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ЗМІСТ / CONTENTS

L. Kovalska, I. Ierko, Yu. Barskyi

Mechanism for transforming the competitive potential of tourism industry subjects in the post-war period.....8

Л. Ковальська, І. Єрко, Ю. Барський

Механізм трансформації конкурентного потенціалу суб'єктів туристичної індустрії у повоєнний період.....8

L. Matviichuk, V. Korsak, S. Knysh

Development of partnership relations between hospitality industry entities amid Ukraine's European integration process 17

Л. Матвійчук, В. Корсак, С. Книш

Розвиток партнерських відносин між суб'єктами індустрії гостинності в умовах євроінтеграційного вектору України..... 17

S. Shults, O. Lutskev

Areas and tools for regulating spatial and structural changes in the economy of Ukraine's regions in the process of post-war recovery..... 27

С. Шульц, О. Луцьків

Напрями та інструменти регулювання просторово-структурних зрушень в економіці регіонів України в процесах повоєнного відновлення..... 27

E. Shahini, E. Shahini

Analysis of current investment projects and their economic justification..... 38

Е. Шахіні, Е. Шахіні

Аналіз поточних інвестиційних проєктів та їх економічне обґрунтування 38

O. Malanchuk, A. Tryhuba, R. Sholudko, V. Fedorchuk-Moroz

A model of synergistic management of a medical project portfolio based on the telegraphic equation..... 51

О. Маланчук, А. Тригуба, Р. Шолудько, В. Федорчук-Мороз

Модель синергетичного управління портфелем медичних проєктів на основі телеграфного рівняння..... 51



Mechanism for transforming the competitive potential of tourism industry subjects in the post-war period

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Abstract. The relevance of the research concerns the implementation of the mechanism for transforming the competitive potential of tourism industry entities in the post-war period to ensure market balance, stability, and competitiveness. Martial law conditions limit the capacities of the industry subjects to implement the concept of competitiveness transformation, which can lead to an imbalance in the tourism services market due to the lack of effective management. The purpose of the study was to develop a mechanism for transforming the competitive potential of tourism industry entities. The study employed both general scientific and special methods of research: methods of analysis and synthesis, method of generalisation, methods of analysis of facts, methods of system-functional approach, and method of systematisation. The essence of the transformation mechanism, presented in three blocks, is substantiated. The basis of the 1st block was a specification of the concept formation according to various scenarios, determination of goals, and institutionalisation. The purpose of the 2nd block was to determine the phases (turbulence, fluctuation, bifurcation, deformation, and transformation) of the transformation by the criteria (sustainability, safety, and competitiveness). The determinant feature of the 3rd block was the tools and means of implementing the transformation mechanism (support systems, development strategy, methods of implementation). The study highlighted a differentiated approach to the selection of transformation goals. The institutionalisation in this study was interpreted as a set of institutes and institutions, owing to which transformative processes can ensure the sustainability, safety, and competitiveness of the tourism industry. The legal, organisational, information, and marketing subsystems, which act as supporting subsystems, were analysed. The study focuses on such tools for the implementation of the transformation mechanism as marketing (ensuring tourists' satisfaction with the quality of tourist services), fiscal policy (regulation of costs and income), and reproduction (creation of new competitive advantages, restoration of tourist potential). The study elucidated the role of methods of implementing the mechanism for transforming the competitive potential of tourism industry subjects (planning, forecasting, and pricing), different intensities of influence, features of their manifestation, and time/periods of external and internal factors influence. The proposed mechanism is of great practical importance.

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The application of a differentiated approach to transformation processes will help to balance demand and supply in the market of tourist services

Keywords: tourism; tourism industry; tourist activity; subjects of the tourism industry; transformational processes; strategy

Introduction

Successful development of the tourism industry, forming and increasing competitive advantages in the field of tourism, including their reproduction, and safe sustainable development of the competitive potential of the subjects of the tourism industry require well-balanced actions to achieve balance in the market of tourist services, taking into account the relevant phase of transformation. In the conditions of martial law, the subjects of the tourism industry face certain challenges in implementing the basic postulates of the concept of competitive potential transformation, and management in these conditions also lacks effectiveness. The war and post-war periods cause an imbalance in the tourist services market due to the lack of a balanced mechanism for transforming the competitive potential of tourism industry subjects (TCPTIS). Creating such a mechanism can ensure balance in the market of tourist resources, stability, safety, and competitiveness of the tourism industry entities in the post-war period, taking into account the phases of transformation of competitive potential (CP). The above determines the relevance of this study.

Many recent studies focus on the analysis of existing approaches to the essence and structure of the transformation mechanisms. I. Usyk (2019) states that “under the conditions of globalisation challenges, the implementation of the mechanism of structural transformation of the Ukrainian economy development creates a basis for the balanced development of all spheres of life, based on the well-balanced use of resources to solve economic, social, and environmental problems”, and the development of the transformation mechanism includes a factor of balanced development of all spheres of activities at different levels of management. A. Pustovarov (2020), considering the structure of the mechanism of economic transformation, focuses on such management methods as “legal, organisational, economic, and psychological. Methods of legal regulation allow translating social relations into legal relations”. The author interprets organisational management methods as “the use of administrative and organisational means of influence on the digital transformation. These means include standards, permits, certificates, prohibitions, restrictions, regulations, rules, quotas, licenses, state programs, and projects”. Economic methods, according to the author, “can be of direct or indirect action. Methods of direct action include reduction of corporate income tax rates; concessional lending to business entities; provision of grants for the implementation of innovative projects; creation or development of business incubators, business

accelerators, industrial parks, innovation clusters, technological platforms; and public-private partnership. The methods of indirect action include search for potential investors; ensuring the access of subjects of innovative activity to the information needed for the creation and implementation of innovations; involvement of technical assistance; promotion of innovative products on domestic and foreign markets; protection against unfair competition”. According to A. Pustovarov (2020), the creation of a fund for entrepreneurship support is an important economic tool for stimulating economic development.

The scientists V.Y. Dorosh *et al.* (2023) note that “it is advisable to study the mechanism of public-private partnership, taking into account innovative approaches to its management, in particular, those that use digital transformation tools”. In the structure of the mechanism, the authors highlight the principles, methods, and instruments of its implementation. The emphasis is laid on the principles of transparency, purposefulness, effectiveness, distribution of costs, and mutual benefit, on the methods of forecasting and planning, and usage of the economic, financial, political, and legal instruments of the mechanism implementation. The authors argue the importance of digital transformation in the field of public-private partnership, considering it as a tool for implementing the concept of competitive potential transformation in the tourism industry. B. Markov (2017) defines the mechanism of transformation as a multifaceted process that should be studied as a sequence of actions and phenomena characterising regularities, cause-and-effect relationships, driving forces, and factors regarding the object of research.

Stability and safety in the post-war period are important aspects of studying TCPTIS. The team of authors N.V. Pavlikha *et al.* (2022) point out that sustainable development in the tourist sphere is a process that protects social justice, ensures environmental sustainability, and facilitates economic efficiency. Social justice means stabilising the social and cultural environment of tourist and recreational destinations, improving working conditions, increasing and expanding employment opportunities, and heightening the availability of tourist and recreational services. Ensuring environmental sustainability requires implementing resource-saving technologies, and greening economic activity in tourism and recreational projects, thus reducing their harmful impacts. On the other hand, economic efficiency is achieved by increasing the efficiency of the use of tourist and recreational resources, innovative development of

the tourist and recreational sector, and improving the quality and competitiveness of tourist and recreational services, their certification, and labeling. In his turn, N.V. Barvinok (2021) argues that security and tourism are interrelated and complementary notions, as tourism, certainly requires security and safety. The most important matter in ensuring the safety of tourism in the world is responsible management based on the concept of sustainable development associated with a clear understanding of tendencies for change in the indefinite future. The transformation mechanism is largely influenced by the tourist attractiveness of destinations, which depends on an objective assessment, investment attraction, and outline of measures to ensure TCPTIS. According to T.S. Smovzhenko & O.I. Hrafska (2020), the effective development of the tourism and recreation sphere in Ukraine is connected, first of all, with the intensification of the modernisation processes in the tourism infrastructure of Ukraine. Due to its obsolescence and low quality, this infrastructure is one of the main causes of the slow growth of the tourism and recreation sector and requires significant investment. The quality of tourist services is an important component of the TCPTIS mechanism. L.A. Bondarenko (2021) suggests that quality depends on benevolence, politeness, delicacy, and compliance with corporate standards.

