAS. It has been proven that the main practical approaches to forming MAS are independent development and implementation by the business organization itself; acquisition of a ready-made solutions; or a combination of both approaches with corresponding advantages and risks.

KEYWORDS: marketing; marketing automation; marketing automation system; project management; business processes; marketing processes.

NUMBER OF REFERENCES 25	NUMBER OF FIGURES 1	NUMBER OF TABLES 0
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JEL Classification:
L26, M31

УДК 69.003

DOI: 10.30857/2415-
3206.2024.1.6

ФОРМУВАННЯ СИСТЕМИ АВТОМАТИЗАЦІЇ МАРКЕТИНГУ

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ВСТУП. У цій статті висвітлюються основні проблеми та перспективи формування системи автоматизації маркетингу скрізь призму академічних досліджень.

ГІПОТЕЗА

ДОСЛІДЖЕННЯ.

Припускається, що ключовим методом, незалежно від підходу до формування системи автоматизації маркетингу (САМ), є підхід, відомий як управління проектами.

МЕТА ДОСЛІДЖЕННЯ. Метою статті є комплексний аналіз основних підходів до формування системи автоматизації маркетингу скрізь призму сучасних академічних досліджень, що дозволить виділити найбільш перспективні з них з точки зору практичної реалізації.

МЕТОДИ. Автором використано загальнонаукові та спеціальні методи дослідження, зокрема системний метод та контент-аналіз – для визначення ключових понять процесу автоматизації маркетингу; компаративний аналіз – для визначення відмінностей між підходами до формування САМ у сферах B2B та B2C; метод кейс-стаді – для дослідження конкретних прикладів формування САМ у різних бізнес-організаціях.

РЕЗУЛЬТАТИ. З'ясовано, що науковці успішно висвітлюють багато з ключових елементів САМ, зокрема вони переважно зосереджуються на конкретних аспектах застосування функцій автоматизації маркетингу; водночас існує потреба в подальшому дослідженні підходів, методів і інструментів формування САМ. Зокрема

якщо говорити про ефект застосування та впровадження саме комплексних багатофункціональних й інтегрованих систем, то він безсумнівно є всеосяжним, особливо у випадку з передовими компаніями martech, що і фіксується науковцями. Саме вивчення їх досвіду з формування САМ, не лише в контексті розвитку технологій, таких як штучний інтелект (ШІ), Big Data тощо, але і проблеми поєднання людського компоненту і відповідного програмного забезпечення в цьому процесі має стати одним із основних векторів новітніх досліджень.

ВИСНОВКИ. Показано, що проблематика формування системи автоматизації маркетингу поступово виходить за рамки бізнес-діяльності компаній і стає об'єктом академічних досліджень. Водночас серед фахових досліджень поки що превалює висвітлення конкретних аспектів застосування функцій автоматизації маркетингу (АМ), які потенційно розглядаються як компоненти цілісної САМ. Доведено, що основними підходами формування САМ на практиці є: самостійна розробка та впровадження власними силами бізнес-організації; придбання готового рішення; поєднання обох підходів із відповідними перевагами та ризиками.

КЛЮЧОВІ СЛОВА: маркетинг; автоматизація маркетингу; система автоматизації маркетингу; управління проектами; бізнес-процеси; маркетингові процеси.

Introduction. The issue of developing Marketing Automation Systems (MAS) is gradually moving beyond the realm of business activities and becoming a subject of academic research. This shift is driven by the growing relevance of this topic for companies operating in both consumer and B2B markets, as they face a range of challenges, primarily related to perception, culture, structure, processes, and people – typical areas that require attention when implementing any complex system.

At the same time, it is important to consider that the transition from a "sales mentality" to a "marketing mentality" presents a significant challenge for companies. Modern marketing automation (MA) solutions offer so many ways to optimize and enhance marketing efforts that they often exceed the understanding and competencies of many individuals working in both marketing and sales. Consequently, the focus of professional research is gradually shifting towards the issue of developing a technological MA architecture based on an integrated approach, which allows for the automation of the entire marketing complex, rather than just isolated marketing tasks.

This highlights the need to fill a knowledge gap in the formation of MAS, as substantial studies by M. Salmi, D. Murphy, R. Titola, Y. Tobon, J. Järvinen, H. Taiminen, S. Voitovych, I. Lorvi, N. Bukala, and others have primarily addressed specific problems or features related to the implementation of marketing automation.

Materials and methods. To achieve the research objective, a comprehensive approach was employed, which included the analysis of academic literature (over 25 scholarly sources focused on contemporary approaches, challenges, and prospects in the development of marketing automation systems), analytical studies, as well as the synthesis and evaluation of practical cases of marketing automation implementation in various business organizations (more than 10 cases from large and medium-sized companies across different business sectors – B2B and B2C).

In conducting a comprehensive analysis of the primary approaches to the formation of marketing automation systems, the author utilized both general scientific and specialized research methods. These included the systematic method and content analysis for identifying key concepts in the marketing automation process; comparative analysis to determine differences between approaches to forming MAS in B2B and B2C sectors; and the case study method to investigate specific examples of MAS formation in various business organizations, with the aim of assessing their impact on the productivity and efficiency of business processes.

Results and discussion. The challenges related to the development and implementation of Marketing Automation Systems (MAS) by companies operating in both consumer and B2B markets have become a key focus of

academic research today. A notable example of research on this topic is the comprehensive study dedicated to the issues of marketing automation implementation in Finnish B2B companies (Salmi, 2020). The central idea of M. Salmi's work is that the complexity of marketing automation (MA) and the corresponding choice of specific software tools for its implementation necessitate addressing a range of issues, including understanding and commitment from top management, clear development priorities and expectation management, creating and maintaining a data-driven culture, revising or even restructuring marketing and sales, leveraging the capabilities of system integrators, metrics, content production and distribution, adapting sales activities to maximize the benefits of marketing automation software, developing and disseminating customer insights, and ensuring the recruitment and continuous training of personnel with the necessary competencies for working with these tools.

In a related study by the well-known marketing automation expert and consultant at the Australian technology company Squiz, D. Murphy (Murphy, 2018), which focuses on the impact of MAS implementation, a few general prerequisites that companies should consider and adhere to before, during, and after the formation/implementation of such systems are also highlighted. These include having the necessary human resources and expertise, revising and implementing new business processes, properly defining the scope of the MAS implementation project, obtaining organizational support at the highest management level, focusing on creating customer-centric content through MAS, making continuous investments, and setting realistic expectations.

Similar conclusions are drawn in R. Tiitola's study (Tiitola, 2022), which analyzes the impact of marketing automation software on the effectiveness of international marketing and heavily relies on D. Murphy's work. The success of implementing relevant software depends on how its usage is planned and how its effectiveness is measured. According to the author, the universal factors influencing the success of this process include analyzing and developing internal marketing and business processes within the company, clearly defining the requirements for MAS and its implementation project, the leadership role of top management and the presence of a qualified project CEO, using MAS primarily for creating and delivering relevant and timely content to the target audience in real-time and quickly responding to customer inquiries, setting realistic expectations for the implementation of such software, continuing to invest in marketing automation, and redistributing the resources freed up by this process towards developing the company's capabilities, effective human resource management, and adapting MAS to the specifics of local markets.

Other studies address specific issues related to the research topic, but they are no less significant. For example, one study (Lampinen, 2018), dedicated to

the issue of timely and targeted communication by marketers at appropriate stages of customer interaction, notes that one of the challenges companies often face is underestimating the potential of MAS software, particularly in automating data collection.

Others emphasize, in our opinion, one of the most important aspects of MAS formation and implementation – the analysis and development of management processes for marketing and other business activities within the company. Several publications, such as (Berghofer, F. et al., 2018; Wood, 2015), rightly point out that without properly organized marketing process management, the development or acquisition of software – considered to be the main ways of implementing MAS – may lead to additional costs, as the desired results may not be achieved precisely due to the irrational belief that technical solutions alone can correct imperfect management processes and procedures.

When it comes to the process of implementing MA software, top management and the marketing department must keep a close watch on whether the financial, time, and human resources spent on the project are justified. This is emphasized by several researchers (Lin et al., 2018), who argue that organizational support from top management is vital for securing the budget and resources necessary for implementing specific programs or comprehensive automation systems. Moreover, one of the most important factors determining the success of this process is the competence of the project manager responsible for MAS implementation, as they make critical decisions during project execution and ensure communication with the company's top management (Lin et al., 2018).

Therefore, a crucial factor in MAS formation is the issue of competencies and perceptions of marketing automation. For instance, in Y. Tobon's study (Tobon, 2017) on marketing automation implementation in B2B companies, it is rightly noted that the transition from a "sales mentality" to a "marketing mentality" is a significant challenge for companies, as modern marketing automation solutions provide so many ways to optimize and improve marketing that they go beyond the understanding and competencies of many people working in both marketing and sales. A particular problem highlighted by researchers is the lack of analytical skills. This is difficult to disagree with when it comes to the perception and development of complex innovative solutions like MAS.

Studies closely related to this topic focus on the challenges of involving direct users of marketing automation software in the project of forming or implementing these products. Several studies (Hassandoust et al., 2016; Sorgenfrei et al., 2014) convincingly demonstrate that the attitude of marketers, who are expected to become users of new corporate software, is also a crucial

factor in the success of MAS implementation, as it influences their willingness to use or not use it.

In this context, some researchers (Silva et al., 2023) especially emphasize the problem of overcoming resistance to the implementation of such technical innovations by staff and management, primarily because it requires them to develop new competencies that were not previously considered inherent in the field of marketing. Refusing to use new available tools in favor of relying only on previous experience can have negative consequences for the overall effectiveness of companies (Silva et al. 2023). Many studies also focus on the need to emphasize the correct aspects when implementing specific functions of MAS software.

One of the ultimate expected outcomes of a MA technology infrastructure project in a company should be to increase the overall effectiveness of lead generation and building relationships with potential clients through lead management, marketing channel management, and content management functions.

For example, in the article by J. Järvinen and H. Taiminen (Järvinen et al., 2016), dedicated to integrating content marketing with sales processes in the B2B sector, it is convincingly argued that when companies use MA software for behavioral targeting and content personalization to make it interesting, useful, and generally relevant to client requests and expectations – based in particular on the capabilities of software systems for data collection, storage, and analysis – they generate more unique leads than before.

The automation of labor-intensive manual tasks related to content creation is also considered by researchers to be an important element of any modern MA software product. Many studies increasingly focus on the use of machine learning and AI capabilities as a means of creating media advertising as the foundation of modern digital marketing. Most of these studies focus on applying machine learning models and text-based generative AI for these purposes (Brand et al., 2023), but recently there has been increasing attention to the issue of implementing AI for generating visual marketing content (Jansen et al., 2023).

The issue of CRM integration with MA software has also long been a central focus of academic research. However, it has mostly been considered as a process of adapting MA functions within the structure of CRM systems, such as automating marketing campaign planning, segmentation, and campaign performance analysis. However, in several academic works, this issue is now being examined in the context of digitized marketing systems. For example, in the work of Ukrainian researchers S. Voitovych, I. Lorvi, and N. Bukalo (Voitovych et al., 2022), dedicated to the automation of company-client interaction processes in the context of marketing digitalization, it is argued that all stages of an organization's interaction with service consumers should be

subject to automation through CRM technology: the initial contact stage, the service delivery stage, and the post-operation interaction stage during after-sales service. According to the authors, such an integrated system should encompass areas such as the MA module, SFA module (sales force automation), CSS module (customer service automation), and CSA module (customer support automation).

Today, the focus of professional research is gradually shifting towards the development of a MAS technological architecture based on an integrated approach that allows for the automation of the entire marketing complex, rather than just individual marketing tasks. This has led to a trend towards the formation of multifunctional MAS, with the most common form being Marketing Automation Platforms (MAP). This is driven by the fact that the initial perception of MAS by businesses and part of the academic community primarily as software with isolated technological architecture (Pardillo, 2019), i.e., hundreds of digital applications acquired from various providers, has been largely mistaken. The obvious drawbacks of such an approach include, among others (Pardillo, 2019):

- Weak ability of personnel to make rational decisions, particularly when dealing with fragmented software functionalities and, consequently, multiple non-overlapping databases. In other words, employees either must spend a lot of time searching for information, such as client profiles, across different databases, or simply act without this information based on intuition, increasing the likelihood of risky decisions.
- Low marketing department productivity due to inefficiencies in business processes, particularly caused by duplication of operations resulting from focusing on individual software solutions that are not integrated into a single system. This, in turn, leads to the marketing team's distraction from coordinating individual operations, thus resulting in time loss and an increased risk of errors in implementing marketing campaigns and other activities. Consequently, this can negatively affect client acquisition and retention as well as the retention of qualified staff within the team.
- Ineffectiveness of targeted communications with clients and leads, especially in the absence of integration between data-gathering software tools and CRM systems. As a result, this leads to a lack of understanding of client needs.
- Loss of time and profitability, as many businesses, when investing in the automation of marketing processes, often do not consider that the mere implementation of software tools – whose maintenance costs are already quite high – without integrating them into a holistic technological architecture and without viewing them as part of a unified organizational management system,

leads to bottlenecks in marketing processes and reduces the overall productivity of the relevant department.

In addition to this, there are also objective problems and challenges related to the implementation of MA software solutions, including technical dependency caused by the need for constant adaptation of business organizations to new technologies, which change over very short periods. Nowadays, every large and medium-sized company has IT departments constantly working on integrating, updating, and testing various applications. This consumes a lot of time for IT departments, making them more overloaded than ever before, thus increasing companies' costs of supporting the IT component of their organizational systems.

MAPs have undergone extraordinarily rapid evolution in the second decade of the 21st century and continue to develop. This development, as noted by many researchers (Stone et al., 2021), is partly related to the emergence of giant companies that develop business process automation software based on cloud computing and AI, unified into a single software ecosystem. These companies, as mentioned in the previous section, include Adobe, Amazon Web Services, Google, Microsoft, Salesforce.com, and others.

The successful formation of such platforms depends on a range of factors that determine the implementation of information and communication technologies (ICT). For example, in the work of J. Mero, A. Tarkiainen, and Y. Tobon (Mero et al., 2020), it is rightly noted that these factors include the competitive structure of the industry, the type and size of the business organization, the product or service range, the size and structure of the customer base, communication channels, available budget, system perception and relevant competencies, and corporate culture.

Other experts reasonably add that in addition to the above, the main differences between the B2B and B2C sectors, if any, also play a role. These include, primarily (Stone et al., 2021):

- Costs, for example, for involving the sales sector in marketing processes, which is more relevant in B2B, where the sales component typically plays a more critical role;
- The need to increase competitiveness over time, which, incidentally, is more important for the B2C sector, as so-called "impulse" and "quick purchases" are phenomena characteristic of this business segment;
- The need to better understand clients, which is equally important for both B2B and B2C sectors;
- The demands from the most valuable clients, e.g., distributors, for more professional marketing, which is a particularly important factor for the B2B sector, where collaboration between marketing and sales departments is the most important area of activity for many companies;

- The need for user-generated content to increase product value, which is equally significant for both B2B and B2C sectors;
- Changes in product technology, such as the implementation of modularity, requiring the digitalization of marketing (and sales) processes to provide better choices for clients – especially important for B2B but may also be important for B2C;
- The equally important role of supplier pressure, especially those higher up the supply chain, to ensure transparency in marketing and supply;
- Regulatory pressure on quality and confidentiality; this aspect is particularly relevant for the B2C sector, where privacy is a cornerstone of regulation, and fines are potentially more severe;
- The digitalization of other aspects of business and the general adoption of a more digital business model or the automation of other business processes (equally important for both B2B and B2C).

Researchers (Stone and Woodcock, 2021) rightly note that the problem of division between marketing and sales activities has mostly disappeared in leading B2C companies and those providing services to B2B companies. These functions are merging with marketing because they are more e-commerce oriented, where the client's journey from product/service awareness to purchase becomes much shorter. Therefore, when developing MAPs, the business model assumes the provision of a ready-to-use platform for end clients with customization options, i.e., the ability to choose the functions (modules) they need, integrate them with AI through a user-friendly delivery method – usually subscription-based – with easy management and fewer issues with development and adoption than before.

This is why some studies have already emphasized that the active implementation of such systems already has significant consequences for global marketing. For example, in the study (Agüera, 2019), it is noted that before the boom of MA technological solutions, segmentation, for example, was the result of studying each market, followed by the manual process of targeting, managing contact information, and interacting with the sales and service sectors. However, now with the possibility of fully automated marketing, the issues of customization mentioned above come to the forefront.

This means that for the largest, usually global, companies, after they have invested in the development or integration of MAPs, the practical application of the latter in various markets is mostly reduced to adapting the components of these systems responsible for content management to local languages and cultural specifics, as the rest of the functions are already automated.

Thus, in summarizing the literature review, it appears that there are now three main approaches to forming MAS:

1. Independent development and implementation by the business organization itself, which, as the studies mentioned show, is a rather costly and risky method;

2. Acquiring a ready-made solution, a MAP, from specialized providers, usually giants of the martech industry, which is extremely convenient (flexible), the least risky, and the most widespread method, as it does not require the company to make large investments in developing such a system (maintaining a large IT department, equipment, and risk management, etc.), except for ongoing staff training. Maintenance, security systems, service support, configuration, and adaptation to the specific needs of the customer (if necessary) fall on the shoulders of the platform provider;

3. A combination of both approaches with the corresponding advantages and risks, where MAS formation is carried out by integrating specific components (modules) from various platforms or individual applications into the company's own system. In addition, this requires the company, at both the top management level and the project leader, to have a clear understanding of what specific tasks the system should solve and, accordingly, which marketing functions should be automated and which should not.

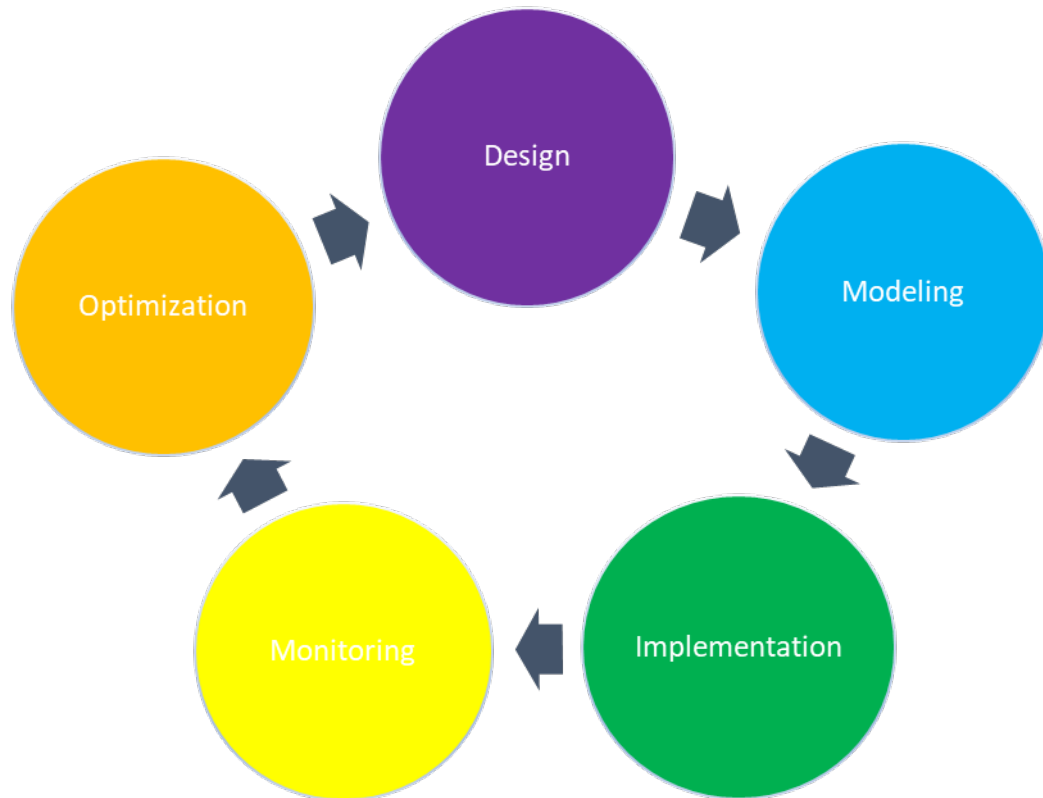
However, regardless of the MAS formation approach, it involves applying proven business process management methods. And the main such method is undoubtedly project management, as it is used to ensure that the planned activities align with the goals and objectives of the project throughout its lifecycle. This ensures clarity in the work of the teams involved in the project and adherence to the project schedule (Marketing Project Management Guide, 2023).

Overall, according to J. Heagney's classic work on project management (Heagney, 2016), a project, by its nature, is a well-planned undertaking that goes through a specific lifecycle with a defined beginning and end. This cycle allows project managers to carefully plan each task and activity to maximize the chances of success.

The process of MAS formation is essentially managed using the same project management principles common to other fields and industries. Although the details of the project implementation workflow may vary depending on technical capabilities, budget, and the team, it is undoubtedly a step-by-step process. Considering the understanding of the classical (five-step) business process management cycle (as in Fig. 1) and based on the work of various researchers (Araf, 2023; Heagney, 2016), the MAS formation project can be represented as consisting of the following stages:

- **Design:** This stage involves defining and analyzing various aspects of the process, from initiation, identifying key tasks, methods, tools, and technologies for MAS creation, project budget, and stakeholders (people,

technical support, and specific modules) responsible for tasks and functions related to this process, to forming a vision of the final state of the implementation process and approval.



Source: developed by the author

Fig. 1. Management cycle of MAS formation project

- **Modeling:** The creation of a marketing automation system model, in this case, can be considered a separate stage, involving the clear definition of stakeholders (project management, including the project leader, marketing director, marketing manager, or other marketing department employees and/or client managers; internal stakeholders, including top managers, heads of other departments, sales department employees, technical specialists; external stakeholders, including MAP and/or other MA software providers, freelancers (web designers and programmers, consultants), and sometimes investors, clients, or users) and their functional roles in building the system according to the tasks set, outlining its key features and functionality.

- **Implementation:** This stage begins when all key stakeholders have agreed on the project, a schedule has been created, and each task has been assigned to specific team members. During this stage, the project team brings the MAS launch plan to life, taking into account the need for change management and extensively using team communication tools. Additionally, the

project leader (project manager) is responsible for defining expectations regarding task execution by the team.

- **Monitoring/Measurement:** The collection of data (documentation) by project managers, analysts, and/or external specialists (e.g., MAP providers) regarding the effectiveness and productivity of MAS (measuring key performance indicators (KPIs), using visualization tools such as tables and charts that can be updated in real-time).

- **Optimization/Adjustment:** Continuous or periodic optimization of MAS operation and its components to maximize and scale efficiency, minimize costs, reduce time for implementing management or technical decisions regarding the system's operation, ensure adherence to corporate business practices, and maintain compliance with regulatory requirements.

Therefore, a review of the literature reveals that, although scholars highlight some of the most important elements of MAS, they generally focus on specific aspects of marketing automation functions, while there is still a lack of attention to the approaches, methods, and tools for MAS formation. When it comes to the impact of applying and implementing comprehensive multifunctional and integrated systems, it is undoubtedly far-reaching, especially in the case of leading martech companies, as noted by researchers. In our opinion, studying their experience in MAS formation – not only in the context of technological developments such as AI, Big Data, etc., but also the challenges of integrating the human component and relevant software in this process – should be one of the primary vectors of recent research.

Conclusions. It has been demonstrated that the issue of developing Marketing Automation Systems (MAS) is gradually transcending the boundaries of corporate business activities and becoming a subject of academic research. However, current professional studies predominantly focus on specific aspects of marketing automation (MA) functions, which are potentially considered as components of a comprehensive MAS. While the trend in research is gradually shifting towards the development of a comprehensive technological architecture for MA functions – one that enables the integration of various functions on a unified software platform to automate the entire marketing complex (evident in the trend towards the formation of multifunctional MAS, with Marketing Automation Platforms (MAP) being the most common form) – there is still a lack of studies that examine the approaches, methods, and tools for MAS formation.

Nevertheless, the existing body of literature allows us to identify three main practical approaches to MAS formation: independent development and implementation by the business organization itself; the acquisition of a ready-made solution, such as a MAP, which is the least risky and most common method of MAS formation; and a combination of both approaches, with their

corresponding advantages and risks, wherein MAS formation is achieved through the integration of specific components (modules) from various platforms or third-party applications into the organization's own system.

It has been shown that regardless of the approach to MAS formation, the primary method employed is project management, which allows the relevant process to be modeled as a five-stage business process management cycle consisting of the following phases: design (defining and analyzing various aspects of the process); modeling (creating the expected MAS model, including its structure, components, stakeholders, and their functional roles); implementation (executing the plan for launching MAS with consideration for change management); monitoring/measurement (documenting the progress of the project and assessing its effectiveness and productivity); and optimization/adjustment (undertaking periodic optimization of MAS operations and its components).

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HOW TO CITE THIS ARTICLE

Byba, V. (2024). Formation of marketing automation system. *Management*, 1(39): 63–77.
<https://doi.org/10.30857/2415-3206.2024.1.6>.

JEL Classification:
O32, M21

UDC 004:338

DOI: 10.30857/
2415-3206.
2024.1.7

THEORETICAL CONCEPT OF ARTIFICIAL INTELLIGENCE, ITS IMPACT ON THE MODERNISATION OF BUSINESS PROCESSES AND STRATEGIC DEVELOPMENT OF ENTERPRISES

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THE PURPOSE OF THE ARTICLE is to study the theoretical concept of artificial intelligence and its impact on the modernisation of business processes and strategic development of enterprises.

RESEARCH METHODS. The article uses the following methods: expert assessments; algorithmic analysis; experimental research; statistical analysis; monitoring and evaluation of results; analysis and synthesis; graphical method, etc.

PRESENTING MAIN MATERIAL. Artificial intelligence (AI) is a multidisciplinary scientific concept that has a huge potential for transformation in the field of business process modernisation and strategic development of enterprises. AI is capable of radically modernising business processes and their strategic development by automating decision-making systems and predicting innovations in production based on data analytics. As AI touches upon issues such as ethics, privacy, and cybersecurity, the misuse of AI can have serious negative consequences for users. The main types of AI fall into two broad areas: Weak AI – systems that are capable of performing specific tasks, but without understanding the broader context or the ability to adapt in general, which can outperform humans in certain tasks but do not have true ‘consciousness’; Strong AI – systems that can think, understand and learn at the level of human intelligence (Strong AI is still a hypothetical area of research, as there is no fully implemented Strong AI in modern science). Currently, there are several main approaches to AI development, each of which has its own peculiarities. The main methods are machine learning, expert systems, neural networks, and evolutionary algorithms. AI is becoming a relevant tool for modernising business processes, optimising resources, and developing enterprises strategically. Thus, AI opens up new horizons for business, allowing

companies to optimise their business processes, minimise costs and increase efficiency. Integrating AI into the development strategy of enterprises requires a deeper understanding of its potential and limitations, where the introduction of AI changes not only individual business processes but also affects the overall approach to the management and development of enterprises. One of the key areas of AI use in the strategic development of enterprises is forecasting and strategic planning, where AI can help enterprises predict economic trends, analyse the competitive environment, and develop strategies that meet future customer demands.

CONCLUSIONS. It has been established that AI has a mega-potential for business transformation, contributing to the modernisation of business processes and strategic development of enterprises. However, to achieve effective results, it is important to be aware of both the advantages and disadvantages associated with its integration. Successful AI integration requires not only technical training, but also the adaptation of business models, a strategic approach, attention to all ethical aspects, investment in innovation, and continuous training of employees. The introduction of AI will allow businesses to optimise their operations, make more informed decisions and adapt to the changing environment. Understanding the importance of AI for businesses allows them not only to adapt to new conditions but also to gain a competitive advantage, as AI is becoming one of the key factors in business development, and its role will only grow in the future.

KEYWORDS: artificial intelligence; modernisation of business processes; strategic development of enterprises; business transformation; integration; innovation; enterprises; adaptation; implementation.

NUMBER OF REFERENCES	NUMBER OF FIGURES	NUMBER OF TABLES
25	4	0

JEL Classification:
O32, M21

УДК 004:338

DOI: 10.30857/
2415-3206.
2024.1.7

ТЕОРЕТИЧНИЙ КОНЦЕПТ ШТУЧНОГО ІНТЕЛЕКТУ, ЙОГО ВПЛИВ НА МОДЕРНІЗАЦІЮ БІЗНЕС-ПРОЦЕСІВ ТА СТРАТЕГІЧНИЙ РОЗВИТОК ПІДПРИЄМСТВ

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МЕТОЮ СТАТТІ є дослідження теоретичного концепту штучного інтелекту, а також його впливу на модернізацію бізнес-процесів та стратегічний розвиток підприємств.

МЕТОДИ ДОСЛІДЖЕННЯ. В статті було використано методи: експертних оцінок; алгоритмічного аналізу; експериментальних досліджень; статистичного аналізу; моніторингу і оцінки результатів; аналізу та синтезу; графічний метод та ін.

ВИКЛАД ОСНОВНОГО МАТЕРІАЛУ.

Штучний інтелект (ШІ) є багатовекторним науковим поняттям, яке має величезний потенціал для трансформації у сфері модернізації бізнес-процесів та стратегічного розвитку підприємств. ШІ здатний радикально модернізувати бізнес-процеси та їх стратегічний розвиток, автоматизуючи системи прийняття рішень та прогнозуючи на основі аналітики даних інновації у виробництво. Оскільки, ШІ дотичний до таких питань, як етика, конфіденційність та кібербезпека, то неправильне застосування ШІ може мати серйозні негативні наслідки для користувачів. Основні види ШІ поділяються на два великі напрямки: Weak AI – системи, що здатні виконувати конкретні завдання, але без розуміння широкого контексту чи здатності до загальної адаптації, які можуть перевершувати людей у певних завданнях, але не мають справжньої «свідомості»; Strong AI – системи, які можуть мислити, розуміти та навчатися на рівні людського інтелекту (Strong AI ще залишається гіпотетичним напрямком досліджень, оскільки в сучасній науці не існує повноцінно реалізованого Strong AI). В сучасних умовах існує декілька основних підходів до розробки ШІ, кожен з яких має свої особливості. Так, основними методами є машинне навчання, експертні системи, нейронні мережі та еволюційні алгоритми. ШІ стає актуальним інструментом для модернізації бізнес-процесів, оптимізації ресурсів та стратегічного розвитку

підприємств. Отже, ШІ відкриває нові горизонти для бізнесу, дозволяючи підприємствам оптимізувати свої бізнес-процеси, мінімізувати витрати та підвищувати ефективність діяльності. Інтеграція ШІ у стратегію розвитку підприємств вимагає більш глибокого розуміння його потенціалу та обмежень, де впровадження ШІ змінює не тільки окремі бізнес-процеси, але й впливає на загальний підхід до управління та розвитку підприємств. Одним із ключових напрямків використання ШІ у стратегічному розвитку підприємств є прогнозування та стратегічне планування, де завдяки ШІ підприємства можуть прогнозувати економічні тенденції, аналізувати конкурентне середовище та розробляти стратегії, що відповідають майбутнім запитам споживачів.

ВИСНОВКИ. Встановлено, що ШІ має мега-потенціал для трансформації бізнесу, сприяючи модернізації бізнес-процесів та стратегічному розвитку підприємств. Однак для досягнення ефективних результатів важливо усвідомлювати як переваги, так і недоліки, пов'язані з його інтеграцією. Успішна інтеграція ШІ потребує не лише технічної підготовки, але й адаптації бізнес-моделей, стратегічного підходу, уваги до всіх етичних аспектів, інвестування в інновації та безперервного навчання своїх працівників. Впровадження ШІ дозволить підприємствам оптимізувати свої операції, приймати більш обґрунтовані рішення та адаптуватися до мінливих умов сьогодення. Розуміння значимості ШІ для підприємств дозволяє останнім не лише адаптуватися до нових умов, але й отримати конкурентну перевагу, оскільки ШІ стає одним із ключових факторів розвитку бізнесу, і його роль у майбутньому лише зростатиме.

КЛЮЧОВІ СЛОВА: штучний інтелект; модернізація бізнес-процесів; стратегічний розвиток підприємств; трансформація бізнесу; інтеграція; інновації; підприємства; адаптація; імплементація.

Statement of the problem. Artificial intelligence (AI) is a multidisciplinary scientific concept that has a huge potential for transformation in the field of business process modernisation and strategic development of enterprises. AI is the foundation of the fourth industrial revolution (Industry 4.0), which leads to automation, digitalisation and intellectualisation of processes that change approaches to business management, strategic development, production optimisation, market analysis and consumer behaviour. AI helps to increase the efficiency and productivity of enterprises by automating routine tasks, analysing large amounts of data and making decisions based on machine learning, which significantly increases the competitiveness of enterprises in the global and world markets. AI is able to radically modernise business processes and their strategic development by automating decision-making systems and predicting production innovations based on data analytics. In addition, AI can perform some of the tasks previously performed by company employees, which leads to the training and retraining of new personnel, the need for new professions, and has a general impact on employment in general. As AI touches on issues such as ethics, privacy and cybersecurity, the misuse of AI can have serious negative consequences for users. AI has the potential to fundamentally change the way we think about intelligence and automation, but its potential should be used with caution and responsibility.

Analysis of publications on the problem. AI issues have always been in the focus of attention of economists, especially in the times of Industry 4.0, and with the onset of technological transformations, responding to consumer demands and modern market requirements. AI has been studied by many researchers: V. Andriievskiy, V. Kyrychenko, O. Kostenko, M. Kurkov, M. Kushnir, A. Tokarieva, B. Lohvinenko, O. Parubets, D. Suhoniako, I. Serediuk, N. Pavlikha, O. Pizhuk, S. Ramazanov, A. Shevchenko, Ye. Kuptsova, Z. Shatska, H. Olshanskyi, A. Shevchenko, K. Yefremova and others. However, scholars have not been able to come to a consensus on the basic concept, which is the subject of our study.

Statement of the main results. The beginning of AI as a scientific discipline is associated with the development of computers in the mid-20th century. The first concepts of AI started to develop in the mid-1950s, when scientists A. Turing and J. McCarthy proposed theories and methods for creating intelligent machines. A. Turing, one of the founders of computer science, proposed the famous Turing Test as a method of assessing the ability of a machine to demonstrate intelligent behaviour equivalent to that of a human. J. McCarthy, for his part, coined the term 'artificial intelligence' and proposed a number of fundamental concepts for the further development of the industry. Over the next decades, AI development went in waves, with periods of high enthusiasm known as the "AI summer" and lulls in interest called "AI winters". However, since the late 1990s, thanks to advances in

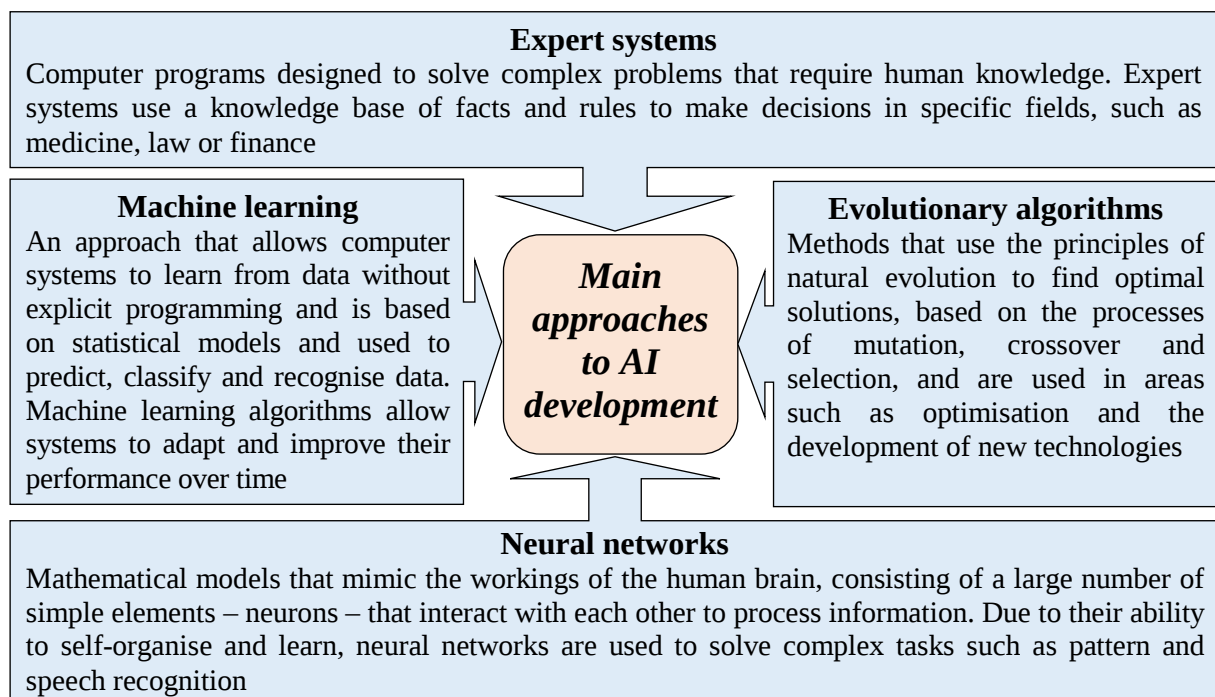
computing technology and access to large amounts of data, AI has experienced a significant rise (Yefremova, 2020; Pizhuk, 2019; Imnazarov and Puzyrova, 2023; Ramazanov, 2022; Komaretska, 2006).

In today's reality, AI is one of the most significant scientific and technological achievements of our time, gaining increasing popularity due to its application in various fields, including medicine, manufacturing, finance, entertainment, computer science, mathematical logic, neuroscience, automata theory and cognitive psychology. The key goal of AI is to develop systems capable of imitating human thinking and behaviour. AI also allows machines to learn, make decisions, and adapt to new conditions, which has significant potential for transforming economic and social systems (Puzyrova and Synytsia, 2024; Kostenko, 2022; Kurkov, 2020). The main types of AI are divided into two broad blocks:

1. Weak AI is a system capable of performing specific tasks but without understanding the broader context or the ability to adapt in general, which can outperform humans in certain tasks, such as chess or face recognition, but does not have true 'consciousness'.

2. Strong AI are systems that can think, understand, and learn at the level of human intelligence. Strong AI is still a hypothetical area of research, as there is no fully implemented Strong AI in modern science.