The study aims to investigate and define the concept of TCPTIS, determine the phases of transformation using the selected criteria, and outline TCPTIS strategies.

Materials and Methods

Both general scientific and special methods were used in the research: methods of analysis and synthesis for researching the approach to the selection of the goals of the TCPTIS; the method of generalisation to review the existing approaches to the interpretation of essence and structure of the transformation mechanism, the methods of fact analysis to consider the scenarios of the TCPTIS phases, functional approach to determine the criteria (stability, safety, and competitiveness); method of systematisation to determine blocks of transforming the competitive potential (formation of the concept, determination of transformation phrases according to criteria, mechanism implementation). In addition, the use of the forecasting method helps to consider the mechanism of transformation in three directions and a pricing method substantiates establishing the optimal level of prices for tourist services, depending on the demand and need for them. The special research methods contributed to concluding that the mechanism of implementation of TCPTIS depends on security indicators (the number of people with average per capita total equivalent income per month below the subsistence minimum (at least 3 times), inflation rate (no more than 107), unemployment rate (no more than 10%), and the total coefficient of natural increase (at least 2.8 people). The study of these indicators is based on methodological

recommendations for calculating the level of economic security of Ukraine defined in the order of the Ministry of Economic Development and Trade of Ukraine (Order of the Ministry of Economic Development and Trade of Ukraine No. 1277, 2013). The mechanism for implementing TCPTIS involves the relationship between the values of the CP indices of the subjects of the tourism industry and the balance/unbalance between producers and consumers of tourism services. The researchers employed materials from scientific articles and monographs by reputable scientists (Chugunov *et al.*, 2018). The actual materials source of the study is a scientific article published by the team of authors I. Ierko *et al.* (2023), where the methodological concept of TCPTIS was analysed, phases of transformation were defined, and approaches and tools of TCPTIS were highlighted. Within the scope of the research topic, the article is its integral continuation.

Results and Discussion

A review of existing approaches to the definition of the content and structure of the transformation mechanism allows interpreting it as a set of conceptual approaches to TCPTIS, which is based on the differentiated choice of strategy, supporting subsystems, tools, and methods of implementation of such a mechanism following the determined criteria and phases of transformation. Three blocks are proposed to form the basis of the TCPTIS mechanism: block 1 – formation of the TCPTIS concept; block 2 – determination of transformation phases by criteria; block 3 – implementation of the TCPTIS mechanism (Fig. 1). In the 1st block, the concept of TCPTIS is formed according to various scenarios of development (realistic, optimistic, pessimistic and inertial), the goals of TCPTIS are determined, and the institutionalisation of TCPTIS is formed.

The basic principle of the concept of TCPTIS is the correlation between the level of CP of the tourism industry subject, which determines the corresponding phase of transformation (turbulence, fluctuation, bifurcation, deformation, transformation), and the level of balance between producers and consumers of tourist services (demand>supply, demand<supply, demand=supply). There is a certain connection between the phases of transformation and the scenarios of the CP development of the tourism industry subject. Under a realistic scenario, a phase of deformation will be observed, characterised by the recovery and development of the CP of the subjects of the tourism industry, increasing the tourist attractiveness of the territories. However, a realistic scenario is possible only in case of cessation of hostilities in Ukraine.

According to the optimistic scenario, a phase of transformation will demonstrate a high level of CP of the subjects of the tourism industry, balanced demand and supply in the market of tourist services, that is, this is the most desirable state of development. However, the

actualisation of the optimistic scenario is possible only under conditions of cessation of hostilities. The pessimistic scenario involves the phases of fluctuation and bifurcation when the market of tourist services is unbalanced and the level of CP of the subjects of the tourism industry is low. Such a scenario will be observed in the conditions of war continuation, active military actions, and the lack of balanced steps on the part of the governing bodies to stabilise the development of the CP of the tourism industry. It is caused by the lack of regulation and the uncontrollability of the destructive factors characteristic of war conditions. The phases of turbulence,

fluctuation, or bifurcation are characteristic of inertial scenarios. At the same time, a further deterioration of the situation caused by military actions is foreseeable and characterised by a decrease in the CP of the subjects of the tourism industry, a low level of GDP, and stagnation of entrepreneurial activity not only in the field of the tourism industry but also in other spheres of economy. A differentiated approach is relevant and worth using to determine the TCPTIS goals. The basis of a differentiated approach to TCPTIS is the criteria and phases (Table 1). An individualised system of goals of TCPTIS is formed according to each criterion and phase.