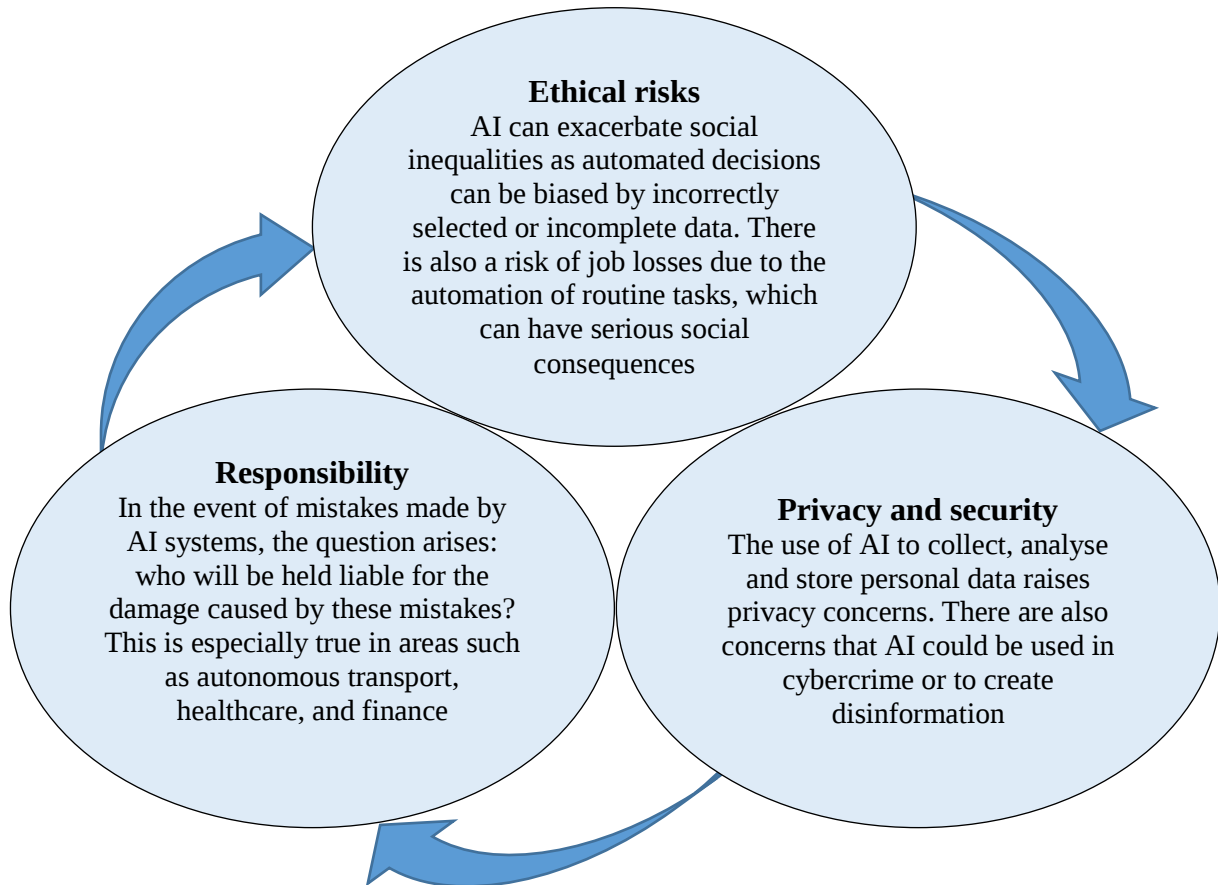
Currently, there are several main approaches to AI development, each of which has its own peculiarities. The main methods are machine learning, expert systems, neural networks, and evolutionary algorithms (Fig. 1).



Source: (Puzyrova and Synytsia, 2024; Kostenko, 2022; Kurkov, 2020).

Fig. 1. Main approaches to AI development

Artificial intelligence, despite its potential, raises many pressing issues that need to be addressed. One of the main issues is the ethical aspects of using AI through privacy, security, discrimination, and liability in case of AI errors (Fig. 2).



Source: (Parubets, Suhoniako and Serediuk, 2019; Shatska and Olshanskyi and Irnazarov, 2023).

Fig. 2. Topical issues to be considered when using AI

Thus, AI is rapidly becoming one of the most influential technologies of the 21st century, which has a profound impact on all sectors of the economy and business, stimulating the transformation of organisations, rethinking management models, and introducing new strategic approaches to development (Kushnir and Tokarieva, 2020; Lohvinenko, 2022; Irnazarov and Puzyrova, 2024).

In today's globalised and digitalised world, businesses face challenges that require innovative approaches to management and development. AI is becoming the main tool for modernising business processes, optimising resources and strategic development of enterprises. AI opens up new horizons for business, allowing companies to optimise their business processes, minimise costs and increase efficiency. The use of AI in business processes goes beyond simple

automation of routine tasks. Today, AI is capable of generating new solutions that can fundamentally affect the strategic development of enterprises (Parubets, Suhoniako and Serediuk, 2019; Shatska, Olshanskyi and Irnazarov, 2023).

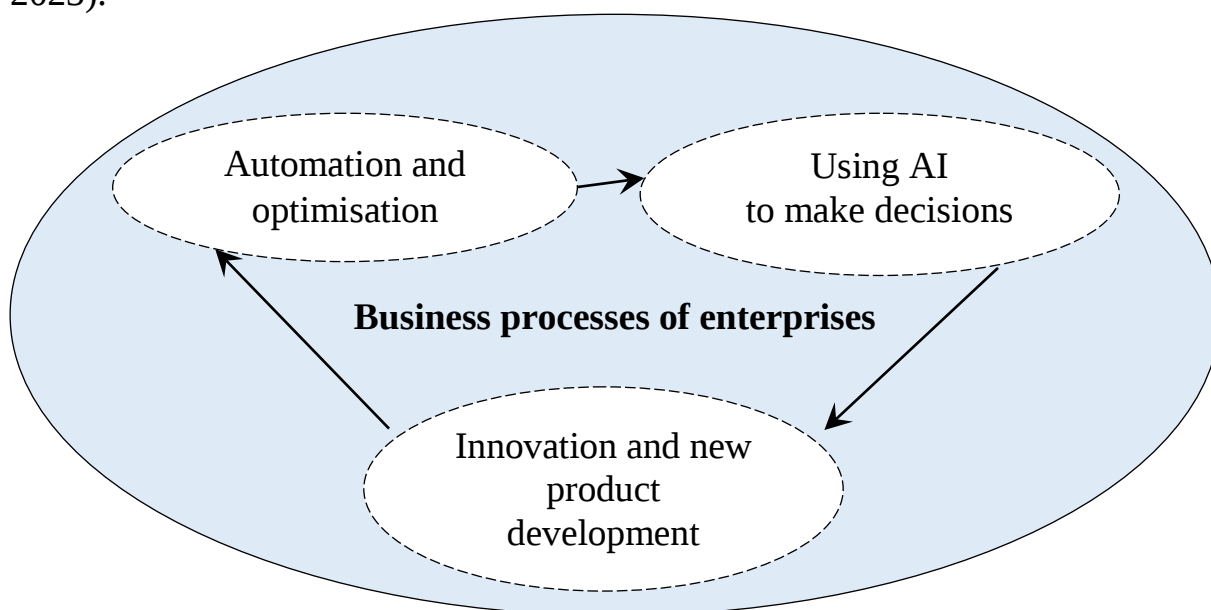
One of the key areas of AI implementation is the automation of routine and repetitive tasks, including the automation of document processing, inventory management, customer service via chatbots, and other similar processes. Such automation can optimise operational costs and free up human resources for more strategic tasks. AI also provides businesses with the ability to analyse large amounts of data in real time, which allows them to identify hidden trends, predict future customer needs, and make informed management decisions. Using machine learning methods, businesses can analyse consumer behaviour, optimise marketing campaigns, and develop personalised offers for customers (Pavlikha, 2023; Puzyrova, Irnazarov and Khaliliaeva, 2023; Kurkov, 2019).

The implementation of AI in businesses is enabling the creation of new business models that were previously impossible or uneconomic, including concepts such as smart products that can adapt to user needs or predictive services that offer products and services to consumers before there is demand for them. It is these kinds of innovations that allow businesses to create unique innovative competitive advantages and enter new markets.

One of the main advantages of using AI in business processes is the ability to automate them, which leads to lower operating costs, increased efficiency, and minimisation of the human factor. Process automation using AI can cover various business areas, from supply chain management to customer service and financial transactions. AI can automate routine tasks, freeing up human resources for more creative and strategic work. AI also has the potential to significantly impact the decision-making process in organisations by analysing large amounts of data in real time, identifying patterns and suggesting the best development strategies. AI-based systems are used to predict market trends, analyse the competitive environment, and assess risks. For many businesses, AI-based solutions provide a competitive advantage through deeper data analysis and more effective strategies. AI also opens up new opportunities for innovation, especially in research and development, where businesses can use AI to accelerate business processes to create new products and services, reduce R&D time, and minimise testing and optimisation costs (Fig. 3).

Integration of AI into the enterprise development strategy requires a deep understanding of its potential and limitations, where the introduction of AI changes not only individual business processes but also affects the overall approach to enterprise management and development. One of the key areas of AI application in the strategic development of enterprises is forecasting and strategic planning. AI can help forecast market trends, product demand, assess the competitive environment, and manage risks. Using machine learning,

businesses can model different scenarios of business processes and choose the best strategies based on complex analytical models. AI also helps businesses identify priority areas of development, identify new market opportunities, and adapt to changes in the external environment. Thanks to AI, businesses can predict economic trends, analyse the competitive environment, and develop strategies that meet future consumer demands (Irnazarov, Kyrychenko and Andriievskiy, 2024; Ramazanov, Shevchenko and Kuptsova, 2020; Shevchenko, 2023).



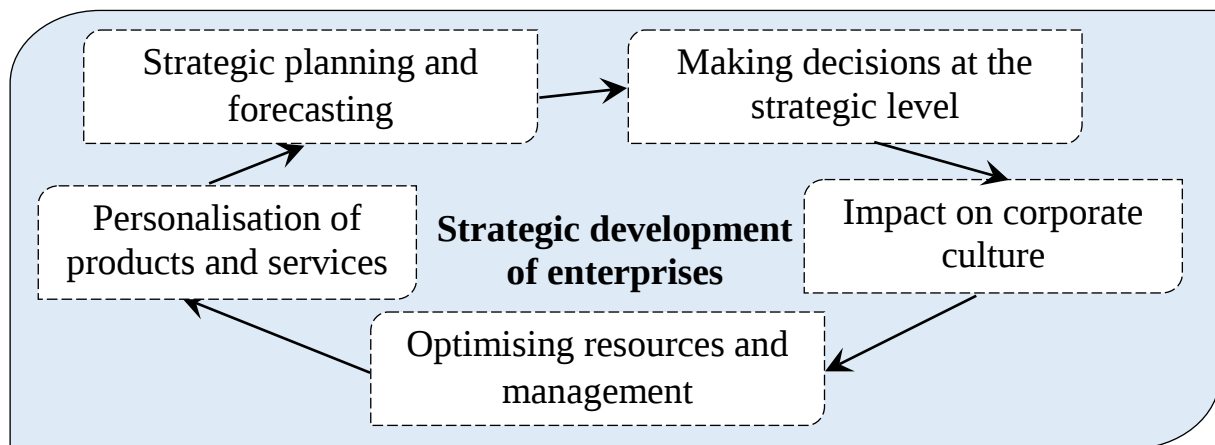
Source: (Irnazarov, Kyrychenko and Andriievskiy, 2024; Ramazanov, Shevchenko and Kuptsova, 2020; Shevchenko, 2023).

Fig. 3. Artificial intelligence in the modernisation of business processes

Another important role of AI in strategic management is the analysis and optimisation of supply chains, which allows businesses to reduce costs, optimise logistics processes, and improve customer service.

Integration of AI into strategic management affects the corporate culture of the enterprise, requiring employees to adapt to changes, openness to new technologies and continuous learning, where competitive enterprises stimulate the development of digital literacy among employees and encourage innovation in business processes. Intelligent management systems allow optimising the use of resources, reducing costs and increasing efficiency, which is especially important in a global competitive environment where the ability to respond quickly to changes in demand and ensure continuity of supply is a key competitive advantage. That's why AI allows automating inventory management, production planning, and logistics processes, which ensures more efficient use of resources. AI also allows businesses to offer consumers more personalised products and services tailored to their individual needs and

preferences, which not only increases customer satisfaction but also fosters loyalty, which in the long run has a positive impact on business profitability (Fig. 4).



Source: (Pavlikha, 2023; Puzyrova, Irnazarov and Khaliliaieva, 2023; Kurkov, 2019).

Fig. 4. The impact of artificial intelligence on the strategic development of enterprises

Thus, despite its many advantages, the integration of AI into business processes is not without its drawbacks:

- ethical and legal aspects – aspects related to the use of data privacy, the possibility of discrimination, and responsibility for decisions that require careful regulation and control;
- risks of job losses – automation of many processes with the help of AI can become a serious social problem if companies do not invest in retraining their employees and creating new jobs in developing areas;
- direct dependence on technology – increased dependence on AI can be a risk for businesses in the event of technical failures or cyberattacks, which prompts them to ensure the reliability and security of AI systems, as well as to develop a contingency plan in case of unforeseen situations.

Conclusions. Artificial intelligence has a mega-potential for business transformation, contributing to the modernisation of business processes and the strategic development of enterprises. However, to achieve effective results, it is important to understand both the advantages and disadvantages associated with its integration. Successful AI integration requires not only technical training, but also the adaptation of business models, a strategic approach, attention to all ethical aspects, investment in innovation, and continuous training of employees. The introduction of AI allows businesses to optimise operations, make more informed decisions, and adapt to the changing environment. AI is already transforming traditional business models by increasing process efficiency, reducing costs, and opening up new opportunities for innovation. Understanding the importance of AI

for businesses allows them not only to adapt to new conditions but also to gain a competitive advantage, as AI is becoming one of the key factors in business development, and its role will only grow in the future.

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HOW TO CITE THIS ARTICLE

Irnazarov, D., Puzyrova, P. (2024). Theoretical concept of artificial intelligence, its impact on the modernisation of business processes and strategic development of enterprises. *Management*, 1(39): 78–89. <https://doi.org/10.30857/2415-3206.2024.1.7>.

JEL Classification:
O32, M21

UDC 65.012.4:
004.9

DOI: 10.30857/
2415-3206.
2024.1.8

**THEORETICAL APPROACHES TO THE
FORMATION OF BUSINESS PROCESSES IN THE
SPHERE OF INFORMATION TECHNOLOGY IN
THE CONTEXT OF DIGITALISATION**

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THE PURPOSE OF THE ARTICLE is to study theoretical approaches to the formation of business processes in the field of information technology in the context of digitalization.

RESEARCH METHODS. The following methods were used in the article: SWOT-analysis; PESTLE-analysis; benchmarking; market and competitor research; data analysis and BI (Business Intelligence); project management; analysis and synthesis, graphical and tabular methods.

PRESENTING MAIN MATERIAL. Modern development of society, digitalization of the economy, globalization and digitalization of economic processes determine fundamentally new approaches to the formation of business processes in the field of information technology in the context of digitalization. The formation of business processes in the IT sector is determined by the rapid pace of digitalization and its impact on all aspects of modern enterprises. Digitalization is a key factor in achieving competitive advantages in the global market, as it allows optimizing business processes, automating business operations, improving communication and data-driven decision-making. The role of business processes in the context of digitalization is to increase the efficiency and speed of enterprises, which allows them to respond quickly to new challenges, minimize costs and improve the quality of products and services. In the context of IT enterprises, digitalization not only accelerates processes but also radically changes the very nature of business, forcing enterprises to adapt their models, strategies, and business processes. The study of theoretical approaches to the formation of business processes in the context of digital transformation has shown that the main approaches are: classical approaches (process-oriented, Input-Output model, Project-Based Approach); modern approaches (Agile methodologies, Lean Management, DevOps). The following features of IT business

processes were identified: dynamism and flexibility; innovation; project-oriented structure. The following tools are used to model and optimize business processes in the IT sector in the context of digitalization: BPMN; ERP systems; project management tools. It is proved that business processes in the IT sector cannot function without a synergistic combination of the main components of digitalization: automation, integration, analytics, flexibility and adaptability, artificial intelligence, cloud technologies.

CONCLUSIONS. It is established that the digitalization of IT enterprises provides new opportunities for optimizing business processes and achieving competitive advantages. It is proved that the introduction of digital technologies contributes to the automation, integration, efficiency and flexibility of business processes. It is determined that IT enterprises should actively use innovative approaches to adapt to the latest market conditions, taking into account theoretical variations and functional aspects of digitalization. It is proved that the formation of business processes in the IT sector requires taking into account theoretical and practical aspects, where classical approaches (process-oriented, project approach) remain basic, and modern approaches (Agile, Lean and DevOps) open up new opportunities for optimizing processes and increasing their efficiency. It has been established that technological innovations, in particular artificial intelligence and cloud solutions, play a synergistic role in transforming business processes in the IT sector, helping enterprises to remain competitive in the face of rapid change and globalization.

KEYWORDS: business processes; information technologies; digitalization; theoretical approaches; IT enterprises; competitive advantages; digital technologies; automation; integration; adaptation; classical approaches; modern approaches; artificial intelligence; transformation.

NUMBER OF REFERENCES	NUMBER OF FIGURES	NUMBER OF TABLES
22	1	1

JEL Classification:
O32, M21

УДК 65.012.4:
004.9

DOI: 10.30857/
2415-3206.
2024.1.8

ТЕОРЕТИЧНІ ПІДХОДИ ДО ФОРМУВАННЯ БІЗНЕС-ПРОЦЕСІВ В СФЕРІ ІНФОРМАЦІЙНИХ ТЕХНОЛОГІЙ В КОНТЕКСТІ ДІДЖИТАЛІЗАЦІЇ

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МЕТОЮ СТАТТІ є дослідження теоретичних підходів до формування бізнес-процесів в сфері інформаційних технологій в контексті діджиталізації.

МЕТОДИ ДОСЛІДЖЕННЯ. В статті було використано такі методи: SWOT-аналіз; PESTLE-аналіз; benchmarking; дослідження ринку і конкурентів; аналіз даних і BI (Business Intelligence); проектний менеджмент; аналізу та синтезу, графічно-табличний методи.