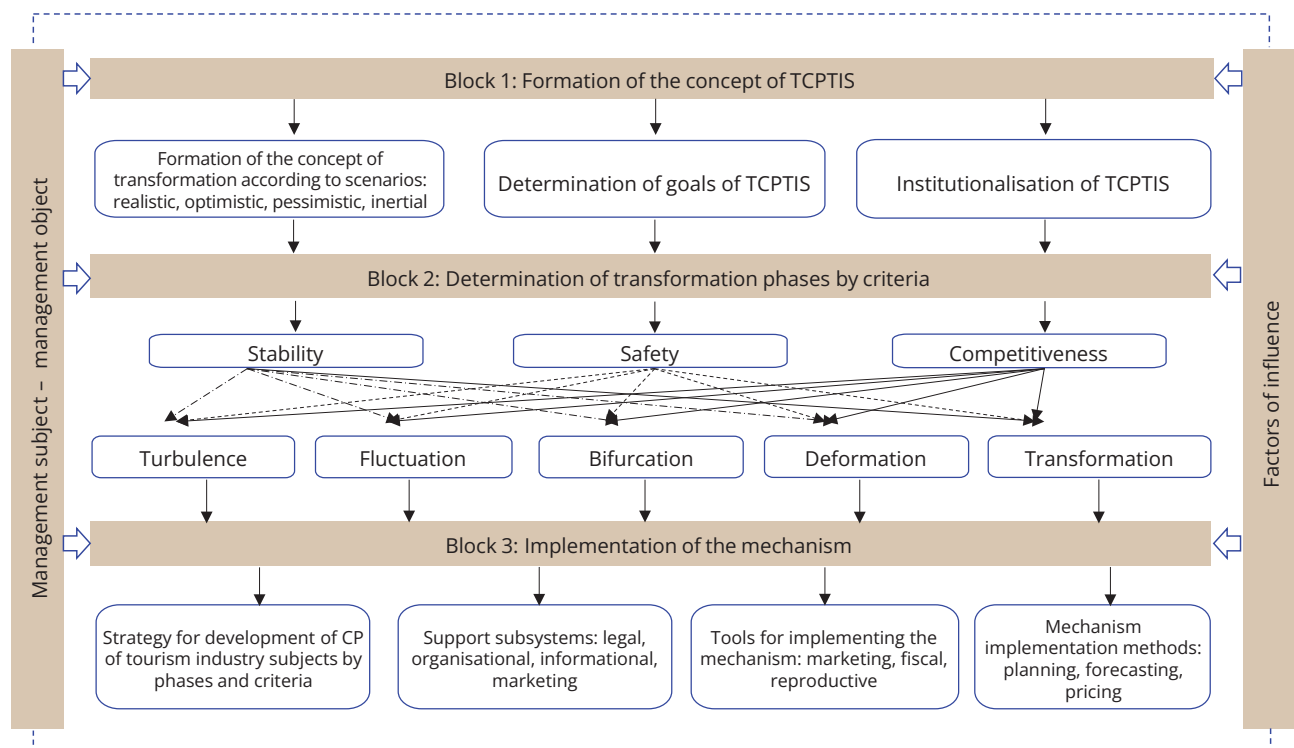


Figure 1. Mechanism of TCPTIS

Source: developed by the authors

Table 1. Differentiated approach to the selection of TCPTIS goals

TCPTIS goals		The criteria of transformation		
		Stability	Safety	Competitiveness
Phases of transformation	Turbulence	Stabilisation of the development of CP of tourism industry subjects, elimination of destructive factors affecting the growth of CP of tourism industry subjects, and increase in the level of consumers' satisfaction with the tourism industry	Increasing the effectiveness of the country's migration policy, aimed at reducing the migration flow of the population, strengthening the control of the development of the CP of the tourism industry subjects	Stabilisation of the efficiency indicators concerning the use of CP in the tourism industry sphere
	Fluctuation	Stabilisation of the sustainable development of the tourism industry	Guaranteeing the safety of the tourism industry development	Eliminating deviations in the development of CP of the tourism industry

Table 1, Continued

TCPTIS goals		The criteria of transformation		
		Stability	Safety	Competitiveness
Phases of transformation	Bifurcation	Elimination of crisis manifestations in the development of the tourism industry, elimination of the crisis in the socio-ecological and economic development of the CP of the tourism industry subjects	Overcoming threatening situations and crises in the development of the CP of the tourism industry subjects	Support (preservation) of the development of those types of CP of the tourism industry that have not been destroyed
	Deformation	Forming a new model of sustainable development of CP of tourism industry subjects	Ensuring the safe development of CP of the tourism industry subjects	Creating new competitive advantages and restoring CP in the tourism industry sphere
	Transformation	Support for the balanced socio-ecological and economic development of the tourism industry subjects	Maintaining a safe state in the development of the CP of the tourism industry subjects (safety of providing tourist services)	Increasing the CP of tourism industry subjects

Source: developed by the authors

Forming the institutional infrastructure of the tourism industry subject is an important integral element of the mechanism under discussion. O. Kovalova (2017) states that “the processes of transformational renewal of the structural policy, improving its effectiveness and operability depend on the proper institutional foundation, the quality of management decisions, and resources involved in this process. Every country chooses its peculiar way and time frame in transition from one model to another. Traditions, customs, attitudes to work, and the methods of the structural policy implementation play a decisive role here”.

Institutionalisation of TCPTIS involves establishing a set of institutes and institutions, via which the transformative processes could ensure the sustainability, safety, and competitiveness of the tourism industry development and, thus, promote, a balanced market of tourist services. Here, it is important to specify the state, regional, and local government bodies responsible for the development of CP in the tourism industry and determine the rules and norms of behavior in the market of tourist services.

The 2nd block deals with the phases of TCPTIS which are determined by the criteria. According to the research, the main TCPTIS criteria include stability, safety, and competitiveness. Each of these criteria is relevant at various phases of transformation (turbulence, fluctuation, bifurcation, deformation, and transformation).

The 3rd block of the mechanism focuses on the development of the strategy of TCPTIS, the formation of supporting subsystems, tools, and methods of implementing the proposed mechanism. When developing the TCPTIS strategy, it is worth using a differentiated approach, based on such criteria as the phase of transformation and the level of balance in the tourist services market. The results of theoretical and analytical studies provide grounds for distinguishing the following transformation phases: turbulence (T), fluctuation (F), bifurcation (B), deformation (D), and transformation (Tr). The tourist services market can be considered balanced when demand (D) = supply (S) and it is imbalanced when demand > supply, or demand < supply. Accordingly, there are 15 types of ratios (Table 2).

Table 2. Correlation between values of CP indices of tourism industry subjects and level of balance/imbalance between producers and consumers of tourism services

		Level of balance/imbalance		
		demand < supply	demand > supply	demand = supply
CP level	Turbulence	(T) = (D < S)	(T) = (D > S)	(T) = (D = S)
	Fluctuation	(F) = (D < S)	(F) = (D > S)	(F) = (D = S)
	Bifurcation	(B) = (D < S)	(B) = (D > S)	(B) = (D = S)
	Deformation	(Df) = (D < S)	(Df) = (D > S)	(Df) = (D = S)
	Transformation	(Tr) = (D < S)	(Tr) = (D > S)	(Tr) = (D = S)

Source: developed by the authors

To ensure the effective development of the tourism industry subject's CP, it is necessary to choose a strategy for each of these fifteen types of ratios. Legal, organisational, informational, and marketing subsystems act as supporting subsystems in the TCPTIS mechanism. The function of legal subsystem is to provide an appropriate legal framework for conducting business in the tourism industry and form legal regulatory bodies in the tourism industry, which can ensure the safety of tourists and the safety of business operations/activities of the tourism industry entities. V. Khudaverdiyeva (2022) claims that a legal system functions as a set of factors characterising the social, economic, legal, and other conditions ensuring the rights and interests of citizens, legal entities, and the state in the tourism sphere. N.A. Leonenko (2019) and T.P. Bezsmertniuk (2021) define the notion of ensuring the legal rights and interests of citizens as "increasing the guarantee and effectiveness of protecting the rights and legal interests of consumers of a tourist product and solving problems related to the satisfaction of travelers' (tourists') interests and the effectiveness of the tourism industry development, in general".

The organisational subsystem of the TCPTIS mechanism ensures the growth of the GDP and revenues from the tourism sector, the expansion of the tourism industry through scaling the types of tourist services, and the maximum satisfaction of consumer needs for quality tourism products. The study highlights such organisational aspects as the development of entrepreneurship in the field of the tourism industry by increasing the number of small and medium-sized business entities, the organisation of new types of tourism, the restoration of tourism business, the improvement of the territory attractiveness, the development of a network of organisational measures regarding the tourism business management.

The information subsystem provides the digitisation of tourist services, contributes to the effective processing of information flows in the system of forming a tourist product, facilitates the formation of an information base about tourist services and the tourism industry subjects, and implies the creation of computer reservation systems (CRS).

The marketing subsystem of the mechanism implementation aims at ensuring a balance between the supply of tourist services and the demand for them; searching for new methods of work and new types of tourist services; identifying and evaluating the current and potential demand for tourist services; searching for sales markets of tourist services. Marketing, fiscal, and reconstructive means are proposed as the tools to implement the TCPTIS mechanism. Marketing tools provide for meeting the needs of tourists for high-quality tourist services, supporting relations with consumers in the medium- and long-term perspectives, monitoring consumers' demands for tourist products, informing them about new types of services. The marketing tools

important for the implementation of the mechanism involve destination branding (formation of positive ideas, values, and attitudes of consumers to a tourist service or destination), event marketing (organisation and holding of special events and activities to familiarise consumers with the subject of the tourism industry and services provided), direct marketing (addressed mailing of information to consumers about types of tourist services), viral marketing (creating positive emotion in the consumer to promote the product).

Fiscal instruments regulate the costs and revenues of the relevant sectors of the economy. As K. Shaposhnykov *et al.* (2021) note, "fiscal instruments, by their very nature, are used directly to accumulate financial resources for business agents aimed at generating state budget revenues". The scientific papers by O. Liutyi (2017), I.Y. Chugunov *et al.* (2018), and A. Vatulov (2020) argue that in this context, "the key challenges include monitoring and assessing the impact of budget expenditures on the competitiveness of tourism entities; increasing the budgetary resources volume and structure justified for the performance of the tasks and functions empowered to authorities at all levels; expanding access to international capital markets; an increase in the budget deficit and public debt as a percentage of the gross domestic product. The goal is to keep them at an economically safe level. The fact, that a significant part of the financial resources of local self-government bodies is spent on the performance of the powers delegated to them, reduces their independence and the level of differentiation in regional development, thereby limiting to some extent the possibilities to strengthen the financial base".