ВИКЛАД ОСНОВНОГО МАТЕРІАЛУ. Сучасний розвиток суспільства, цифровізація економіки, глобалізація і діджиталізація економічних процесів визначають принципово новітні підходи до формування бізнес-процесів у сфері інформаційних технологій в контексті діджиталізації. Формування бізнес-процесів в ІТ-сфері визначається швидким темпом розвитку діджиталізації та її впливом на всі аспекти діяльності сучасних підприємств. Діджиталізація є ключовим чинником досягнення конкурентних переваг на глобальному ринку, оскільки дозволяє оптимізувати бізнес-процеси, автоматизувати бізнес-операції, покращити комунікацію та прийняття рішень на основі даних. Роль бізнес-процесів у контексті діджиталізації полягає в підвищенні ефективності та швидкості роботи підприємств, що дозволяє оперативно реагувати на нові виклики сьогодення, мінімізувати витрати та нарощувати якість продукції та послуг. В контексті ІТ-підприємств діджиталізація не лише прискорює процеси, але й докорінно змінює саму природу бізнесу, змушуючи підприємства адаптувати свої моделі, стратегії та бізнес-процеси. Дослідження теоретичних підходів до формування бізнес-процесів в умовах цифрової трансформації показало, що основними підходами є: класичні підходи (процесно-орієнтований, модель Input-Output, проектний (Project-Based Approach); сучасні підходи (гнучкі методології (Agile), Lean Management, DevOps). Серед особливостей бізнес-процесів ІТ-сфери було визначено такі:

динамічність і гнучкість; інноваційність; проектно-орієнтована структура. Для моделювання та оптимізації бізнес-процесів в ІТ сфері в контексті діджиталізації використовують наступні інструменти: BPMN; ERP-системи; інструменти для управління проектами. Доведено, що бізнес-процеси в сфері ІТ не можуть функціонувати без синергійного поєднання основних компонентів діджиталізації: автоматизація, інтеграція, аналітика, гнучкість та адаптивність, штучний інтелект, хмарні технології.

ВИСНОВКИ. Встановлено, що діджиталізація бізнесу ІТ-підприємств надає нові можливості для оптимізації бізнес-процесів та досягнення конкурентних переваг. Доведено, що впровадження цифрових технологій сприяє автоматизації, інтеграції, підвищенню ефективності та гнучкості бізнес-процесів. Визначено, що ІТ-підприємства повинні активно використовувати інноваційні підходи для адаптації до новітніх умов ринку, враховуючи теоретичні варіації та функціональні аспекти діджиталізації. Доведено, що формування бізнес-процесів у сфері ІТ вимагає врахування теоретичних і практичних аспектів, де класичні підходи (процесно-орієнтований, проектний підхід) залишаються базовими, а сучасні підходи (Agile, Lean та DevOps) відкривають нові можливості для оптимізації процесів та підвищення їх ефективності. Встановлено, що технологічні інновації, зокрема штучний інтелект та хмарні рішення, відіграють синергійну роль для трансформації бізнес-процесів в ІТ-секторі, допомагаючи підприємствам залишатися конкурентоспроможними в умовах швидких змін та глобалізаційних перетворень.

КЛЮЧОВІ СЛОВА: бізнес-процеси; інформаційні технології; діджиталізація; теоретичні підходи; ІТ-підприємства; конкурентні переваги; цифрові технології; автоматизація; інтеграція; адаптація; класичні підходи; сучасні підходи; штучний інтелект; трансформація.

Statement of the problem. The modern development of society, digitalization of the economy, globalization and digitalization of economic processes determine fundamentally new approaches to the formation of business processes in the field of information technology in the context of digitalization. Information technologies are changing business models, facilitating adaptation to new conditions and transition to the Fourth Industrial Revolution, which involves full automation and digitalization of production processes. As part of digital transformation, digitalization is becoming a key tool for commercializing business processes. Accordingly, the question arises of the formation of optimization mechanisms for business processes of IT enterprises through their improvement and digitalization.

The formation of business processes in the field of information technology in the context of digitalization is determined by the rapid pace of development of information technology and its impact on all aspects of modern enterprises. Digitalization is becoming a key factor for achieving competitive advantages in the global market, as it allows optimizing business processes, automating operations, improving communication and data-driven decision-making. In the IT sector, this trend is particularly important due to the need for flexible adaptation to the ever-changing technological environment. The role of business processes in the context of digitalization is to increase the efficiency and speed of enterprises, which allows them to respond more quickly to new challenges, reduce costs and improve the quality of products and services. For the successful development of companies, it is important to adapt to modern business trends in a timely manner and move to a digital environment that ensures competitiveness.

Analysis of publications on the problem. The analysis of previous studies is based on scientific works: M. Hammer and J. Ciampi, who conducted a study on business process reengineering and investigated the issue of radical changes in business processes due to the introduction of new technologies; T. Davenport studied information technology as the main tool for business transformation and process optimization; Johannes Willy and Thomas Mayer studied the modeling and automation of business processes using IT solutions; F. Dean and L. Grow considered the integration of information technology into business processes and enterprise management in the era of digitalization; P. Vale and J. Ross dealt with issues of corporate architecture and strategies for digital business transformation, explored how information technology can change the structure and functions of companies; A. Hartung and D. Hargreaves studied digital innovations and their impact on business management and company models; G. Kaplan and D. Norton considered strategic management of companies. Norton considered the issues of strategic business management in the context of digitalization; I. Mazor paid attention to organizational aspects and management of IT-based business processes in the digital economy; S. Popov and

A. Chumakova studied issues related to the digitalization of business processes at enterprises and management of innovation processes in the era of digital transformations. Among modern scholars, the following researchers have dealt with the issues of business processes and digitalization: O. Arefieva, T. Lutska, A. Chkan, N. Kyrychenko, P. Kasai, M. Chuprina, I. Shekhovtsova, O. Harafonova, H. Zhosan, O. Husieva, S. Lehominova, T. Kuchmiiova, L. Lazebnyk, T. Lazorenko, I. Sholom, K. Mikhieienko, O. Olshanska, O. Sharipova, M. Tepliuk, O. Timinskyi, O. Voitenko, I. Raichuk, V. Tkachuk, S. Obikhod, N. Zimina and others.

Statement of the main results. In today's global and competitive environment, information technology (IT) is one of the most dynamic and important sectors of the economy. Information technology not only drives technological innovation, but also affects all other areas of business. Managing business processes in the IT sector is critical, as their proper formation can lead to increased company efficiency, resource optimization, and improved service quality. Accordingly, digitalization is becoming the foundation of business development, especially in the IT sector, due to the introduction of digital technologies in all aspects of the enterprise, from internal operations to external interactions with customers and partners. In the context of IT enterprises, digitalization not only accelerates processes but also fundamentally changes the very nature of business, forcing enterprises to adapt their models, strategies, and business processes. Accordingly, the importance of researching theoretical approaches to the formation of business processes in the context of digital transformation is growing (Table 1) (Husieva and Lehominova, 2018; Lazebnyk, 2018; Arefieva and Lutska, 2009).

Table 1

Main approaches to the formation of IT business processes

CLASSIC		MODERN	
Process-oriented approach	This approach is based on the principle of organizing the company's activities in the form of continuous business processes, each of which has a clearly defined beginning and end, as well as intermediate stages. An important aspect is the presence of clear roles and responsibilities for each stage of the process. The process-oriented approach allows for more efficient resource planning, optimized time expenditures, and a higher level of quality control.	Flexible methodologies (Agile)	Agile methodologies have become popular in the IT sector because of their ability to respond quickly to changing requirements and provide a more interactive approach to product development. The main goal of Agile is to continuously adapt to the needs of the customer and create additional value at every stage of development. This approach is effective for organizations that operate in an environment of instability and constant change of requirements.

End Table 1

CLASSIC		MODERN	
Input-Output model	This model emphasizes the interaction between different business processes based on the flow of resources and information. According to this concept, each business process includes "inputs" (resources, data, tools) that are transformed into "outputs" (finished products, services). The model helps to identify weaknesses in the organization and helps to optimize the use of resources.	Lean Management	Lean Management is aimed at eliminating losses in business processes and increasing efficiency by optimizing resources and time. In the IT sector, this approach allows you to minimize unnecessary operations, focus on creating a product that meets the real needs of the client, and reduce time to market.
Project-Based Approach	Within this approach, business processes are viewed through the prism of individual projects with defined time frames and goals. This approach is especially relevant in the IT industry, where software development or the implementation of new systems usually have the character of projects. The project approach helps to plan resources more accurately, clearly define milestones and tasks, and control the quality of work.	DevOps	DevOps is a modern approach to organizing business processes in IT that combines development and operational support. The main idea of DevOps is to automate processes and integrate teams to ensure continuous implementation of changes, rapid release of new product versions, and improve overall quality. DevOps allows you to shorten the development cycle, respond to errors faster, and improve team productivity.

Source: (Husieva and Lehominova, 2018; Lazebnyk, 2018; Arefieva and Lutska, 2009).

In the context of digitalization, business processes can take different theoretical forms. The most important variations include the following:

- agent-based models (business processes are viewed as the interaction of agents who make decisions based on available information and algorithms);
- models based on artificial intelligence (business processes include elements of self-organization and self-learning, where artificial intelligence systems optimize processes based on real-time data);
- hybrid models (a combination of classical approaches to business process management with innovative digital technologies that increase efficiency and flexibility).

From a more classical point of view, business processes cover various aspects of enterprise operations, including project management, software development, IT infrastructure support, information security, data processing, and other important functions. Business processes in IT are a sequence of interrelated actions or operations aimed at creating a product or providing services within IT

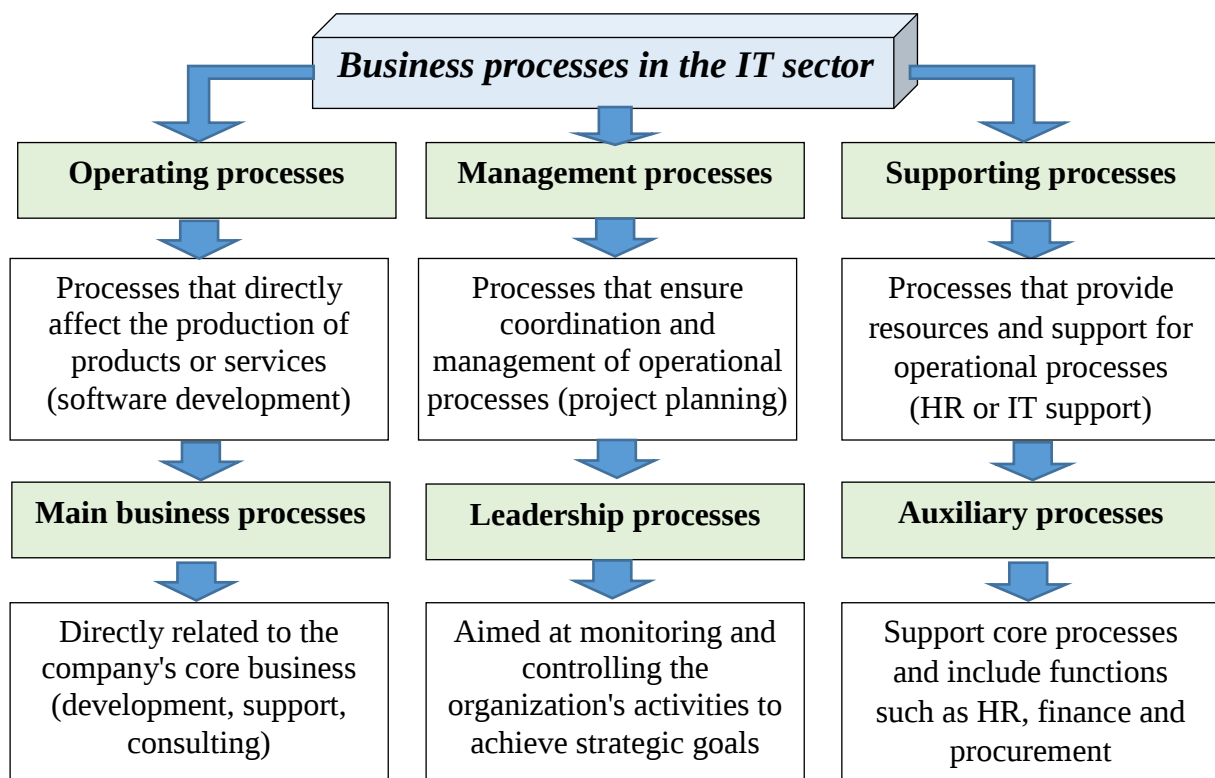
systems. Business processes in the IT sector are classified into three categories (Fig. 1) (Puzyrova and Synytsia, 2023a; Timinskyi, Voitenko and Raichuk, 2021; Chuprina and Shekhovtsova, 2016; Harafonova and Zhosan, 2023).

When studying business processes in the IT sector, it is necessary to pay attention to certain specific features:

- dynamism and flexibility – IT projects often have a high degree of variability due to the rapid evolution of technologies and market requirements. Business processes in IT enterprises must be adaptive and able to respond quickly to new environmental challenges;

- innovativeness – IT companies are focused on introducing new technologies and approaches, which requires constant modernization and optimization of business processes;

- project-oriented structure – IT companies operate on the basis of a project approach, where each project is a separate business process with clearly defined goals, resources, and time lag.



Source: (Synytsia and Puzyrova, 2024; Kuchmiiova, 2023; Puzyrova and Synytsia, 2024; Mikhieienko, 2013).

Fig. 1. The structure of IT business processes

Regarding the impact of digitalization on business processes of IT enterprises, it should be emphasized that digitalization encompasses the use of digital technologies to optimize and transform business processes. Digitalization

includes the automation of routine operations, the introduction of digital project management platforms, the use of artificial intelligence for decision-making and data analysis, the integration of cloud solutions for data storage and processing (Synytsia and Puzyrova, 2024; Kuchmiiova, 2023; Puzyrova and Synytsia, 2024; Mikhieienko, 2013).

Digitalization leads to a significant change in the organization of business processes through the automation of operational processes, which reduces the number of routine tasks and increases labor efficiency. Digitalization is transforming processes that previously required a significant amount of manual work, and now they can be performed by automated systems based on artificial intelligence algorithms (Chkan, Kyrychenko and Kasai, 2021; Lazorenko and Sholom, 2020). Digital platforms for business management enable comprehensive tracking and analysis of all stages of the process in real time, which greatly facilitates project, resource and risk management. The use of digital platforms contributes to the creation of a transparent and integrated business structure, which reduces the impact of the human factor on business processes (Synytsia and Svyrydov, 2024; Olshanska and Puzyrova, 2022; Puzyrova, 2022).

The following tools are used to model and optimize business processes in the IT sector in the context of digitalization:

1. BPMN (Business Process Model and Notation) – BPMN is a standardized language for modeling business processes that allows you to visualize and document business processes in the form of diagrams, which simplifies communication between different departments and helps to identify possible problems at the planning stage.

2. ERP-systems (Enterprise Resource Planning) – ERP-systems integrate various business processes within a single platform, which allows you to effectively manage the resources of the enterprise, which provide the ability to automate routine processes, manage financial flows, human resources and other key aspects of the company.

3. Project management tools are Jira, Trello, Asana, which are the most popular project management tools among IT companies, and which allow optimizing teamwork, coordinating tasks, tracking progress and increasing the productivity of the enterprise.

To summarize, it can be argued that theoretical approaches to the formation of business processes in the field of information technology in the context of digitalization cannot function without a synergistic combination of the main components of digitalization (Sharipova, 2009; Tepliuk, 2021; Puzyrova and Synytsia, 2023b; Synytsia and Puzyrova, 2023; Tkachuk, Obikhod and Zimina, 2020):

1. Automation. Process automation allows you to increase the speed and accuracy of operations with the help of specialized software products.

2. Integration. Digital platforms combine all key business processes into a single system that provides real-time integration of data and processes, which contributes to more effective coordination between different structural units of the enterprise.

3. Analytics. The use of business intelligence tools allows you to collect and analyze large amounts of data to predict market trends, manage risks, and optimize processes.

4. Flexibility and adaptability. Digital tools make it easy to change the structure and functionality of processes in response to changes in the internal or external environment.

5. Artificial intelligence. Artificial intelligence is one of the most important factors affecting business processes in the IT sector, allowing you to automate routine tasks, improve data analytics and increase overall process efficiency.

6. Cloud technologies. Cloud technologies allow companies to reduce infrastructure costs and provide flexibility in managing business processes, which ensures uninterrupted access to data and software, regardless of the location of users.

Conclusions. Digitalization of IT companies' business provides new opportunities to optimize business processes and achieve competitive advantages. The introduction of digital technologies contributes to the automation, integration, efficiency, and flexibility of business processes. IT companies should actively use innovative approaches to adapt to new market conditions, taking into account theoretical variations and functional aspects of digitalization. The formation of business processes in the IT sector requires taking into account various theoretical and practical aspects. Classical approaches, such as process-oriented or project-based approaches, remain important, but modern methodologies such as Agile, Lean, and DevOps open up new opportunities for optimizing processes and increasing their efficiency. Technological innovations, such as artificial intelligence and cloud solutions, are adding new tools to transform business processes in the IT sector, allowing enterprises to remain competitive in a rapidly changing market.

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HOW TO CITE THIS ARTICLE

Synytsia, S., Puzyrova, P. (2024). Theoretical approaches to the formation of business processes in the sphere of information technology in the context of digitalisation. *Management*, 1(39): 90–100. <https://doi.org/10.30857/2415-3206.2024.1.8>.

JEL Classification:
O15

УДК 658.512

DOI: 10.30857/2415-
3206.2024.1.9

THE ROLE OF IMPROVING THE QUALITY OF BUSINESS PROCESSES AND PRODUCTS IN THE POST-WAR RECONSTRUCTION OF UKRAINE

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Introduction. After Ukraine's victory in the war, it will be necessary to build a new economy of the country, which will be stronger and more stable than before the war. For this, the quality of business processes and products must be high. The modern trend of the market economy: the product must be made in such a way, which is justified economically, ecologically and socially. In the conditions of the war and post-war reconstruction, ensuring high quality should become a national idea, which will allow the rapid recovery of Ukraine's economy.

The purpose of the study is to justify the important role of improving the quality of business processes and products in the conditions of Industry 5.0 and the post-war reconstruction of Ukraine.

Research methods. To obtain scientific results, the historical method, theoretical generalization, induction, deduction, analysis and synthesis were used in the research.

Result. In the process of research, the development of approaches to quality management was considered in the historical aspect in the context of industrial revolutions. Industry 5.0 is a concept that seeks to combine human abilities, advanced technologies and care for the environment and bring them back into production. The processes of ensuring the high quality of the company's products, environmentalization of production, and digitization of activities play a decisive role in the transition of enterprises to the principles of

Industry 5.0. The primary role is assigned to human resources. Success on the market, victory over competition and sustainable development can be achieved by enterprises that have ensured systematic quality management, which enables the production of high-quality, environmentally safe products in an ethical manner, and have also been able to green, digitize and humanize the process of designing, manufacturing and selling products that issued, or services provided. Quality 5.0 is a combination of comprehensive quality management with the concept of sustainable development, which is based on the trinity of economic, environmental and social spheres.

Conclusions. For the post-war recovery of Ukraine's economy, the high quality of business processes and products should become a national idea. This will allow enterprises to switch to the principles of Industry 5.0. Quality management in the conditions of Industry 5.0 should be human-centered and eco-economic. Comprehensive quality management is being merged with methods of greening production and digitalization of activities, which makes it possible to produce high-quality products in a transparent and ethical way and meet the requirements of all stakeholders – consumers, shareholders and the company's own staff, state bodies and local communities.

Keywords: Industry 5.0; quality; environmentalization; digitalization; human resources.

NUMBER OF REFERENCES	NUMBER OF FIGURES	NUMBER OF TABLES
16	0	2

JEL Classification:
O15

УДК 658.512

DOI: 10.30857/2415-
3206.2024.1.9

РОЛЬ ПІДВИЩЕННЯ ЯКОСТІ БІЗНЕС-ПРОЦЕСІВ ТА ПРОДУКЦІЇ У ПОВОЄННОМУ ВІДНОВЛЕННІ УКРАЇНИ

Світлана БОНДАРЕНКО

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Вступ. Після перемоги України у війні потрібно буде будувати нову економіку країни, яка буде сильнішою і стабільнішою довоєнної. Для цього якість бізнес-процесів та продукції повинна бути високою. Сучасна тенденція ринкової економіки: товар повинен бути зроблений таким і тільки таким способом, який виправданий економічно, екологічно і соціально. В умовах війни та післявоєнної розбудови забезпечення високої якості повинно стати національною ідеєю, що дозволить швидко відновити економіку України.

Метою дослідження є обґрунтування важливої ролі підвищення якості бізнес-процесів та продукції в умовах Індустрії 5.0 та повоєнному відновленні України.

Методи дослідження. Для одержання наукових результатів у дослідженні використано історичний метод, теоретичне узагальнення, індукцію, дедукцію, аналіз та синтез.

Результат. У процесі дослідження розглянуто розвиток підходів до управління якістю в історичному аспекті в контексті промислових революцій. Індустрія 5.0 – це концепція, яка прагне поєднати людські здібності, передові технології та турботу про екологію і повернути їх у виробництво. Вирішальну роль для переходу підприємств на принципи Індустрії 5.0 відіграють процеси забезпечення високої якості продукції підприємства, екологізація виробництва, цифровізація діяльності. Першорядна роль

відводиться людським ресурсам. Успіх на ринку, перемогу конкурентній боротьбі та сталий розвиток можуть мати підприємства, які забезпечили системне управління якістю, що дає змогу випускати якісні, екологічно безпечні вироби в етичний спосіб, а також змогли екологізувати, цифровізувати та гуманізувати процес проєктування, виробництва та реалізації продукції, що випускається, або послуг, що надаються. Якість 5.0 є поєднанням всеосяжного управління якістю з концепцією сталого розвитку, в основі якого знаходиться триєдинство економічної, екологічної та соціальної сфер.

Висновки. Для післявоєнного відновлення економіки України висока якість бізнес-процесів та продукції повинна стати національною ідеєю. Це дозволить підприємствам перейти на принципи Індустрії 5.0. Управління якістю в умовах Індустрії 5.0 має бути людиноцентричним та еколого-економічним. Проходить зрощування всеосяжного управління якістю з методами екологізації виробництва та цифровізації діяльності, що дає змогу виробити якісну продукцію в прозорий і етичний спосіб та задовольнити вимоги всіх стейкхолдерів – споживачів, акціонерів та власний персонал підприємства, державні органи та місцеві громади.

Ключові слова: Індустрія 5.0; якість; екологізація; цифровізація; людські ресурси.

Introduction. Victory in the war with the Russian Federation will not return Ukraine to pre-war times. After the victory, it will be necessary to build a new economy of the country, which will be stronger and more stable than the pre-war one. For this, the quality of business processes and products must be high. The modern trend of the market economy: the product must be made in such and only such a way, which is justified economically, ecologically and socially. In the conditions of war and post-war development, ensuring high quality should become a national idea, which will allow to quickly restore the economy of Ukraine and move to the principles of Industry 5.0.

Resources and methods. The works of such domestic and foreign scientists as A. Weimerskirch, A.V. Vakulenko, L.M. Witkin, E. Daming, J. Juran, S. George, M.L. George, J.M. Jobe, J.R. Evans, K. Ishikawa, W.B. Zahochai, Yu.B. Kabakov, P.Ya. Kalita, T.P. Kalita, O.M. Kryvoruchko, E. Laptsyski, O.M. Livinsky, W.M. Lindsay, D.P. Loiko, T. Luyster, O.I. Momot, Neumann Earl, K. Rampersad, H. Taguchi, L.A. Trachenko, A.Yu. Chornyi, M.I. Shapoval, Sh. Shingo, R.V. Shulyar, O.M. Yazvinska et al.

However, the question of the importance and role of the quality of business processes and products in the post-war reconstruction of Ukraine has not been fully studied and requires further research and development.

The purpose of the study is to identify the peculiarities of quality management of business processes and products in the conditions of Industry 5.0 and to determine the role of quality in the post-war reconstruction of Ukraine. Based on the goal, the following tasks were set and solved: the study of the historical approach to quality management in the context of industrial revolutions, the characteristics of Industry 5.0 and the analysis of the features of quality management of business processes and products in the conditions of Industry 5.0.

Results and discussion. Information about the transition to the principles of Industry 5.0 began to spread in 2017. The European Commission started work on relevant documents in 2021. Industry 5.0 is a concept that seeks to combine human abilities, advanced technologies and care for the environment. Industry 5.0 seeks to bring human, social and environmental aspects back into production. Industry 5.0 does not replace Industry 4.0, but improves and complements it, adding the goals of sustainable development, sustainability and "green transition" (gre4ka.info, 2023).

Industry 5.0 enables businesses to become more resilient, flexible and adaptable by improving supply chains and increasing corporate social responsibility. Goals of Industry 5.0:

- Rapid response to social and economic challenges, such as pandemics or wars.
- "Green production", circular economy.

- Expansion of corporate social responsibility of enterprises and organizations.
- Increasing scientific and technical innovations.
- Improvement of the education system.
- Introduction of new economic thinking.

Humans are expected to perform intellectual work that requires critical thinking and non-standard approaches, while machines are expected to safely assist humans in performing precise, complex and dangerous tasks. Obviously, this requires qualified personnel and appropriate training (gre4ka.info, 2023).

The principles of Industry 5.0 are relevant for Ukraine, which is in a state of war. These principles need to be quickly and widely implemented, since it will not work to bring the economy to the level of developed countries based on the principles of Industry 3.0 or even Industry 4.0, because in Ukraine there is a lot of destruction, loss of human and other resources as a result of the war. For a quick transition to the conditions of Industry 5.0, it is important to ensure high quality of business processes and products and services.

In the international standards ISO 9000: 2015, quality is considered as the degree to which the totality of the object's own characteristics satisfies the requirements (Table 1) (UkrNDNTs, 2016). International and domestic scientists and practitioners (Bondarenko and Svyryniuk, 2014; Zabotin, Hrosytska, Trushliakova and Sypko, 2008; Laptsyski, 2006; Livinskyi, Savenkov, Palchyk and Chertkov, 2018; Momot, 2007; Panchenko, 2018; Sarancha, 2006; Sychenko and Tkachenko, 2006; Topolnyk, 2012) in the field of quality proceed from the position that the quality of an object, in particular products and services, is determined by its consumer properties. This statement is correct, since from the point of view of the consumer, the fact that the object satisfies their needs, which can be established or predictable, is important. The concept of "quality" has many aspects (Table 1), so in each definition one of the aspects is highlighted and none of the definitions has the necessary completeness and accuracy. This is explained by the following arguments: the extreme importance of the category itself; a large variety of objects that have inherent quality; subjective perception of properties of objects by each individual; the degree of development of society, etc.

In modern conditions of scientific and technological progress, the role of the technical and technological aspects of quality is gradually decreasing, while the economic, social, ecological, and moral aspects are increasing. The transition of enterprises and organizations to sustainable development is the need of the hour.

To ensure the high quality of business processes and products, it must be managed. In the process of research, the development of approaches to quality

management was considered in the historical aspect in the context of industrial revolutions and summarized in a Table 2.

Table 1

Characteristics of quality aspects

Aspect	Explanation
Technical	Improvement of technique leads to improvement of quality
Technological	A high level of technology leads to an increase in quality
Economic	Quality is an economic category, all measures to ensure and improve quality are associated with costs, so they must be effective and cost-effective
Ecological	Society has a stable need for environmentally friendly, safe products. Consumers also demand that the production process of products be transparent, ethical and environmentally friendly
Social	The result of quality management at the enterprise is the satisfaction of consumer needs for high-quality products, which, in turn, leads to an increase in the quality of life. Achieving loyalty of consumers and company personnel
Moral	Low-quality products are immoral because the material, financial, labor, and human resources invested in them were used inefficiently. Observance of ethical and moral norms at the stages of the life cycle of goods
Political	Quality has a decisive influence on the competitiveness of enterprises and organizations, the sum of which competitiveness forms the competitiveness of the country and, accordingly, affects the political situation in the country and its international position
Scientific and technical	Scientific and technical progress is a source of quality improvement. The increase in the level of quality ensures the acceleration of scientific and technical progress
Legal	The protection of consumer rights in the world and in Ukraine has a normative and legal basis
National	The peculiarities of the thinking of each nation and nationality affect the setting of goals in the field of quality and the methods of their achievement

Source: developed by the author based on (Zabotin, Hrosytska, Trushliakova and Sypko, 2008; Livinskyi, Savenkov, Palchyk and Chertkov, 2018; Momot, 2007; Panchenko, 2018; Sarancha, 2006; Sychenko and Tkachenko, 2006; Topolnyk, 2012; <https://www.uaq.org.ua/index.php/uk/>; Deming, 1993).

Quality in the conditions of Industry 1.0 – Second half of the 18th century – during the XIX century – stage of rejecting products. The purpose of the stage is to prevent defective products from reaching the consumer. At the factories of Samuel Colt, the idea of assembling weapons from parts of standard sizes arose. Before assembly, the parts were checked by controllers using gauges. Later, this idea was put into production by Henry Ford and other entrepreneurs. A new profession is emerging – quality controllers, which have begun to merge into quality departments. The methods of control, the metrological base of measurements are being improved. The practice includes fines for defective products.

Quality in the conditions of Industry 2.0 – the end of the 19th – the beginning of the 20th century – quality control stage – there is still a need to

reject products that do not meet the requirements of regulatory documentation. The purpose of control is to prevent defective products from entering the market. The radical difference between this stage and the previous one is the approach in which product quality is ensured by the quality of its production processes. In 1924 Walter Shewhart proposed control charts as a process quality control tool.

Table 2

Quality management in the context of industrial revolutions

Industrial revolutions	Period	Features of the revolution	Quality	Quality management tools
Industry 1.0	The second half of the 18th century. – throughout the XIX century	Production based on mechanization and the use of steam and water energy	Quality 1.0	Product rejection. Use of passing and non-passing gauges, upper and lower limits of tolerances.
Industry 2.0	The end of the XIX – the beginning of the XX century	Use of electricity Flow production	Quality 2.0	Product quality control. Control charts of V. Shukhart, statistical methods of quality management.
Industry 3.0	From the 1980s – the first decades of the XXI century	Production based on IT technologies and automation	Quality 3.0	Quality management using international standards ISO 9000, comprehensive quality management, quality awards.
Industry 4.0	2010–2021	Production based on cyber-physical systems, robotics, sustainable development	Quality 4.0	Comprehensive quality management, sustainable development, quality management system of business processes based on the principles of sustainable development, environmentalization of quality.
Industry 5.0	2021 and up to now	Production that combines human abilities, advanced technologies and care for the environment	Quality 5.0	Comprehensive quality management in the context of sustainable development, environmentalization of quality, digitization of activities, human-centered approach.

Source: prepared by the author.

Quality in the conditions of Industry 3.0 – From the 1980s – the first decades of the XXI century – the stage of quality management – is characterized by an increase in the volume of production, therefore the goal of quality management at this stage is not just to prevent defective products from reaching consumers, but to not produce defective products. For this, quality must be managed at all stages of product creation and sale. In 1987, the international

organization for quality ISO developed and adopted international standards for quality management systems of the 9000 series, which determined where the world's only defined approach to the functioning of quality management systems at enterprises and organizations was reflected. Satisfying the demands of consumers is the main purpose of the functioning of quality management systems. Voluntary certification of quality management systems is spreading.

Quality in the conditions of the Industry 4.0 – 2010–2021 year – stage of comprehensive quality management, active development of quality management at the international level. In the conditions of Industry 4.0, which is characterized by the development of information and communication technologies, automation and robotization of production processes, satisfaction of consumer requirements is the main purpose of the functioning of quality management systems. Comprehensive quality management combined with sustainable development, greening of production. Comprehensive quality management TQM (Total Quality Management) is an approach to the management of the organization, aimed at quality, which is based on the participation of all its employees and is aimed at achieving long-term success by satisfying the requirements of consumers, benefiting the personnel of the enterprise, local communities, government bodies and society as a whole. This is an approach to the management of the organization, which is based on building a corporate culture of the enterprise aimed at quality. Training of personnel throughout their career becomes a determining factor in improving the quality of products and business processes. An important strategy of TQM is to ensure corporate social responsibility and sustainable development of the enterprise. The prize for high quality has become widespread based on the results of a competition among enterprises at the national or international level, which evaluates the efforts and achievements of enterprises in the field of quality assurance and improvement. Quality awards are established to stimulate the development of quality, the introduction of progressive methods of production management, which reflect the ideology of quality. This is the Japanese Edwards Deming Quality Award, Malcolm Baldrige American Quality Award, European Quality Award of the European Foundation for Quality Management EFQM.

Quality in the conditions of Industry 5.0 – 2021 – to date – In quality management at the stage of Industry 5.0, the stage of greening and digitalization of comprehensive quality management continues. Success on the market, victory over competition and sustainable development can be achieved by enterprises that have ensured systematic quality management, which enables the production of high-quality, ecologically safe products in an ethical manner, and have also been able to green, digitize and humanize the process of designing, manufacturing and selling products that issued, or services provided. The role of

human resources in Quality 5.0 management is paramount. Works [1, 5] are devoted to issues of social policy and environmentalization of production. Quality 5.0 does not cancel but complements Quality 4.0 and is a combination of comprehensive quality management with the concept of sustainable development, which is based on the trinity of economic, environmental and social spheres. Digitization of activities is important, as it is a defining trend in the development of human civilization. Today, digital technologies are a mandatory component of business processes and form modern models and mechanisms of enterprise management.

Conclusions. For the post-war recovery of Ukraine's economy, ensuring the high quality of business processes and products is the basis for the sustainable development of enterprises and ensuring the transition of the economy to the principles of Industry 5.0. – a concept that combines human abilities, advanced technologies and care for the environment. Industry 5.0 brings human, social and environmental aspects back into production. Industry 5.0 does not replace Industry 4.0, but improves and complements it. In the conditions of war and post-war development, ensuring high quality should become a national idea, which will allow to quickly restore the economy of Ukraine and move to the principles of Industry 5.0. Quality management in the conditions of Industry 5.0 should be human-centered and eco-economic. Quality management is merging with methods of greening production and digitalization of activities, which makes it possible to produce quality products in a transparent and ethical manner and to meet the requirements of stakeholders - consumers, shareholders and the company's own staff, state bodies and local communities.

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HOW TO CITE THIS ARTICLE

Bondarenko, S. (2024). The role of improving the quality of business processes and products in the post-war reconstruction of Ukraine. *Management*, 1(39): 101–110. <https://doi.org/10.30857/2415-3206.2024.1.9>.

JEL Classification: O36, L26	INNOVATION OF THE SME SECTOR IN POLAND AND ITALY
UDC 334.012.6	Nunzio CASALINO¹, Ireneusz ŻUCHOWSKI², Liudmyla HANUSHCHAK-YEFIMENKO³, Krzysztof KRUKOWSKI⁴
DOI: 10.30857/ 2415-3206. 2024.1.10	<i>¹ Guglielmo Marconi University and Luiss Guido Carli University, Rome, Italy ² International Academy of Applied Sciences in Lomza, Poland ³ Kyiv National University of Technologies and Design, Ukraine ⁴ University of Warmia and Mazury in Olsztyn, Poland</i>

PRESENTATION AND PURPOSE OF THE STUDY. The SME sector is the backbone of the economies of both Poland and Italy. In Poland, the SME sector comprises more than 2.2 million enterprises, accounting for around 99.8% of all active businesses, while in Italy, the SME sector comprises around 4.4 million enterprises. Italy is one of the countries in the European Union with the most significant number of SMEs. Micro-enterprises dominate the SME structure in both countries. They generate a significant percentage of exports. In the case of Poland, this is about 30% of the total value of exports, and in the case of Italy, this sector accounts for more than 52% of the country's total exports. Innovation is critical for SMEs to survive and grow in a highly competitive environment. Supporting innovation in the SME sector is essential, especially given the natural barriers these businesses face.

This article compares approaches to innovation in SMEs in Poland and Italy.

RESEARCH METHODS. The paper uses a literature analysis method. The paper reviews the literature on the topic and innovativeness of the SME sector in Poland and Italy. The selection of literature made it possible to compare the importance and innovativeness of this sector in both countries.

THE RESULTS. The literature analysis has shown that SMEs are the backbone of the economy in Poland and Italy, but their role in innovation varies. In both countries, access to finance is one of the biggest obstacles to SME innovation activities. In both countries, there is a problem of a mismatch between the qualifications of employees and market needs, which limits the ability of SMEs to innovate.

CONCLUSIONS. Poland and Italy should adopt new systemic solutions to support their SME sectors better. They should improve the conditions for innovation development in this sector.

KEYWORDS: innovation; SME sector; importance of SMEs; SME in Poland; SME in Italy.

NUMBER OF REFERENCES	NUMBER OF FIGURES	NUMBER OF TABLES
54	0	0

JEL Classification:
O36, L26

УДК 334.012.6

DOI: 10.30857/
2415-3206.
2024.1.10

ІННОВАЦІЯ СЕКТОРУ МСП В ПОЛЬЩІ ТА ІТАЛІЇ

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ПРЕЗЕНТАЦІЯ ТА МЕТА ДОСЛІДЖЕННЯ.

Сектор МСП є основою економіки як Польщі, так і Італії. У Польщі сектор МСП включає понад 2,2 мільйона підприємств, що складає близько 99,8% усіх активних підприємств, тоді як в Італії сектор МСП включає близько 4,4 мільйона підприємств. Італія є однією з країн Європейського Союзу з найбільшою кількістю МСП. Мікропідприємства домінують у структурі МСП в обох країнах. Вони формують значний відсоток експорту. У випадку Польщі це близько 30% від загальної вартості експорту, а у випадку з Італією цей сектор становить понад 52% від загального експорту країни. Інновації мають вирішальне значення для того, щоб МСП вижили та розвивалися в жорсткому конкурентному середовищі. Підтримка інновацій у секторі МСП є важливою, особливо з огляду на природні бар'єри, з якими стикаються ці підприємства.

У цій статті порівнюються підходи до інновацій у МСП Польщі та Італії.

МЕТОДИ ДОСЛІДЖЕННЯ. У роботі використано метод аналізу літератури. У статті розглядається література на тему та інноваційність сектору МСП у Польщі та Італії. Добірка літератури дала змогу порівняти важливість та інноваційність цього сектору в обох країнах.

РЕЗУЛЬТАТИ. Аналіз літератури показав, що МСП є основою економіки Польщі та Італії, але їх роль в інноваціях різна. В обох країнах доступ до фінансування є однією з найбільших перешкод для інноваційної діяльності МСП. В обох країнах існує проблема невідповідності кваліфікації працівників потребам ринку, що обмежує здатність МСП до інновацій.

ВИСНОВКИ. Польща та Італія повинні прийняти нові системні рішення для кращої підтримки своїх секторів МСП. Вони мають покращити умови для розвитку інновацій у цьому секторі.

КЛЮЧОВІ СЛОВА: інновації; сектор МСП; важливість МСП; МСП у Польщі; МСП в Італії.

Introduction. Small and medium-sized enterprises (SMEs) play a vital role in the economies of both Poland and Italy. They influence regional development, job creation, and innovation (OECD, 2017). In the context of SMEs, innovation is determined by various factors, such as access to capital, institutional support, human resources, and public policies (Carree and Thurik, 2010; Audretsch, 2019).