The reconstructive tools provide for the reproduction of the CP of the tourism industry, the restoration of the tourist potential on the destroyed territories, the development of such types of tourism as green, medical, sports, educational, business, military; inspiring tourists' interest in "iconic places" of the post-war period, and renovation of tourist infrastructure.

The methods of planning, forecasting, and pricing are especially effective for the TCPTIS mechanism implementation. According to O. Kirilova (2009), "the forecasting and planning of tourist activity can be conducted in three directions: the study of demand, as a reflection of the public need for meaningful leisure time, which includes the study of markets by types, forms, classes of service and other requirements for the tourist products in various segments of the consumer market; study of the proposal as a reflection of the country's real conditions for the development of the tourism industry; assessment of the effectiveness of the current tourist product offer, its completeness, and quality following the existing demand and its possible changes; optimisation of the ratio of supply and demand in the market of tourist services". Factor models are most frequently used as a forecasting method. Their application provides a basis for determining the change in the level

of CP of the tourism industry subject depending on the influence of various factors of the external and internal environments.

Pricing, as a method of implementing the proposed mechanism, deals with determining the optimal level of prices for tourist services, depending on the demand and supply of them. V.R. Kupchak & K.V. Pavlov (2018) single out such approaches to pricing of a tourist product as "the cost approach (to calculate the cost price and the marginal markup for the final service); a competitiveness-based approach (takes into account the price policy of competitors); a conjunctural approach (to find out the specific features of the change and the impact of the market situation)". Every subject of the tourism industry forms its own price policy, the principal elements of which are the availability of prices, a system of discounts, and payment terms depending on the type of tourist service. The effectiveness of the pricing policy determines the profitability of the tourist business and its attractiveness to the tourist. In their research paper, R. Dudyak *et al.* (2018) state that "the price of tourism products can sometimes be considered as the basic factor that influences the choice of the service by consumers. This is characteristic of countries with a low purchasing power of the population and cheap tourist products or for countries in a state of economic crisis". Therefore, the level of prices for tourist services should be correlated with the phases of TCPTIS. In the deformation and transformation phases, the subject of the tourism industry forms a price policy satisfying the needs of consumers with a high level of purchasing power. In this case, a tourist package offers Luxury tourism services or some unique ones. For the remaining phases of the transformation, it is necessary to ensure the average level of prices for tourist services.

Another important issue that should be considered is the influence of external and internal factors on the TCPTIS mechanism. Such factors may have different intensities of influence, nature of manifestation, time/period of influence, and be unpredictable and uncontrollable. They are the factors that will determine the phase of the transformational process and the balance in the tourist services market. Therefore, in this case, the ability of the subjects of transformational process management to respond quickly and efficiently to any manifestations of positive and negative influences is significant, as well as their readiness to take preventive measures to eliminate their destructive impact on the development of the CP of the tourism industry subjects.

Conclusions

The study elucidates the features and structure of the TCPTIS mechanism in the post-war period. Determination of blocks and criteria, differentiated approaches, and institutionalisation of the transformation mechanism

are interpreted as basic elements for its development. The analysis of modern approaches to the formation of the mechanism of TCPTIS contributes to the understanding of this process as a complex of conceptual approaches. It is based on the choice of strategy, means, and methods depending on the chosen path and phases of transformation. The study considers the transformation mechanism through the analysis of its three blocks: formation of the concept, definition of phases of transformation by criteria, and implementation of the mechanism. These approaches can contribute to increasing the effectiveness of management of the TCPTIS process in the post-war period. At the basis of the differentiated approach to defining the goals of TCPTIS are three criteria: sustainability, safety, and competitiveness, which are the most significant for the successful development of the tourism industry. Sustainability implies the ability of the economy to adapt to varying social, economic, and environmental conditions, ensuring long-term development. Safety means the assurance of the safety and protection of tourists, reducing the risks of negative events or accidents. Competitiveness needs constant improvement of the quality and attractiveness of tourist offers and the preparedness to compete in the market of tourist services. The study offers insights into the role of various subsystems and tools in the implementation of the mechanism, namely: the strategy of developing the competitive potential of tourism industry entities by phases and criteria; support subsystems (legal, organisational, informational, marketing); tools for implementing the mechanism (marketing, fiscal, reproductive); methods of the mechanism implementation (planning, forecasting, pricing). The transformation mechanism provides various subjects of the tourism industry with the opportunity to choose optimal development strategies depending on their internal resources, level of competitiveness, and specifics of their activity. Such a differentiated approach will allow the subjects of the tourism industry to ensure diversity and compliance of supply options with demand needs, which will contribute to the balanced development of the tourist services market and increase the overall level of competitiveness of the industry. Therefore, the proposed mechanism of transforming the competitive potential and a differentiated approach to TCPTIS can help to balance the demand and supply in the market of tourist services. The study findings are important in the practical sphere, for example, for the analysis of the tourism industry of Ukraine in modern conditions.

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Conflict of Interest

None.

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Механізм трансформації конкурентного потенціалу суб'єктів туристичної індустрії у повоєнний період

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Анотація. Актуальність дослідження полягає у впровадженні механізму трансформації конкурентного потенціалу суб'єктів туристичної індустрії в повоєнний період для забезпечення збалансованості ринку, стійкості та конкурентоспроможності. Умови воєнного стану обмежують здатність суб'єктів галузі реалізувати концепцію трансформації конкурентоспроможності, що може призвести до дисбалансу на ринку туристичних послуг через відсутність ефективного управління ними. Мета дослідження полягала у розробці механізму трансформації конкурентного потенціалу суб'єктів туристичної індустрії. У дослідженні було використано як загальнонаукові, так і спеціальні методи: методи аналізу та синтезу, метод узагальнення, методи аналізу фактів, методи системно-функціонального підходу, метод систематизації. Встановлено суть механізму трансформації, в якому відображено три блоки. В основу 1 блоку входило формування концепції, а саме: формування концепту за різними сценаріями, визначення цілей та інституціоналізація. Суть 2 блоку визначала фази (турбулентність, флуктація, біфуркація, деформація та трансформація) трансформації за критеріями (сталість, безпечність та конкурентність). Детермінантою 3 блоку була реалізація механізму трансформації: забезпечуючі системи, стратегія розвитку, інструменти та методи реалізації. Розглянуто диференційований підхід до вибору цілей трансформації. Встановлено, що інституціоналізація у цьому дослідженні передбачала набір інститутів та інституцій, завдяки яким забезпечуються трансформаційні процеси у забезпеченні сталості, безпечності та конкурентності розвитку туристичної індустрії. Проаналізовано правову, організаційну, інформаційну та маркетингову підсистеми, які виступають в ролі забезпечуючих підсистем. Досліджено маркетингові (забезпечують задоволення потреб туристів у якісних туристичних послугах), фінансові (регулювання витрат та доходів), відтворювальні (відтворення конкурентних переваг, відновлення туристичного потенціалу) інструменти реалізації механізмів. Окреслено роль методів реалізації механізму трансформації конкурентного потенціалу суб'єктів туристичної індустрії, а саме: планування, прогнозування та ціноутворення. Виявлено різну інтенсивність впливу, характер прояву, часовий період чинників зовнішнього та внутрішнього впливу. Запропонований механізм має практичне значення та повинен сприяти застосуванню диференційованого підходу до процесів трансформації, що допоможе збалансувати попит та пропозицію на ринку туристичних послуг.