Innovation, defined as the ability to introduce new products, processes, and management methods, is critical to their competitiveness (Schumpeter, 1934; Porter, 1990). Innovation refers to an organisation's ability to create new technological, product, or organisational solutions (Drucker, 1985). Schumpeter (1934) identified the importance of entrepreneurship and innovation as critical factors in economic development. In the SME literature, innovation is typically measured by indicators such as the number of patents filed, new product launches, and the level of investment in research and development (R&D) (Hervás-Oliver, Garrigós and Gil-Pechuán, 2011; Nambisan, Wright and Feldman, 2019). Recent research suggests that innovation in SMEs is more oriented toward process and organisational innovation than product innovation, which is particularly evident in Central and Southern Europe (Bianchini, Llerena and Martino, 2020).

Small and medium-sized enterprises (SMEs) are the backbone of the economies of both Poland and Italy. Their role in both countries is crucial due to their dominant share in the enterprise structure. They also significantly impact employment and create a high share of added value in the economy. In Poland and Italy, SMEs are the primary source of innovation, driving local, regional, and national economic development.

In Poland, the SME sector consists of more than 2.2 million enterprises, accounting for approximately 99.8% of all active businesses (CSO, 2020). This group is dominated by micro-enterprises, which account for as much as 96.7% of all SMEs. Small companies (with 10–49 employees) account for 2.8% of the sector, and medium-sized companies (50–249 employees) for only 0.3%. Only 0.2% of enterprises in Poland are large companies. It shows SMEs' importance to the Polish economy (PARP, 2020).

SMEs in Poland create around 69.3% of all jobs, making them a vital component of the labour market (CSO, 2020). In 2019, SMEs generated nearly 49.1% of gross value added, and their share of GDP was 44.7% (PARP, 2020). It is particularly evident in the trade, services, construction, and manufacturing sectors.

In Italy, the SME sector comprises around 4.4 million companies. Italy is one of the countries in the European Union with the highest number of SMEs (ISTAT, 2019). SMEs in the country make up as much as 99.9% of all enterprises, with micro-enterprises being the dominant group (94.9%). Small

enterprises account for 5.0%, and medium-sized enterprises only 0.9%. They also play an important role, although to a lesser extent than microenterprises (OECD, 2021).

Regarding employment, Italian SMEs create more than 78.6% of all jobs (ISTAT, 2019). It is one of the highest rates in Europe. A distinctive feature of Italy is the large number of family businesses, which often operate in niche industrial and manufacturing sectors such as fashion, food and beverages, machinery, and arts and crafts (Lotti, 2018). Due to this high proportion of small businesses, Italy has a unique SME ecosystem that plays a crucial role in local economic development and export promotion (Calza, Aliane and Cannavale, 2020).

In Poland, the SME sector generates around 30% of the total export value, which is relatively low compared to Western European countries (PARP, 2020). Polish SMEs often face barriers related to the costs of entering international markets, a low level of innovation, and limited access to information about foreign markets (Mazur-Wierzbicka, 2019).

In Italy, the sector is much more active in international markets. It generates over 52% of Italy's total exports (OECD, 2021). Italian SMEs' high level of internationalisation is due to their specialisation in producing high-value-added goods and their strong links with international markets. Small and medium-sized companies in the fashion, furniture, or engineering sectors are often export leaders and play a key role in creating the 'Made in Italy' brand (De Marchi, Di Maria and Gereffi, 2017).

The level of innovation of SMEs in Poland is relatively low, reflected in the moderate level of R&D expenditures and the low number of patent applications (Eurostat, 2021). According to the Innovation Union Scoreboard (2020) report, Poland is among the 'moderate innovators' in the EU, scoring well below the EU average. Barriers to innovation include low levels of cooperation between science and business, financial constraints, and insufficient institutional support (Jakubczak, 2020). What is essential, however, is that the owners of the surveyed SMEs are aware that innovation is a determinant of the competitiveness of modern businesses (Drews, 2018).

Despite firms' fragmented structure, the innovation level is higher in Italy. Italian SMEs invest in product, process, and marketing innovation, which allows them to gain competitive advantages in international markets (Capasso, Cusmano, Morrison, 2013). The industrial cluster sector is mainly developed and is crucial in technology transfer and cooperation between firms (Iammarino, Piva, 2008).

Challenges facing SMEs. SMEs face several challenges in Poland and Italy that may limit their growth. In Poland, the fundamental problems are a lack of access to capital, high bureaucracy, and low levels of entrepreneurship

education (Szczerba, 2021). In Italy, on the other hand, the challenges are the complex tax system, high regulatory pressure, and limited access to modern technology (Bonaccorsi, 2017).

Despite these challenges, SMEs in both countries have the potential to develop further, especially in an international context. Government innovation support programmes, the development of industrial clusters, and a growing awareness of the need to invest in digital technologies can significantly influence the future of the SME sector in both Poland and Italy (OECD, 2021).

Innovation is a crucial enabler for SMEs to survive and thrive in a highly competitive environment (Rosenbusch, Brinckmann, Bausch, 2011; Audretsch, 2019). Research shows innovative companies are more likely to grow and expand into international markets (Czarnitzki, Hottenrott, 2011; Gherghina, Botezatu, Hosszu, & Simionescu, 2020). However, the level of innovation in Polish small and medium-sized enterprises is still significantly lower than the average in EU countries. Many entrepreneurs do not undertake innovative activities because the costs of their implementation are too high, while those who have decided to implement them primarily self-finance this activity (Zuzek, 2016).

Factors influencing SME innovativeness in Poland and Italy. Access to finance is one of the most critical determinants of SME innovation (Casalino and Mazzone, 2008; Beck and Demircug-Kunt, 2006; Szczerba, 2021). In Poland, companies often face barriers related to access to capital due to the high cost of credit and the limited number of alternative sources of financing (Kowalewski, Stanko and Śliwiński, 2012; Błach, Gorzeń-Mitka and Grabowski, 2020). Due to the strong links between banks and local businesses, access to credit is more accessible in Italy, favouring innovative activities (Colombo and Grilli, 2007; Ughetto, 2016).

Institutional support, which is very important, includes, among others, subsidies, tax breaks, and support in the form of government programmes (Radošević and Lepori, 2009; Mazur-Wierzbicka, 2019). In Poland, institutions such as the National Centre for Research and Development (NCBR) and the Polish Agency for Enterprise Development (PARP) offer numerous programmes to support innovation in SMEs (NCBR, 2020). In Italy, similar functions are performed by the Ministry of Economic Development (MISE), which manages EU and national funds allocated to innovation in the sector (MISE, 2018; Bonaccorsi, 2017).

Innovation is not possible without adequately prepared employees. The level of education and skills of employees are essential factors for the innovation potential of SMEs (Becker, 1964; Roper, Du and Love, 2008). In Poland, the problem is the low level of technological skills and limited cooperation between the scientific sector and business (Zolnierski, 2010; Jakubczak, 2020). In Italy,

however, the structural mismatch between workers' skills and market needs is a problem (Iammarino, Piva, 2008; Corò and Grandinetti, 2020).

Determinants of SME Innovation in Poland and Italy. Public policies play a crucial role in developing innovation in SMEs (OECD, 2017; Potoczek, 2020). In Poland, innovation policy is based on the Strategy for Responsible Development, which aims to increase R&D spending to 1.7% of GDP by 2023 (Ministry of Development, 2017). Italy develops clusters and innovation networks to strengthen cooperation between companies and research institutions (MISE, 2018; Greco, Grimaldi and Cricelli, 2020).

Public policies are crucial for developing innovation in the SME sector in Poland and Italy. Governmental and institutional actions, including financial support, regulation, and the promotion of cooperation between the private and public sectors, aim to increase the capacity of firms to undertake innovative activities. Although both countries aim to support innovation in the SME sector, their approaches differ in priorities, programme structure, and effectiveness of implementation.

Public policies in Poland. Poland's innovation policy is oriented towards supporting technological development and increasing the level of innovativeness of domestic enterprises through various financial programmes and institutional initiatives. The key strategic document in this regard is the Strategy for Responsible Development (SOR), adopted in 2017 by the Ministry of Development, which sets development goals until 2030 (Ministry of Development, 2017). The strategy envisages increased investment in research and development and the creation of favourable conditions for innovation through the development of an innovation ecosystem and support for technology transfer. Areas of support include:

- **Funding programmes:** The primary funding sources for innovation in Polish SMEs come from EU and national funds. The most critical programmes implemented in the previous programming period were the Operational Programme Inteligentny Rozwój and the Fast Track initiative managed by the National Centre for Research and Development. These programmes offered grants and support for implementing R&D projects to increase Polish companies' competitiveness (NCBR, 2020). In 2020, support under the OPIR covered around 2,000 projects with a total value exceeding PLN 15 billion.

- **Supporting cooperation between science and business:** Polish innovation programmes strongly emphasise cooperation between science and business. An example of such activities is the BRIDGE Alfa programme, which aims to support technology transfer by co-financing early-stage R&D projects (PARP, 2020). However, the effectiveness of this programme is limited by the low level of commercialisation of research results due to limited cooperation between universities and businesses (Jakubczak, 2020).

Despite numerous programmes supporting innovation, their implementation faces barriers related to bureaucracy and SMEs' low uptake of funds. Many small firms do not have the resources to effectively apply for funds and manage complex R&D projects, reducing their support access (Mazur-Wierzbicka, 2019).

Public policies in Italy. In Italy, innovation policy is based on broad initiatives to develop industrial clusters and support innovation activities in the SME sector through regional and national programmes. A critical strategic document is the National Plan for Research 2021–2027, which defines innovation policy priorities and public funding targets for research and innovation (MISE, 2018). The plan emphasises regional development, industrial specialization promotion, and internationalization of Italian companies. Areas of support include:

- **Creating Industrial Clusters.** Italian innovation policy is strongly linked to industrial clusters, which bring companies from specific sectors in a given geographical area. Examples include clusters in the Emilia-Romagna region (machinery) or Tuscany (fashion sector). These clusters receive government support through tax breaks and access to unique financial programmes such as the Fondo di Garanzia per le PMI, strengthening cooperation between companies and technology transfer (Greco, Grimaldi and Cricelli, 2020).

- **Financial support and tax credits:** Italy bases much of its innovation policy on tax credit mechanisms, such as the Patent Box, which offers preferential tax treatment for companies investing in R&D and commercialising patents. This scheme encourages companies to increase their research investments by reducing their tax burden (OECD, 2021). In addition, Italy benefits from European funds such as Horizon 2020, but their uptake is limited by regional variation and the lack of practical coordination tools (Ughetto, 2016).

- **Regional programmes:** In Italy, innovation policy is highly decentralised, and many innovation support programmes are managed at the regional level. An example is the Regione Lombardia programme, which supports innovation in the biotechnology sector by offering grants and loans at preferential interest rates to regional companies. This regional structure allows programmes to be better tailored to local needs while leading to significant regional disparities (Capasso, Cusmano and Morrison, 2013).

In summary, innovation policies in Poland and Italy differ regarding priorities and tools to support the SME sector. Poland focuses on financial support and the promotion of cooperation between science and business, while Italy puts more emphasis on the development of industrial clusters and the use of tax instruments to support innovation. The following differences can be identified in the approaches to innovation policy in the countries analysed:

- **Central versus regional approach.** Polish innovation policy is highly centralised, with the main programmes managed nationally. On the other hand, Italy is characterised by a high level of decentralisation, resulting in significant regional differences in access to innovation support (OECD, 2021). Innovation policies in Lombardy and Emilia-Romagna are more developed than in southern regions such as Calabria and Campania.

- **Efficiency of policies.** In Italy, the effectiveness of policies supporting innovation is limited by the large number of regional programmes, which often overlap, leading to administrative chaos and coordination problems (Greco, Grimaldi and Cricelli, 2020). Despite having well-defined programmes, Poland struggles with a low uptake of funds by SMEs due to the lack of adequate support for small firms in the application and implementation of R&D projects (Szczërba, 2021).

- **R&D versus commercialisation orientation.** Polish innovation support programmes strongly emphasise funding R&D projects, while in Italy, there is a greater emphasis on supporting commercialisation and cluster collaboration (Capasso, Cusmano and Morrison, 2013). Consequently, Polish SMEs often struggle to translate research results into tangible product and market innovations, while Italian firms are more successful.

Barriers to innovation. Small and medium-sized enterprises' innovativeness in Poland and Italy face barriers that limit their ability to create and implement new technological, product, or organisational solutions. Despite the different economic and institutional contexts, similar problems can be identified in both countries, although their intensity and structure differ depending on the specifics of local markets and industrial traditions. The main barriers include:

- **Financial barriers.** It is one of the main constraints to developing innovation in the SME sector in Poland and Italy. The lack of capital is particularly acute for companies with fewer resources, making it difficult to raise funds for R&D and investment in new technologies (Beck and Demircug-Kunt, 2006). In addition, the lack of support from banks means that SMEs are often forced to seek alternative sources of financing (Casalino, 2014). In Poland, this problem is due to several factors. First of all, the financing structure of SMEs is mainly based on bank loans, which is a barrier for many companies, especially micro businesses, due to the high collateral requirements of credit and

loan institutions (Kowalewski, Stanko and Śliwiński, 2012). As a result, many Polish companies avoid taking the risk of implementing innovation (Mazur-Wierzbicka, 2019). Although government programmes, such as EU funds under the Intelligent Development Operational Programme, have tried to address these barriers, their availability is limited, and the application process is complicated (NCBR, 2020). In Italy, we face a similar situation as in Poland. Due to the traditional market structure, Italian banks prefer to finance large, stable companies, limiting SMEs' access to capital (Ughetto, 2016). In addition, many family businesses in the southern Italian regions are reluctant to use external financing for fear of losing control of the company (Bonaccorsi, 2017). These barriers are being mitigated by the development of venture capital funds and EU support programmes such as Horizon 2020, but their take-up is still below expectations.

- Institutional and regulatory barriers include the unpredictability of regulation, high administrative costs, and complex legal procedures. In both countries, entrepreneurs often report problems related to the inconsistent regulatory system and the lack of clear guidelines for innovation support. This problem is particularly acute in Poland due to the complex tax system and frequent legislative changes (Potoczek, 2020). The high level of bureaucracy makes it difficult for small firms to react quickly to market changes, which is crucial in innovation implementation. Furthermore, entrepreneurs complain about difficulties obtaining public support due to unclear application procedures and the lack of uniform standards for evaluating innovation projects (Szczerba, 2021). In Italy, regulatory complexity and administrative barriers are also a significant problem. IPR regulations are complex, and enforcement is sometimes insufficient, discouraging SMEs from investing in innovative projects and solutions (Bonaccorsi, 2017). Many firms, especially in the southern Italian regions, avoid taking innovative actions due to the unpredictability of local regulations and the inefficiency of the judicial system (Calza, Aliane and Cannavale, 2020).

- Technological and human capital barriers are vital in shaping the innovation capacity of companies. Both countries have problems related to the shortage of skilled workers and limited cooperation with the scientific sector. In Poland, the problem is low technological skills and insufficient engineers and specialists in new technologies (Jakubczak, 2020). Furthermore, cooperation between the science sector and business remains limited, negatively affecting the technology transfer process (Żołnierski, 2010). Programmes supporting such cooperation (e.g., NCB's 'Fast Track') are a step in the right direction, but their effectiveness is still limited (NCRD, 2020). Similarly, in Italy, the mismatch between the skills of the workforce and the needs of the labour market is a problem, particularly affecting the technology sector (Iammarino and Piva,

2008). Small and medium-sized firms rarely collaborate with universities and research institutes, which limits their ability to absorb advanced technologies (Greco, Grimaldi, Cricelli, 2020). Research by Casalino (2014) indicates that the innovative success of SMEs often depends on collaboration with external partners and the implementation of organisational changes. In contrast, many Italian SMEs rely on traditional technologies, which limits their ability to create disruptive innovations (Capasso, Cusmano and Morrison, 2013).

- Cultural and attitudinal barriers. Innovation is strongly linked to organisational culture and entrepreneurs' attitudes toward risk and change. There are differences in attitudes towards innovation in both countries, which translates into the level of innovative activity in a country's SME sector. The dominant cultural barrier in Poland is risk aversion and fear of failure (Mazur-Wierzbicka, 2019). Polish entrepreneurs, especially in smaller companies, often focus on maintaining their current business, avoiding risky investments in research and development. An additional problem is the low openness to cooperation between companies, which limits the potential for clustering and joint research initiatives (Jakubczak, 2020). In contrast, in Italy, especially in the northern regions, the entrepreneurial culture is strongly developed, and SMEs are more open to collaboration and implementation of new solutions (Lotti, 2018). The situation is different in Italy's southern regions, where traditional management approaches still prevail, and innovation is considered unnecessary. Italians are more inclined to innovate when they have the support of industrial clusters, which play a crucial role in knowledge transfer and innovation (Iammarino and Piva, 2008).

Summary. Barriers to innovation in Poland and Italy differ, although many are common to both countries. Common barriers include limited access to capital, regulatory complexity, and a shortage of skilled labour. Poland struggles with the challenges of regulatory instability and a low culture of innovation, while in Italy, the problem is a significant regional disparity and insufficient exploitation of the potential of industrial clusters.

Many factors, such as access to finance, institutional support, and the level of human capital, determine SMEs' innovativeness in Poland and Italy. Numerous innovation support programmes exist in both countries, but their effectiveness depends on the regional and sectoral context. The Polish innovation model focuses more on state financial support, while the Italian model emphasises cross-sectoral cooperation and cluster development.

This paper compares approaches to SME innovation in Poland and Italy, considering public policies, barriers, and factors supporting innovation development. The analysis shows that, despite similar goals and challenges, the countries analysed apply different strategies to support innovation in the SME

sector, resulting from their different economic structures, levels of regional development, and industrial traditions.

The analysis of the literature carried out leads to the following conclusions:

1. In Poland and Italy, SMEs are the backbone of the economy, but their role in terms of innovation is differentiated. In Italy, SMEs are more integrated into industrial clusters, favouring knowledge and technology transfer, whereas, in Poland, firms act more individually and face more difficulties in cross-sectoral cooperation.

2. In both countries, access to finance is one of the biggest obstacles to SME innovation activities. In Italy, the problem is the structural reluctance of banks to finance small firms and the solid regional variation in access to capital. In Poland, however, access to EU and national funds is complicated due to high bureaucracy and complicated application procedures, which deter smaller companies.

3. In Poland, policies to support innovation are highly centralised and focus on financial support and subsidies. In contrast, in Italy, there is more emphasis on developing industrial clusters, promoting regional specialisations, and using tax credits to support innovation. Polish policy is mainly based on support in the form of grants and subsidies, while in Italy, there is a preference for tax instruments and co-financing of projects through regional initiatives.

4. In both countries, there is a problem of a mismatch between workers' skills and market needs. It limits the ability of SMEs to innovate. In Poland, the problem is more related to the lack of specialists in new technologies and limited cooperation between universities and businesses. In Italy, the problem mainly affects the southern regions, which have limited access to modern educational infrastructure.

5. Italy has a better-developed system of clusters and cooperation networks, which encourages the exchange of knowledge and experience between companies. On the other hand, Poland lacks a developed infrastructure to support international cooperation, limiting the opportunities for SMEs to expand into foreign markets.

Based on the literature analysis and conclusions, the following practice recommendations were made:

1. In both Poland and Italy, consideration should be given to simplifying application procedures and introducing new financial instruments such as microloans, soft loans, or venture capital funds that are tailored to the specific characteristics of micro and small enterprises. In Italy, it is additionally worth strengthening financial programmes in regions with a low level of innovation, such as southern Italy. It should ensure increased accessibility to finance for SME innovation activities:

2. Support for programmes linking universities and businesses should be increased, especially in Poland, where cross-sectoral cooperation is limited. It is advisable to develop initiatives such as living labs and cooperation platforms that enable the creation of R&D consortia involving small and medium-sized companies. These activities should strengthen cooperation between science and business.

3. In Poland, education and training programmes promoting innovation and entrepreneurship should be developed within the formal education system and through programmes targeted at SME owners and employees. Similar initiatives should be introduced in Italy, especially in the southern regions, to reduce the innovation gap between the north and south of the country. Promoting a culture of innovation should be a permanent feature of all development strategies formulated, regardless of the level of government.

4. Italy could benefit from the experience of regions such as Emilia-Romagna and extend industrial cluster practices to less developed regions. In Poland, on the other hand, it is worth investing in developing regional innovation and technology centres, which could become centres of cooperation and knowledge transfer.

5. Poland should consider introducing "Patent Box" type programmes and other tax reliefs encouraging companies to invest in R&D and protect intellectual property. Such solutions have proved successful in Italy, increasing the interest of companies in innovative activities, which should be treated in Poland as good practice to be implemented.

6. Developing policies to support industrial clusters, which can act as platforms linking businesses, research institutions, and local authorities, should be incorporated into development policies in both countries. In Poland, the focus should be on creating clusters in the eastern regions to reduce development disparities between different parts of the country.

7. In Poland and Italy, it is necessary to increase the emphasis on monitoring and evaluation of innovation support programmes in order to adapt them to changing market needs. It is also worth developing feedback mechanisms that allow entrepreneurs to report problems and barriers to using these instruments.

In conclusion, implementing the above recommendations can significantly improve the conditions for developing SME innovation in Poland and Italy, thus strengthening their competitiveness in the European and global markets. Adapting policies to local needs and better using existing resources may be the key to increasing the innovative activity of these enterprises.

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HOW TO CITE THIS ARTICLE

Casalino, N., Żuchowski, I., Hanushchak-Yefimenko, L., Krukowski, K. (2024). Innovation of the sme sector in Poland and Italy. *Management*, 1(39): 111–126. <https://doi.org/10.30857/2415-3206.2024.1.10>.

JEL Classification:
Q14

UDC 334.72:
338.43]-043.86

DOI: 10.30857/2415-
3206.2024.1.11

**FORMATION OF INDICATORS FOR
MANAGING THE INNOVATIVE
DEVELOPMENT OF AGRICULTURAL
ENTERPRISES IN RURAL AREAS**

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INTRODUCTION AND PURPOSE OF THE STUDY. The purpose of the study is to determine the process of forming indicators for the management of innovative development of agricultural enterprises in rural areas in the current conditions and the European integration vector of the state, taking into account the goals of sustainable development.

RESEARCH METHODS. During the study, the following scientific economic methods were used: the grouping and classification method, index-indicator method, structural-logical analysis method, graphic method, etc.

PRESENTATION OF THE MAIN MATERIAL. The need to transition to innovative development of agricultural enterprises in rural areas was analyzed and substantiated in order to balance and stabilize the latter. Criteria for innovative development of rural areas were developed: institutional (study of the state of regulatory and legal support for the application of innovations, innovative approaches, creation of innovative prerequisites and

an appropriate environment in the agricultural sector of the country, etc.); index-indicator (comprehensive assessment of the development of the country's innovative potential, which includes sustainable development by studying specific indicators (indexes and indicators) of the implementation of innovations); innovative entrepreneurship; innovative infrastructure; innovative culture.

RESULTS. The index-indicator criterion is deepened by proposing separate and substantiated groups of indicators of innovative development of rural areas based on the Oslo Guidelines (by measuring scientific, technological and innovative activity in business): indicators of innovative potential of rural areas; indicators of knowledge flow management; indicators of assessment of the external environment of agricultural enterprises.

KEYWORDS: agricultural enterprises; European integration; innovative development; innovative activity; sustainability; sustainable development; rural areas; development.

NUMBER OF REFERENCES	NUMBER OF FIGURES	NUMBER OF TABLES
19	11	6

JEL Classification:
Q14

УДК 334.72:
338.43]-043.86

DOI: 10.30857/2415-
3206.2024.1.11

**ФОРМУВАННЯ ІНДИКАТОРІВ
УПРАВЛІННЯ ІННОВАЦІЙНИМ
РОЗВИТКОМ АГРАРНИХ ПІДПРИЄМСТВ
СІЛЬСЬКИХ ТЕРИТОРІЙ**

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та дизайну, Україна*

**ВСТУП І
ДОСЛІДЖЕННЯ.**

дослідження визначено процес формування індикаторів управління інноваційним розвитком аграрних підприємств сільських територій в умовах сьогодення та євроінтеграційного вектора держави, враховуючи цілі сталого розвитку.

МЕТОДИ ДОСЛІДЖЕННЯ. Під час дослідження використано такі наукові економічні методи як: метод групування та класифікації, індексно-індикаторний, метод структурно-логічного аналізу, графічний метод та ін.

ВИКЛАД ОСНОВНОГО

МАТЕРІАЛУ. Проаналізовано та обґрунтовано необхідність переходу до інноваційного розвитку аграрних підприємств сільських територій задля збалансування та стійкості останнього. Розроблено критерії інноваційного розвитку сільських територій: інституціональний (дослідження стану нормативно-правового забезпечення можливостей застосування інновацій, інноваційних підходів, створення інноваційних передумов

та відповідного середовища в аграрному секторі країни тощо); індексно-індикаторний (комплексна оцінка розвитку інноваційного потенціалу країни, до якої належать сталий розвиток шляхом дослідження конкретних показників (індексів та індикаторів) впровадження інновацій); інноваційне підприємництво; інноваційна інфраструктура; інноваційна культура.

РЕЗУЛЬТАТИ. Індексно-індикаторний критерій поглиблено шляхом пропонування виокремлених та обґрунтованих груп показників інноваційного розвитку сільських територій на основі Керівництва Осло (шляхом вимірювання науково-технологічної та інноваційної діяльності у бізнесі): індикаторів інноваційного потенціалу сільських територій; індикаторів управління потоками знань; індикаторів оцінки зовнішнього середовища аграрних підприємств.

КЛЮЧОВІ СЛОВА: аграрні підприємства; євроінтеграція; інноваційний розвиток; інноваційна діяльність; стійкість; сталий розвиток; сільські території; розвиток.

Introduction. Management of the development of agricultural enterprises assumes the presence of potential in the enterprise, effective strategic management of its activities, which are the determining guidelines for forming the vision of the enterprise in the long term. The prospects for research in this direction are to substantiate methodological approaches and determine the main indicators of management of the development of agricultural enterprises in rural areas to assess their potential and further activities.

Problem statement. Analysis of the development and further activities of agricultural enterprises consists in building a system of indicators with the help of which it is possible to judge individual aspects of development: environmental, social, economic types of activities of the enterprise.

Unresolved parts of the problem. The construction of integral, aggregated indices with the help of which it is possible to comprehensively judge the development of a business entity at the macro, meso and micro levels plays an important role in the study, analysis, modeling and forecasting of economic processes at various levels of management. The main difficulty in aggregating information into indices is determining the weight of the original indicators without losing significance and without excessive subjectivity.

Analysis of literary sources. Regarding the calculation of the integral coefficient of the ecological state of the land area, P.I. Korenyuk proposed a corresponding normative scale and a scale of gradation of the value of this coefficient (Table 1). Therefore, the integral index of the ecological state of the territory is a relative indicator that characterizes the complex state of the land area of the region, the country, in this study of agricultural enterprises of the Vinnytsia region. As previously noted, the gradation scale of the integral coefficient of the ecological state of the land area is presented in Table 1 (Koreniuk, 2003).

Table 1

**Graduation scale of the integral coefficient
of the ecological state of the land area**

Coefficient value	Ecological safety
<0,33	Ecologically crisis
0,34-0,66	Ecologically pre-crisis
>0,66	Ecologically moderately safe
about 1	Ecologically safe

Source: (Koreniuk, 2003).

Presentation of the main material Usually aggregated indicators are divided into the following groups:

- socio-economic;
- ecological-economic;

- socio-ecological;
- ecological-socio-economic (uk.wikipedia.org).

We will begin the study of the management of the development of agricultural enterprises in rural areas of Vinnytsia region and its main indicators with the selection of research subjects. They selected six agricultural business entities of Vinnytsia region, which occupy leading positions in the rating among the twenty best agricultural enterprises in Vinnytsia region (kurkul.com).

Let's describe their activities:

- Archi LLC. Land bank: 5,270 hectares.
- Lypivka-Agro LLC. Land bank: 4,500 hectares. Areas of activity: grain, legume, oilseed, vegetable.
- Agro-Etalon LLC. Land bank: 4,428 hectares. Areas of activity: grain, legume, oilseed, vegetable, fish farming, beekeeping.
- Olgopil AF LLC. Land bank: 4,340 hectares.
- Dashkivtsi PJSC. Land bank: 4,300 hectares. Areas of activity: grain, oilseed, fruit.
- Peredovik LLC. Land bank: 4,190 hectares. Areas of activity: grain, legume, oilseed, vegetable, dairy and meat cattle breeding (kurkul.com).

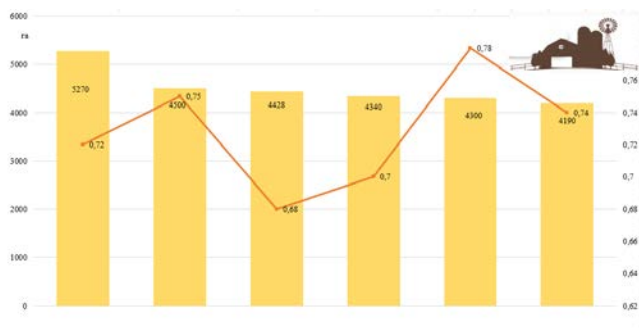
Analyzing the given economic entities, we note that the farms have a large land fund. That is, when conducting economic activity, economic entities face the issue of rational use of nature, ecological production, soil protection, which is expressed through ecological and economic indicators of management of the development of agricultural enterprises. The paradigm of the strategy of rational use of nature involves the formation of an adequate conceptual apparatus, improvement of the ecological and regulatory legal framework, coordination of the development of agricultural natural resource potential with the priorities of socio-economic policy (Laslo, Dyichenko and Nahorna, 2018).

In this regard, domestic scientists conducted research, practical application of the level of environmental friendliness of a land area using the integral coefficient of the ecological state of the land area (Holovchenko, 2015).

Graphically, the land bank of agricultural enterprises and the integral coefficient of the ecological state of the land territory of Vinnytsia region, as of 01.01.2024, and the indicator of the integral coefficient of the ecological state of the land territory of the leading agricultural enterprises of Vinnytsia region are presented in Fig. 1 and Fig. 2.

Analyzing the dynamics of agricultural land and the load of agricultural land on the 1st average employee of the leading agricultural enterprises of Vinnytsia region over the last five years, it should be noted that the land fund of business entities has grown by an average of 313 hectares or 7.47%, as for the load of agricultural land on the 1st average employee, there is also an increase of

1.10 hectares or 5.62% – a positive trend in the activities of agricultural enterprises of the Vinnytsia region.



Source: based on (kurkul.com; Laslo, Dyichenko and Nahorna, 2018; Koreniuk, 2003; Holovchenko, 2015).

Fig. 1. Land bank of agricultural enterprises and the integral coefficient of the ecological state of the land territory of Vinnytsia region, as of 01.01.2024

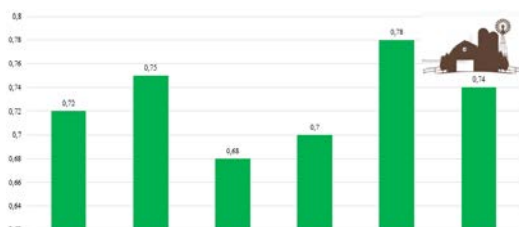


Fig. 2. Indicator of the integral coefficient of the ecological condition of the land territory of the leading agricultural enterprises of Vinnytsia region, as of 01.01.2024

Over the last studied period, there has been a fluctuation in the average number of employees of the leading agricultural enterprises of Vinnytsia region, which is influenced by many factors of both external and internal nature. On average, this indicator fluctuated by 4 people or 1.9%.

To further characterize the state and efficiency of the leading agricultural enterprises of Vinnytsia region, we will analyze the provision of fixed assets of business entities, both in absolute and relative terms and coefficients, which are shares of the main indicators of management of the development of agricultural enterprises in rural areas. Analyzing the dynamic processes of the average annual cost of fixed assets of the leading agricultural enterprises of Vinnytsia region, we see some fluctuation in their value.

Labor capitalization is an indicator that characterizes the ratio of the average annual cost of the enterprise's fixed assets to the average annual number of employees.

Fund availability – fund availability characterizes the provision of the area of agricultural land with fixed assets and is calculated as the ratio of the average annual cost of fixed assets to the area of agricultural land.

Capital intensity is an indicator, the inverse of capital return, which shows the value of the cost of fixed assets per unit of output produced by the enterprise. This indicator serves to determine the efficiency of using the organization's fixed assets.

Return on assets is the ratio of the value of output in monetary terms to the average annual value of fixed assets (www.google.com).

The working capital of an enterprise is characterized by working capital and current assets that are at the disposal of the enterprise and can be converted into cash within one production cycle or year.

The turnover ratio (number of turnovers) is calculated as the ratio of the cost of products sold at current wholesale prices for a certain period to the average balance of working capital for the same period (Kobyletskyi, analizua.com).

The average annual cost of working capital and the dynamics of the turnover ratio of working capital of leading agricultural enterprises in Vinnytsia region over the past five years are presented in Table 2.

Table 2

Average annual cost of working capital and average value of the turnover ratio of working capital of leading agricultural enterprises of Vinnytsia region, 2019–2023

Agricultural enterprise	Average annual cost of working capital 2019–2023, thousand UAH	Average annual cost of working capital 2019–2023, thousand UAH
Archi LLC	5768,00	2,138
Lypivka-Agro LLC	7180,00	0,796
Agro-Etalon LLC	5760,20	1,513
Olgopil AF LLC	5181,13	1,036
Dashkivtsi PJSC	5221,48	2,032
Peredovik LLC	5089,61	1,048

Over the last studied period, the amount of material costs for the production of leading agricultural enterprises of Vinnytsia region increased on average by 95.11 thousand UAH or 5.63%, this trend is understandable and explained by the state of the domestic economy.

Next, we turn to the analysis of the financial results of leading agricultural enterprises of Vinnytsia region over the past five years, which are represented by economic indicators of development management and enterprise activities.

Analyzing the main financial results of leading agricultural enterprises of Vinnytsia region over the past five years, which are represented by economic indicators of development management and enterprise activities: net income (revenue) from the sale of products (goods, works, services) and gross profit (loss), we note an increase in net income (revenue) from the sale of products (goods, works, services) on average by farms by 254.90 thousand UAH or 5.63%, and gross profit (loss) increased on average by 31.96 thousand UAH or 5.36%.

Next, we move on to detailing the production, sales, and marketability of agricultural products of the leading agricultural enterprises of the Vinnytsia region, its structure, and specialization coefficient.

Specialization of agriculture is a complex process that develops in various forms. Specialization of agricultural enterprises is the predominant production in them of the corresponding type (types) of products for which there are the most favorable natural and economic conditions. The efficiency of production in agricultural enterprises depends not only on the size of the industries that are leading in them, but also on how developed other industries that have a commodity nature are. The more such industries in the economy, the smaller their size and lower the concentration of production, as a rule. The specialization of an agricultural enterprise is determined using the specialization coefficient. Using the indicator of the structure of commodity products, one can conclude about the level of development of individual industries and the degree of specialization of the economy in the production of the main (leading) of them, then the coefficient of commodity concentration of industries is used to judge the level of specialization of an agricultural enterprise, taking into account all its commodity industries. It is customary to consider that an enterprise is multi-industry when this coefficient does not exceed 0.20, with an average – 0.21–0.40, above average – 0.41–0.50, high – 0.51–0.60 and with a deep – over 0.60. Other things being equal, the efficiency of the functioning of agricultural enterprises increases with an increase in the absolute value of the coefficient of commodity concentration of industries, but at the same time the risk of loss of financial stability increases due to a possible deterioration in the market conditions for products of specialization industries (buklib.net).

Also, to analyze the production, marketing and sales activities of an agricultural enterprise, the level of marketability is determined. The marketability coefficient characterizes the share of products ready for sale in the total volume of products produced (buklib.net).

As a result of the calculation, the specialization coefficients of six leading agricultural enterprises of Vinnytsia region were obtained, the coefficient indicators are qualitative, mediocre, and LLC "Lypivka-Agro" has a high specialization coefficient, which indicates the in-depth specialization of the agricultural enterprise. The structure of the commodity products of the studied enterp Judging by the structure of marketable products, the studied agricultural enterprises have a developed crop production sector, and some also have a livestock sector, which was noted at the beginning of the study of the topic of managing the development of agricultural enterprises in rural areas. The level of marketability of agricultural products of the leading agricultural enterprises of the Vinnytsia region was determined (Table 3).

Archie LLC
Coefficient of
specialization
 $K = 0.226$, average

Source: based on
(opendatabot.ua; www.vin.gov.ua;
www.vn.ukrstat.gov.ua;
ukrstat.gov.ua (2020–2022)).

LLC "Lypivka-Agro"
Coefficient of
specialization
 $K = 0.427$, high

Source: based on
(opendatabot.ua; www.vin.gov.ua;
www.vn.ukrstat.gov.ua;
ukrstat.gov.ua (2020–2022)).

Agro-Etalon LLC
Coefficient of
specialization
 $K = 0.269$, average

Source: based on
(opendatabot.ua; www.vin.gov.ua;
www.vn.ukrstat.gov.ua;
ukrstat.gov.ua (2020–2022)).

STOV AF "Olgopil"
Coefficient of
specialization
K = 0.384, average

Source: based on
(opendatabot.ua; www.vin.gov.ua;
www.vn.ukrstat.gov.ua;
ukrstat.gov.ua (2020–2022)).

PJSC "Dashkivtsi"
Coefficient of
specialization
 $K = 0.301$, average

Source: based on
(opendatabot.ua; www.vin.gov.ua;
www.vn.ukrstat.gov.ua;
ukrstat.gov.ua (2020–2022)).