Ключові слова: туризм; індустрія туризму; туристична діяльність; суб'єкти індустрії туризму; трансформаційні процеси; стратегія



Development of partnership relations between hospitality industry entities amid Ukraine's European integration process

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Abstract. The development of partnership relations among hospitality industry entities has gained particular relevance amid Ukraine's European integration course. Collaboration between government institutions, business entities, and local communities creates new opportunities for enhancing competitiveness and integrating into the European market. The aim of the study was to propose approaches for establishing partnerships between business entities based on the analysis of existing types of partnerships that promote the development of the hospitality industry and contribute to regional economic growth. The study's main methodological framework included economic-mathematical and comparative analyses, as well as empirical and theoretical methods. The article analysed tax revenues from hospitality industry entities for the period 2021-2023, revealing a general decline in tax revenues from the hospitality industry overall. It has been proven that cooperation between government institutions, local communities, private businesses, and non-governmental organisations creates conditions for balanced resource use and the development of innovative solutions that contribute to the preservation of the natural environment and cultural heritage. A stakeholder grouping was carried out, which allows for a multi-level approach to developing the hospitality industry based on integrating the interests of various market participants. The structure of relationships between hospitality industry entities in the context of European integration has been identified and systematised (cooperative relations, competitive relations, symbiotic relations, contractual relations, alliance, and cluster relations). The effectiveness of specialised alliances and cluster associations, which are based on voluntary cooperation between various industry participants striving to achieve long-term development goals, has been proven. The impact of partnership relations on the development of Ukraine's tourist destinations has been studied and described. The study emphasised the adaptation of Ukrainian hospitality industry entities to European quality standards and their cooperation in achieving sustainable development. The practical significance of the study lies in the development of methodological recommendations that can be used by: business entities to improve partnership relations and enhance competitiveness in the European market; local

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authorities to promote the development of the hospitality industry; and educational institutions to train personnel in accordance with the requirements of the European market

Keywords: higher education institutions; panel data; econometric modelling; fixed and variable effects; pooled regression; employment

Introduction

In the context of Ukraine's European integration trajectory, partnership relations between hospitality industry entities have become particularly relevant. European integration promotes the establishment of new standards and requirements for service quality, making cooperation among all market participants essential. Partnerships enable hospitality industry entities to effectively exchange experiences, knowledge, and resources, thereby enhancing their competitiveness and the quality of services at the international level. Collaboration between hotels, restaurants, travel agencies, and other businesses in the industry is key to sustainable development in the context of integration with the European market.

Cooperation with European partners and investors provides Ukrainian hospitality businesses with access to innovative technologies, new management methods, and marketing tools. Ukraine's course towards European integration opens new opportunities for cooperation between government, private structures, and international organisations, thus raising quality standards. Establishing effective partnerships in the hospitality industry, while considering economic, social, and environmental aspects, requires detailed analysis. One of the key aspects of partnership relations is the optimisation of interaction among various stakeholders, such as hotels, restaurants, travel agencies, local communities, and authorities. It is important to understand how cooperation between these entities can contribute to the creation of high-quality tourism products that meet European standards and global competition.

Partnership relations between business entities are an essential aspect of developing the hospitality industry, contributing to regional economic growth and adaptation to European integration requirements. Studying the challenges these entities face and developing recommendations for improving cooperation is vital for sustainable development and enhancing international competitiveness.

Researchers M. Stehnei & K. Khaustova (2020) identified factors affecting the development of the hospitality industry. Their study analysed the reasons hindering the development of Ukraine's hospitality industry during military actions and explained the projected impact of the war on its future development.

Scholars D. Ofori & C. Appiah-Nimo (2021) examined the impact of managing relationships with suppliers and customers on the competitive advantages and performance of hotels. They analysed the hypothetical relationship using structural equation modeling via the

partial least squares method (PLS-SEM) and demonstrated that customer relationship management has a significant positive impact on hoteliers' competitive advantage.

Researcher N. Barvinok (2022) evaluated the impact of global security factors on the development of Ukraine's international tourism industry from 2011 to 2021. The author focused on the effects of Russian military-political aggression on the development of Ukraine's hospitality industry, analysed the causes hindering the growth of Ukraine's tourism sector during wartime, and explained the predicted consequences of the war for the hospitality industry, as well as the crisis phenomena following large-scale hostilities. She also provided examples of countries that overcame crises and quickly restored international tourism on their territories, developing it with renewed strength.

A. Humenyuk (2022) studied the main scientific approaches to classifying factors influencing the development of hospitality. These include approaches that classify the factors of forming partnerships between hospitality entities and related market participants (partnership features), approaches that structure these factors with a focus on productivity (key influences) and future predictability, and approaches that classify factors influencing customers' choices of hospitality establishments (customer preference features). Additionally, there are approaches that classify the factors influencing customer selection of hospitality establishments, as well as those based on key hospitality development factors, characteristic of the current stage of development, including efficiency factors (or key influencing factors), predictive factors, partnership development factors, customer preferences, and market factors.

Researchers H. Tarasiuk & V. Piankov (2022) studied the stages of hospitality development according to J.R. Walker, highlighting and analysing the periods of hospitality industry establishment in Ukraine: the "Soviet service" period before 1991, the post-Soviet period from 1991 to 2004, the revival stage from 2005 to 2013, the stagnation period from 2014 to 2016, the quantitative and qualitative flourishing of the national hospitality industry from 2016 to 2019 due to the transformation and emergence of new entities and service diversification, the COVID-19 and post-COVID-19 period of 2020 to 2021 focusing on safety, individualisation, and development prospects of "tourism magnets" and the promotion of the national tourism brand; and 2022 – the socially conscious stage of reorienting hospitality entities to basic

human values and needs, with adaptation to operating under full-scale war conditions.

Researchers M. Kryshchanovych *et al.* (2023) examined the effectiveness of regulatory relations between entities at the local level and proposed optimising the local aspects of national business safety regulation within the context of sustainable development. They found that national regulatory acts often fail to account for all safety aspects. The publication presents a model for optimising the local aspects of national business safety regulation for a specific region, taking into account sustainable development principles.

B.S. Shuliuk (2023) studied the conceptual, theoretical, methodological, and practical aspects of the financial mechanism of public-private partnership. The research focuses on using financial tools and levers to develop partnership relations between the state and business. The work proposes an original approach to modernising the financial mechanism of public-private partnership in line with the goals of the country's socio-economic development.

Researchers J. Langgat *et al.* (2023) examined hotels that employ environmentally sustainable practices. Based on a survey of 169 hotel managers with 3 to 5-star ratings, structural equation modeling using partial least squares (PLS) was performed. The results highlighted the importance of supporting and developing environmentally sustainable practices at all levels, from government management bodies to tourist-receiving communities.

Researcher S. Gazuda (2024) proposed a new approach to stakeholder grouping as an important component in the branding development of agricultural regions within the context of European integration, where each group has unique interests, resources, capabilities, and expectations that can be mobilised to achieve shared goals, formulate effective strategies, and implement them. The research demonstrates that the institutional infrastructure for branding development in regions, within the context of European integration, combines several key elements whose interconnected interests are aimed at supporting and fostering effective partnership relations between agricultural sector entities.

V. Zhmudenko *et al.* (2024) identified the features of strategic management of tourism and hospitality business entities and emphasised the importance of implementing modern industry development trends, particularly in the areas of digitalisation and digitisation. They proposed strategic measures to improve the state of the hospitality and tourism industry in Ukraine, regardless of whether the focus is on foreign or internal tourists.

Research into partnership relations in the hospitality industry highlights the importance of integrating social, environmental, and economic principles of sustainable development to achieve long-term success and meet modern global requirements. To enhance the competitiveness and service quality provided by business entities, it is advisable to analyse and identify ways

to develop partnership relations among hospitality industry participants amid Ukraine's European integration processes.

Materials and Methods

During the research, various scientific methods were employed to ensure the reliability of results and contribute to the formation of well-founded conclusions. In particular, the empirical method allowed for the collection of factual data regarding the activities of hospitality industry entities and for analysing them based on specific observations and real indicators. This method provided practical insights into the dynamics of changes in the hospitality industry and the interactions among partners. The theoretical method was applied to analyse existing scientific approaches, concepts, and models in the field of partnership development in the hospitality industry. It enabled the identification of the main trends used in global practice and allowed for the formulation of new hypotheses and suggestions for further research on adapting these concepts within the context of Ukraine's European integration. The analytical method helped break down the complex processes of forming partnerships into individual aspects for more detailed analysis, allowing for a deeper understanding of each stakeholder's role in the hospitality industry's development and assessing their contributions to forming competitive tourism products. The economic-mathematical method was used for the statistical analysis of collected data regarding the business activities of hospitality entities, establishing mathematical relationships among the studied indicators, such as tax revenues from the hospitality industry.

The primary data for analysis were statistical materials, particularly from the State Agency for Tourism Development of Ukraine (Public report of the head..., 2024) and the National Tourism Organization of Ukraine (Strategic Roadmap..., 2024). These sources provided data on tax revenues from hospitality industry entities for the years 2021-2023, enabling the graphical interpretation of the dynamics of tax revenues from the studied entities. Data from the State Statistics Service of Ukraine (2020) was analysed to determine the quantitative indicators of registered hospitality entities in Ukraine for identifying types of partnerships among hospitality stakeholders. Additionally, analytical reports from the World Tourism Organization (Global and regional tourism performance, 2024) and the World Economic Forum (Travel and tourism, 2024) were used in the study, allowing for the analysis of global trends in the studied industry.

The data were classified and systematised for further analysis. These sources provided an objective basis for analysing the dynamics of industry development and assessing the impact of external factors on the activities of hospitality entities. The collected and processed analytical and statistical materials allowed for characterising

the state, structure, and dynamics of the relevant indicators of partnership relations among hospitality industry entities in the context of Ukraine's European integration.

An economic-statistical analysis of the performance indicators of hospitality industry entities was conducted, revealing trends and patterns in the development of the studied sector. Additionally, a graphical model was developed to illustrate changes in tax revenues and subsidies from hospitality industry entities. Based on the obtained results, a series of recommendations was formulated to enhance the development of partnership relations among hospitality industry entities within the framework of Ukraine's European integration.

Results and Discussion

In the context of contemporary European integration processes, Ukraine faces new challenges and opportunities concerning the adaptation of the hospitality industry to European norms and standards. Partnership relations among stakeholders in the development of the hospitality industry have become an important factor in ensuring competitiveness, innovation, safety, and the stable development of these processes, facilitating the integration of products and services into the global market and attracting foreign investment for regional reconstruction.

Ukraine's integration into the European economic space promotes the opening of new markets and the creation of additional opportunities for small and medium-sized businesses in the hospitality industry; however, it also raises the requirements for the quality of products and services, infrastructure, and the management of business processes. A crucial aspect is the role of government support and regulatory mechanisms that influence the development of partnership relations among hospitality industry entities. The results of the research indicate the need to establish a favourable legal framework that would encourage entrepreneurs to engage in more active cooperation and participation in international projects and initiatives. In the context of European integration, it is essential to ensure that Ukrainian quality standards align with European norms, which will enhance the competitiveness of Ukrainian products and services in the global market.

Understanding the nature of the interconnections between the main stakeholders in the hospitality industry is vital for creating a conducive environment for these processes. Partnerships among entities such as hotels, restaurants, travel agencies, service providers, local government authorities, and educational institutions are crucial for ensuring sustainable development and adapting to European standards. Such interconnections require synergistic interaction, where each participant plays an important role in achieving common goals and creating competitive advantages. Effective partnerships are possible under conditions of transparent communication among stakeholders, joint development of strategies, and investment in service quality (Mazur, 2023).

For example, educational institutions can contribute to raising the qualification level of personnel necessary for the innovative development of the industry, while local authorities can create favourable conditions for attracting investments and supporting entrepreneurship. At the same time, the business environment in the hotel and restaurant industry can become a significant partner in promoting regional branding and tourism attractiveness. This interconnection not only promotes economic growth but also fosters the development of social capital, improves the level of mutual trust among stakeholders, and stimulates the application of innovative approaches to problem-solving.

The development of local and international partnerships is also an important aspect, allowing for the exchange of experiences, technologies, and best practices, which, in turn, contributes to the overall enhancement of the competitiveness of Ukraine's hospitality industry within the framework of European integration. Creating such an environment requires the active participation of all parties in modernisation processes, innovative development, and the establishment of sustainable connections, ensuring the long-term development of the hospitality industry and its integration into global markets (Brinkerhoff & Brinkerhoff, 2011).

Grouping stakeholders in the development of the hospitality industry, especially in the context of European integration, plays an important role in forming effective strategies and implementing regional development goals. This approach allows for better coordination of efforts among different participants in the process and ensures effective solutions to urgent problems facing the industry.

It is reasonable to distinguish the following types of partnerships among hospitality stakeholders:

- ▣ government and local authorities: they play a key role in establishing the regulatory framework governing the hospitality industry and creating incentives for business development through support programs and favourable investment conditions. The context of European integration opens up opportunities for Ukraine's participation in European infrastructure projects, which can support the development of tourist regions and enhance their attractiveness;

- ▣ business entities in the hospitality industry: these are the main executors of the studied processes, as the businesses provide direct services within the industry. Partnerships among them not only improve service quality but also optimise costs through shared resource utilisation, marketing campaigns, and the adoption of new technologies. Additionally, collaboration among different entities within regions fosters the development of local tourist routes and the creation of comprehensive tourism products that meet European standards;

- ▣ external and internal investors: they play a significant role in the development of regional tourist infrastructure. European integration processes stimulate the

attraction of foreign investors who possess the experience and financial resources to implement large projects, which may include building modern tourist locations, recreational areas, and developing transportation infrastructure that attracts more tourists and visitors;

▣ educational and research institutions: they provide training and preparation of qualified personnel for the hospitality industry and conduct research to enhance the efficiency of business processes, implement innovations, and adapt to new market conditions. The involvement of these stakeholders is essential for ensuring the sustainable development of the hospitality industry through continuous improvement of the quality of products and services;

▣ local communities: they also significantly influence the development of hospitality, acting as both service providers and consumers of the industry's outcomes. They can actively engage in creating tourism products, the development of which contributes to preserving cultural heritage and maintaining the ecological balance of the areas. In the context of European integration, it is crucial for local communities to participate in decision-making processes and collaborate with other stakeholders to develop regional tourist clusters and other professional associations.

Thus, grouping stakeholders allows for the formation of a multi-level approach to the development of the hospitality industry based on the integration of the interests of various market participants. The interaction of these groups contributes to the creation of effective strategies that meet European standards and consider the specifics of each region, enabling not only improvements in the quality of products and services but also sustainable socio-economic growth and international competitiveness of the Ukrainian hospitality industry.

Business entities in the hospitality industry encompass a wide range of business structures that provide services in tourism, hotel management, restaurant services, and related activities aimed at meeting the needs of tourists and guests. This group includes hotels and other accommodation establishments, dining establishments, travel agencies, and tour operators, as well as companies providing transportation services and leisure organisation (Jawabreh *et al.*, 2020). They are the main service providers in the hospitality industry, and their activities determine the overall quality of products and services in the region.