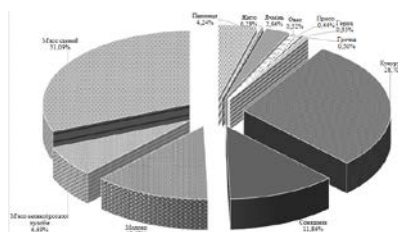


Fig. 3. Structure of commercial products of Archi LLC of Vinnytsia region

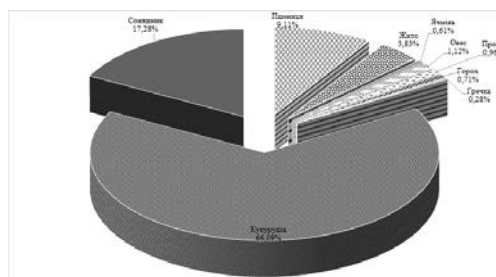


Fig. 4. Structure of marketable products of LLC "Lypivka-Agro" of Vinnytsia region

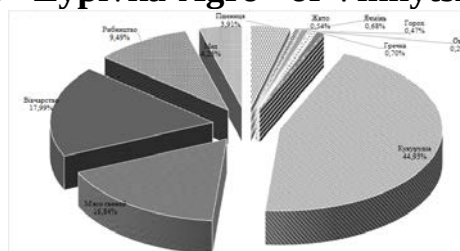


Fig. 5. Structure of marketable products of Agro-Etalon LLC of Vinnytsia region

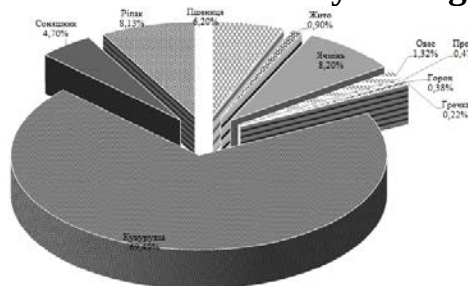


Fig. 6. Structure of marketable products of STOV AF "Olgopil" Vinnytsia region

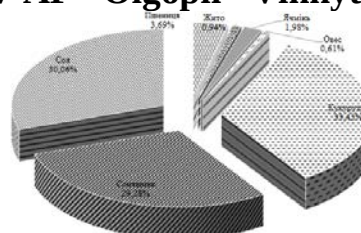


Fig. 7. Structure of marketable products of PJSC "Dashkivtsi" Vinnytsia region

LLC "Peredovik"
Coefficient of
specialization
 $K = 0.399$, average

Source: based on
(opendatabot.ua; www.vin.gov.ua;
www.vn.ukrstat.gov.ua;
ukrstat.gov.ua (2020–2022).

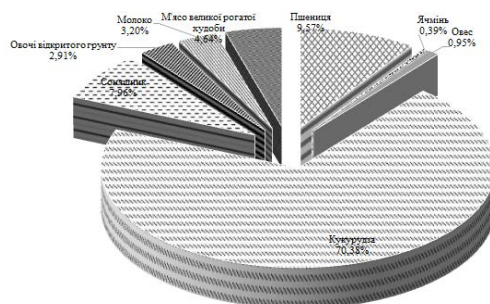


Fig. 8. Structure of marketable products of LTD "Peredovik" of Vinnytsia region

Table 3

Level of marketability of agricultural products of leading agricultural enterprises of Vinnytsia region

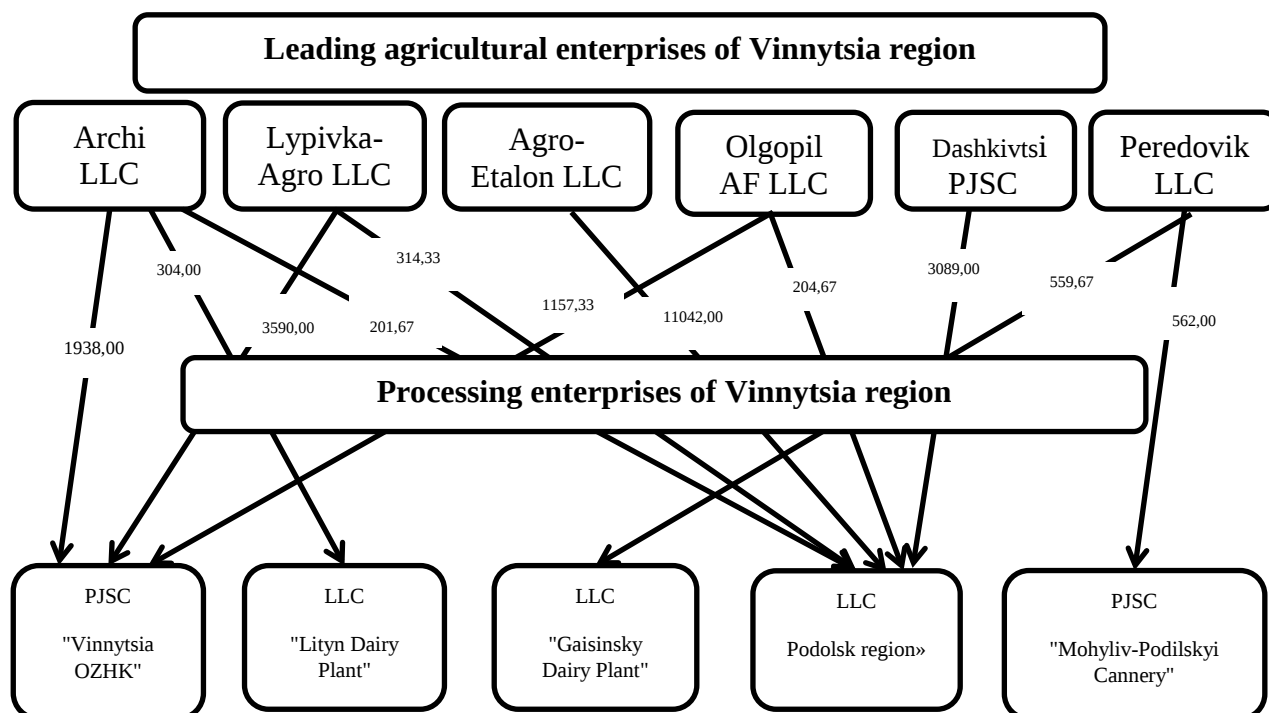
Agricultural enterprise	Marketability level, %
Archi LLC	91,00%
Lypivka-Agro LLC	88,00%
Agro-Etalon LLC	89,00%
Olgopil AF LLC	78,00%
Dashkivtsi PJSC	86,00%
Peredovik LLC	92,00%

Source: based on (opendatabot.ua; www.vin.gov.ua; www.vn.ukrstat.gov.ua; ukrstat.gov.ua (2020–2022).

Having sufficiently high marketability levels, the studied agricultural enterprises are permanent sellers of their products to processing enterprises of the Vinnytsia region. The logistics chain of agricultural product sales by one of the main processing enterprises is schematically presented, although the full cycle of sales and logistics is broader and covers other processing enterprises of the region and enterprises of neighboring regions of various levels.

The next stage in defining and describing the main indicators of managing the development of agricultural enterprises is the indicators and coefficients of personnel turnover. One of the important ones in managing the activities of an agricultural enterprise is the coefficient of personnel turnover and the coefficient of personnel stability. The coefficient of personnel turnover is an indicator that indicates the percentage ratio of the number of dismissed employees to the average annual number of people at the enterprise calculated for a certain period.

The coefficient of personnel stability is the ratio of the number of employees with work experience at the enterprise for more than one year (for a certain period) to the average number of employees for the corresponding period (Balabaniuk, 2011).



Source: based on (opendatabot.ua; www.vin.gov.ua; www.vn.ukrstat.gov.ua; ukrstat.gov.ua (2020–2022).

Fig. 9. Schematic presentation of the plan for transportation of agricultural products of leading agricultural enterprises of Vinnytsia region, 2023

We observe fluctuations in the staff turnover rate of the studied agricultural enterprises of Vinnytsia region, the average value of this coefficient is 2.31%, which is a relatively low value – positive, as for the personnel stability coefficient, its average value over the past five years is 61.09%, which is also a positive phenomenon, indicating the relative stability of the personnel of agricultural enterprises.

Next, we will define the next step of the study – determining the state of innovation of agricultural enterprises of Vinnytsia region. The main indicator of innovative activity is the integral indicator of the implementation of innovative potential.

To determine the integral indicator of the realization of innovative potential, the formula is used:

$$\Pi_{in} = \frac{\Pi_1 + \Pi_2 + \Pi_3 + \Pi_4 + \Pi_5 + \Pi_6}{t}, \quad (1)$$

where Π_{in} – the average value of the i -th indicator for t years; t is the analyzed.

The components of the integral indicator of the implementation of innovative potential are the factors of resource potential: labor resources, fixed assets, material and intangible resources, investment costs in innovative

activities, intellectual property and other components. The normative value of the integral indicator of the implementation of innovative potential is more than 0.5, which indicates that the economic entities of the region involve 50% of their resource potential in innovative activities: labor resources, fixed assets, material and intangible resources, carry out investment activities (attract investment funds) and are provided with intellectual property (Voinarenko and Skaliuk, 2008).

As a result of the calculation, a dynamic series of the integral indicator of the implementation of the innovative potential of leading agricultural enterprises of the Vinnytsia region over the last five years and its characteristics were obtained (Table 4).

Table 4

Dynamics of the integral indicator of the implementation of the innovative potential of leading agricultural enterprises of Vinnytsia region, 2019–2023

Agricultural enterprise	Years					Deviation 2023 from 2019		Average level of the integrated indicator of innovation potential realization, 2019, 2023
	2019	2020	2021	2022	2023	absolute, +, -	relative, v.p.	
	1	2	3	4	5	6	7	8
Archi LLC has a high value of the integral indicator of the realization of innovative potential	0,938	0,940	0,943	0,901	0,986	0,048	105,12	0,942
LLC "Lypivka-Agro" high value of the integral indicator of the implementation of innovative potential	0,894	0,801	0,788	0,722	0,869	-0,025	97,17	0,815
Agro-Etalon LLC high value of the integral indicator of the implementation of innovative potential	0,850	0,862	0,833	0,831	0,853	0,003	100,33	0,846
STOV AF "Olgopil" high value of the integral indicator of the implementation of innovative potential	0,806	0,790	0,845	0,818	0,838	0,032	103,93	0,819

End of Table 4

	1	2	3	4	5	6	7	8
PJSC "Dashkivtsi" has a high value of the integral indicator of the implementation of innovative potential	0,862	0,751	0,890	0,783	0,871	0,009	101,05	0,831
LLC "Peredovik" high value of the integral indicator of the implementation of innovative potential	0,798	0,812	0,845	0,831	0,854	0,056	107,03	0,828

Source: based on (opendatabot.ua; www.vin.gov.ua; www.vn.ukrstat.gov.ua; ukrstat.gov.ua (2020–2022).

Analyzing the calculated dynamic series of the integral indicator of the implementation of the innovative potential of the leading agricultural enterprises of Vinnytsia region over the last five years, it should be recognized that the studied agricultural enterprises have a high value of the integral indicator of the implementation of the innovative potential. Its average value is 0.847 p.p., an increase over the last period of 0.020 p.p., which determines the active innovation process in agricultural enterprises of the region.

The final stage of the study of the topic of management of the development of agricultural enterprises in rural areas of Vinnytsia region and its main indicators is the measurement of efficiency in the performance system and the methodology for assessing the activities of enterprises based on the integrated total productivity of factors of production of competitive agricultural products of the studied enterprises of Vinnytsia region.

The main indicators that determine the level of competition in industry markets and may indicate the need to change the institutional conditions of entrepreneurial activity are the concentration index and the Herfindahl-Hirschman index.

Concentration index – calculated as the sum of the squares of the shares of enterprises in the market, which is previously defined as the object of regulation:

$$C_n = \sum_{i=1}^n d_i^2, \quad (2)$$

where d_i – is the enterprise's share in the product (means of production) market; n – is the number of enterprises for which the indicator is calculated.

The Herfindahl-Hirschman index is calculated as the sum of the squares of the shares of all enterprises operating in the market defined as the object of regulation:

$$HHI = \sum_{i=1}^n d_i^2. \quad (3)$$

Ranging from 0 (competition) to 1 (monopoly of the seller or buyer), the index reflects market concentration and is often the main indicator in implementing policies aimed at ensuring economic competition. It effectively reflects the redistribution of shares between enterprises operating in the market, responding both to the growth of the leader's share and to changes in the number of market players (Vitvitskyi and Shvets, 2019).

Taking into account the previous economic indicators and calculations of the coefficients of the six leading agricultural enterprises of Vinnytsia region, we will calculate the production concentration index among the studied enterprises as the primary indicator of the agricultural market analysis. The advantages of the production concentration index are relatively little information, and the disadvantage is that all other enterprises on the market are not taken into account.

The dynamic series of the production concentration index among the leading agricultural enterprises of Vinnytsia region for the last five years is presented in Table 5.

Table 5

Dynamics of the production concentration index among leading agricultural enterprises of Vinnytsia region, 2019–2023, %

Agricultural enterprise	Years					Average concentration index, 2019, 2023
	2019	2020	2021	2022	2023	
Archi LLC	12,33	12,99	13,01	13,46	15,17	13,39
Lypivka-Agro LLC	11,22	11,54	11,86	12,18	14,67	12,29
Agro-Etalon LLC	10,11	10,09	10,71	10,90	14,83	11,33
Olgopil AF LLC	11,20	11,22	12,20	12,54	13,00	12,03
Dashkivtsi PJSC	10,09	11,07	12,05	13,03	14,33	12,11
Peredovik LLC	11,34	11,23	12,88	13,36	15,33	12,83

Source: based on (opendatabot.ua; www.vin.gov.ua; www.vn.ukrstat.gov.ua; ukrstat.gov.ua (2020–2022); Vitvitskyi and Shvets, 2019; Kyryliuk, 2016).

We note the average value of the production concentration index among the leading agricultural enterprises of Vinnytsia region is 12.33%, in the dynamics among the studied agricultural enterprises this index is growing, that is, the main production of agricultural products is concentrated among these business entities and this is evidenced by the previously determined specialization coefficient of each of these agricultural enterprises.

Next, we determine the Herfindahl-Hirschman index. Its advantages are the ability to determine the level of market monopolization, and the disadvantages are the difficulty in accessing information about the fate of all enterprises in the market and the calculation in the case of a large number of enterprises (Kyryliuk, 2016). Therefore, in our study, we operate on the initial statistical information of the studied agricultural enterprises and determine this index among them. The dynamics of the Herfindahl-Hirschman index of the leading agricultural enterprises of Vinnytsia region over the recent period is presented in Table 6.

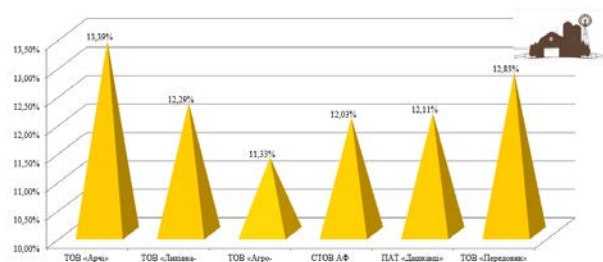
Table 6

Dynamics of the Herfindahl-Hirschman index of leading agricultural enterprises in Vinnytsia region, 2019–2023

Agricultural enterprise	Роки					Average value of the Herfindahl-Hirschman index, 2019, 2023
	2019	2020	2021	2022	2023	
Archi LLC	12,30%	12,70%	13,03%	13,44%	15,07%	13,31%
Lypivka-Agro LLC	11,27%	11,55%	11,89%	12,08%	13,67%	12,09%
Agro-Etalon LLC	10,12%	11,09%	11,71%	10,80%	13,83%	11,51%
Olgopil AF LLC	11,25%	11,23%	12,02%	12,55%	13,01%	12,01%
Dashkiivtsi PJSC	11,09%	11,80%	12,06%	12,54%	13,33%	12,16%
Peredovik LLC	11,34%	11,23%	12,84%	13,06%	13,77%	12,45%
Only six leading agricultural enterprises for determining the Herfindahl-Hirschman index	0,45	0,48	0,54	0,55	0,68	0,54

Source: based on (opendatabot.ua; www.vin.gov.ua; www.vn.ukrstat.gov.ua; ukrstat.gov.ua (2020–2022); Vitvitskyi and Shvets, 2019; Kyryliuk, 2016).

Referring to the normative scale of the Herfindahl-Hirschman index, as the main indicator in the implementation of a policy aimed at ensuring economic competition and one that reflects market concentration, we note that the studied business entities are competitive in the agricultural market of the region. The dynamics of the production concentration index among the leading agricultural enterprises of Vinnytsia region and the Herfindahl-Hirschman index are graphically presented in Fig. 10 and Fig. 11.



Source: based on (opendatabot.ua; www.vin.gov.ua; www.vn.ukrstat.gov.ua; ukrstat.gov.ua (2020–2022); Vitvitskyi and Shvets, 2019; Kyryliuk, 2016).

Fig. 10. Dynamics of the production concentration index among leading agricultural enterprises of Vinnytsia region, 2019–2023

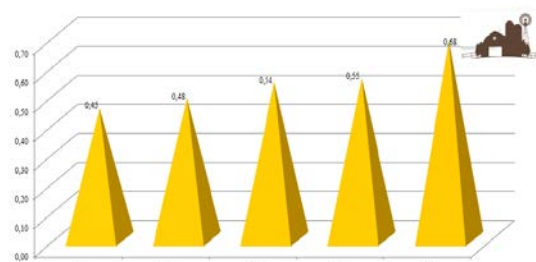


Fig. 11. Dynamics of the Herfindahl-Hirschman index of leading agricultural enterprises of Vinnytsia region, 2019–2023

Conclusions and prospects of the study So, finalizing the study of the main indicators of management of innovative development of agricultural enterprises in rural areas of Vinnytsia region, it should be noted that only the main part of them was studied, for a more detailed study, research, analysis, comparison, modeling and forecasting of these values, a wider range of economic, statistical, financial information of business entities is necessary, which can become a process of ensuring their high adaptability to the external environment.

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HOW TO CITE THIS ARTICLE

Matiienko, V. (2024). Formation of indicators for managing the innovative development of agricultural enterprises in rural areas. *Management*, 1(39): 127–143. <https://doi.org/10.30857/2415-3206.2024.1.11>.

МЕНЕДЖМЕНТ

журнал

Комп'ютерний набір та макетування

КРИВОНОС Олена

Технічний редактор

ГАНУЩАК-ЄФІМЕНКО Людмила

Відповідальний за поліграфічне виконання

ОВЕЧКІНА Лілія

Підп. до друку 19.06.2024. Формат 60×84 1/16.
Ум. друк. арк. 8,36. Облік. вид. арк. 6,55. Наклад 100 пр. Зам. 2120.

Видавець і виготовлювач Київський національний університет технологій та дизайну.
вул. Мала Шияновська, 2, м. Київ, 01011, Україна.

Свідоцтво про державну реєстрацію друкованого засобу масової інформації
Серія KB № 22130–12030 ПР від 16.05.2016.

Свідоцтво про внесення суб'єкта видавничої справи до державного реєстру видавців,
виготівників і розповсюджувачів видавничої продукції ДК № 993 від 24.07.2002.

MANAGEMENT

Journal

Computer Typesetting & Modeling

KRYVONOS Olena

Technical Editor

HANUSHCHAK-YEFIMENKO Liudmyla

Responsible for printing

OVECHKINA Liliia

Printing proof 19.06.2024. Format 60×84 1/16.
Conditional sheet 8.36. Calculated sheet 6.55. Circulation 100 copies. Order N 2120.

KNUTD Instant Printing Department.
Mala Shyianovska Street, 2, Kyiv, 01011, Ukraine.

Certificate KB № 22130–12030 ПР, 16.05.2016.

Certificate ДК № 993, 24.07.2002.