One of the key aspects of developing business entities is the implementation of modern service standards adapted to the requirements of the European market, which includes infrastructure modernisation, staff qualification improvement, and the development of new services that meet the needs of international tourists. For hotels and restaurants, this means ensuring a high level of comfort, safety, and individual approach to each guest, which are the essential components of European hospitality culture. Partnership relations among busi-

ness entities are a crucial element in the development of the hospitality industry. Interaction between hotels, restaurants, travel agencies, and other businesses allows for the creation of comprehensive tourism products, enhancing the attractiveness of regions for international tourists. This collaboration may include joint marketing campaigns, the development of tourist routes, and special offers for guests, contributing to better satisfaction of their needs and expectations.

Furthermore, the activities of hospitality entities contribute to job creation in the region, attracting investments, and infrastructure development. They are important elements in the formation of regional tourist clusters that unite different businesses within common development strategies and collaborations with local communities, government authorities, and investors. G. Shamborovskyi *et al.* (2022) noted that as of 2022, international tourism has gained particular importance in the context of the globalisation of the world economy, becoming one of the crucial factors in the social and economic development of countries worldwide.

As noted by I. Shyshkin *et al.* (2023), the tourism sector is a vital component of the external economy of countries worldwide, and various negative factors, including the COVID-19 pandemic, significantly impact their further development. In the context of European integration, business entities in the hospitality industry face challenges related to the introduction of new regulatory norms and quality standards. To successfully adapt to these new conditions, they need to embrace innovation and continually enhance their competitiveness, which includes the implementation of digital technologies, the development of eco-friendly practices, the preservation of cultural authenticity, and sustainable development – all of which are crucial factors for attracting modern tourists and integrating hospitality services (Scholz *et al.*, 2023).

The military actions of Russia in Ukraine have negatively affected the hospitality industry, leading to a significant decline in activities, a reduction in the number of tourists, and a decrease in revenues from the sector. During active hostilities, most hotels, travel agencies, and other hospitality industry entities were forced to suspend their operations or significantly reduce the volume of services provided, directly impacting tax revenues. The reductions were particularly noticeable in categories such as hotels and tour operators, where revenues decreased by more than 15%. At the same time, uncertainty and risks for foreign tourists led to a decline in both internal and international tourist flows, further exacerbating the crisis in the hospitality industry. The loss of seasonal income and the reduction of tourist infrastructure, especially in regions close to combat zones, became the main factors contributing to the decline in revenues. The dynamics of tax revenues from hospitality industry entities are illustrated in Figure 1.

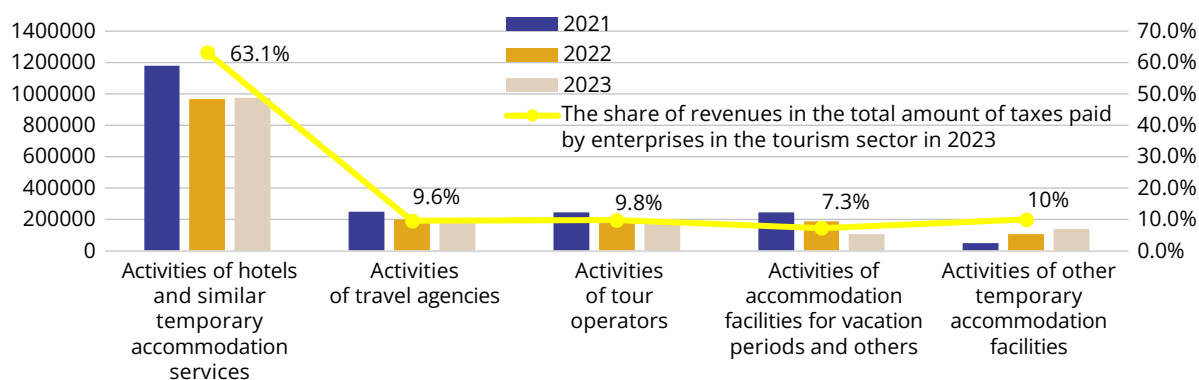


Figure 1. Dynamics of tax revenues from hospitality industry entities

Source: compiled from the Public report of the head of the State Tourism Development Agency of Ukraine Maryana Oleskiv for 2023 (2024), Strategic Roadmap "Recovery of small and medium-sized businesses in the tourism and hospitality sector in 2023-2033" (2024), V. Zhmudenko et al. (2024)

Despite the negative impact of the war, some segments of the industry, such as other temporary accommodation services, have managed to show growth. This may be linked to the movement of internally displaced persons temporarily staying in safe regions of Ukraine, creating demand for alternative accommodation options. However, this positive trend was not sufficient to compensate for the overall decline in tax revenues from the industry as a whole. The further development of the hospitality industry during wartime will depend on government support aimed at stabilising the situation in the country, restoring tourist confidence, rebuilding infrastructure, and stimulating business activity in the sector.

The presented graph illustrates changes in tax revenues from various types of hospitality industry entities (activities of hotels and similar temporary accommodation services, travel agencies, tour operators, vacation accommodation, and other temporary accommodation services). In 2021, tax revenues were the highest for the studied period (2021-2023) among all categories of hospitality industry entities. In 2022, tax revenues from different types of hospitality activities significantly decreased. An analysis of statistical data from the National Tourism Organization of Ukraine (Strategic Roadmap..., 2024) and the State Agency for Tourism Development (Public report of the head..., 2024) revealed that the highest tax payment figure for the first nine months of 2023 came from the hotel sector – 916647.7 UAH (63.2%), while other temporary accommodation services paid 145769.4 UAH (10.0%), tour operators contributed 142197.6 UAH (9.8%), travel agencies paid 138015.6 UAH (9.5%), and vacation accommodation and other temporary residences accounted for 106385.1 UAH (7.3%). In percentage terms, the total number of taxpayers decreased by 11% in the first nine months of 2023 compared to 2022 and by 36% compared to the pre-war year of 2021. Overall, the data indicate a gradual decline in tax revenues from hospitality during the specified period, attributed to the challenging political and economic situation.

The integration of different stakeholder groups contributes to the sustainable development of the hospitality industry in regions, as it allows for the consideration of environmental, social, and economic aspects in tourism development strategies and programs. Cooperation among government institutions, local communities, private businesses, and non-governmental organisations creates conditions for balanced resource use and the formulation of innovative solutions that support the preservation of the natural environment and cultural heritage.

The environmental aspect involves the implementation of eco-friendly technologies and approaches in the operations of hospitality entities, including the use of energy-efficient systems, waste minimisation, the adoption of circular economy principles, and the preservation of natural landscapes (Hamzah *et al.*, 2021). As noted by A. Khatter *et al.* (2019), with the support of local-level stakeholders, it is possible to create environmentally responsible tourism products that meet the requirements and needs of tourists, fostering socio-economic growth in regions.

The social aspect focuses on engaging local communities in decision-making processes and the implementation of tourism projects, which helps preserve local traditions and culture while ensuring an equitable distribution of economic benefits among residents of the region. Integrating local communities into tourism projects not only creates new jobs but also enhances the level of mutual trust between entrepreneurs and the population, positively impacting social stability and development (Imran *et al.*, 2018).

The economic aspect focuses on creating competitive products and services based on partnerships between business entities, educational institutions, and local authorities. This approach promotes investment in infrastructure development, enhances service quality, and attracts new markets. By engaging foreign investors and collaborating with international organisations, regions can more effectively integrate into the global tour-

ism industry, increasing their revenues and creating long-term development opportunities. Thus, the integration of environmental, social, and economic aspects through partnerships among various stakeholders ensures a comprehensive approach to the sustainable development of the hospitality industry, enhancing the tourism attractiveness of regions, ensuring long-term stability, and fostering the prosperity of local communities while preserving natural resources and improving the quality of life for residents (Al-Saady & Rezouki, 2022).

Partnership relations allow for the attraction of a wide range of resources and expertise to achieve a common goal – enhancing competitiveness by creating quality products and services in the hospitality industry. This collaboration involves interaction among private enterprises, local authorities, educational institutions, investors, and local communities, enabling more efficient use of available resources and creating opportunities for hospitality development.

Partnerships with educational institutions facilitate the improvement of professional standards through training programs and the preparation of specialists equipped with the necessary skills to provide quality services. This helps hotels, restaurants, and travel agencies implement modern service standards that meet the expectations of contemporary tourists. Such initiatives also encourage hospitality enterprises to adopt innovations, including technologies aimed at enhancing service processes.

Collaboration with local authorities provides support for developing tourism infrastructure, a crucial element in increasing the attractiveness of tourist destinations and regions. Authorities should provide incentives and investment stimuli for enterprises engaged in tourism infrastructure development, assisting them in

securing funding for building new hotels, entertainment complexes, or tourist attractions. Such partnerships also contribute to creating a favourable legal and regulatory environment that facilitates business operations within the hospitality industry.

Investors are important participants in partnership relations. Their involvement allows for the attraction of financial resources for implementing large hospitality industry projects, such as developing new tourism products, improving infrastructure, or introducing innovative technologies. Partnership with investors not only increases the level of capital investment in the region but also ensures long-term financial stability for hospitality entities.

Interaction with local communities is also a vital part of partnership relations. Local residents can actively participate in developing tourism products and services, considering and promoting the region's authentic features, culture, and natural resources. This approach enables the creation of unique tourism products and services that appeal to tourists, subsequently enhancing the region's competitiveness. Partnerships among different stakeholders allow for the combination of their resources to create quality products and services that elevate the competitiveness of the hospitality industry. This, in turn, fosters sustainable hospitality development, opening new opportunities for growth, investment attraction, and integration into global and European markets. Clearly defined areas of cooperation among stakeholders allow for the coordination of efforts between businesses, educational and research institutions, government bodies, communities, and other interested parties to create new and high-quality products and services. The structure of relationships among hospitality industry entities in the context of European integration is illustrated in Figure 2.

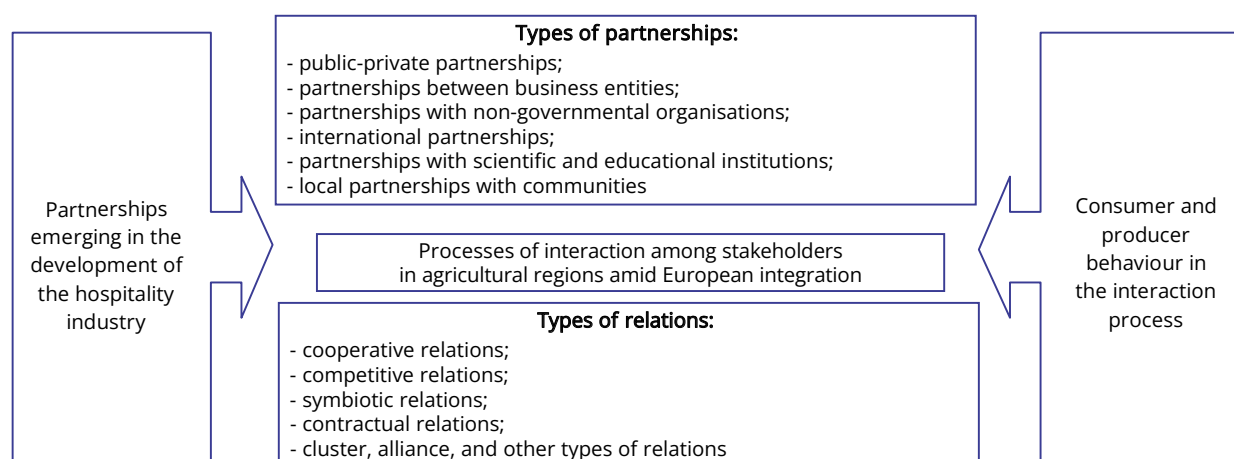


Figure 2. Structure of relationships among hospitality industry entities in the context of European integration

Source: developed by the authors

The types of relationships in partnerships emerging during the development of the hospitality industry reflect various forms of interaction among industry

participants, including businesses, government bodies, educational institutions, and communities. These relationships can vary in terms of cooperation level, control,

and resource exchange. The main types of relationships are worth noting:

- ▣ cooperative relations: these are relationships in which partnership participants collaborate to achieve a common goal. Such interaction is based on the exchange of knowledge, resources, and experience. Cooperative relations facilitate effective role distribution and responsibility allocation, optimising processes and creating higher quality products and services. In the hospitality industry, this can manifest in joint promotions of tourism products or coordinated marketing efforts among hotels, restaurants, and travel agencies;

- ▣ competitive relations: this type of relationship arises when partners, while collaborating in certain aspects, simultaneously compete with each other in the market. For example, several hotels or restaurants may jointly organise events or marketing campaigns to attract tourists to the region but compete for customers by offering different service levels or prices. Such relationships help stimulate innovation and improve service quality;

- ▣ symbiotic relations: these involve interdependence among partners, where each party benefits from the other and relies on its successful operations. For instance, hotels may depend on local suppliers for products and services, such as tour agencies or transportation companies, to provide a complete tourism package, while restaurants rely on local food producers, farmers. In these relationships, each partner has a unique role, and the success of one directly impacts the others;

- ▣ contractual relations: these are legally binding agreements between partners that define rights, obligations, and terms of cooperation. They can include service agreements, franchise contracts, or licensing agreements. Contractual relations are the most formalised, ensuring transparency and clear distribution of responsibilities among the parties. In the hospitality industry, they are often used to protect the interests of the parties and ensure compliance with contractual obligations;

- ▣ alliances and cluster relations: strategic alliances and cluster relationships are based on voluntary cooperation among different industry participants aiming to achieve long-term goals, such as developing new markets or joint innovations. In such cases, companies and organisations combine their resources and knowledge to gain a competitive advantage and expand their activities. For example, regional tourism clusters work to promote specific tourist destinations.

These types of relationships enable hospitality industry entities to develop cooperation at various levels, enhancing their competitiveness and creating innovative products that meet market demands and European integration standards. Such coordination not only contributes to expanding market outlets for hospitality products and increasing revenues for businesses but also significantly impacts socio-economic development and improves the quality of life for local populations,

making the process of European integration more effective and beneficial for all participants.

Conclusions

The study concludes that the development of partnerships among stakeholders in the hospitality industry can become an important factor in Ukraine's European integration, enhancing the competitiveness of the sector in the regions, stimulating innovation, and improving the quality of services provided. Such cooperation will facilitate more effective resource utilisation, expand access to European markets, and increase compliance with EU standards. Interaction among various hospitality industry stakeholders will create synergy that accelerates adaptation to European requirements and promotes the sustainable development of the national tourism industry.

The analysis of tax revenue indicators from the activities of key hospitality industry entities has shown a gradual decline, attributed to the complex political and economic situation. The total number of taxpayers in the first nine months of 2023 decreased by 36% compared to 2021 and by 11% compared to 2022. The primary reasons for the decrease in tax revenues from hospitality industry activities include a sharp decline in demand from foreign guests due to military actions in Ukraine, the exclusion of entire regions from tourism circulation, ongoing missile and mine threats, closed airspace, and restricted access to the country's tourist destinations.

Partnership relations among business entities facilitate the creation of comprehensive tourism products that enhance regional competitiveness. The application and development of various types of relationships, particularly cooperative, symbiotic, and alliance relationships, allow for the optimisation of resource, knowledge, and technology utilisation. This approach promotes the development of tourist regions by creating conditions for improved infrastructure, higher service quality, and attracting foreign investment. The interdependence among partnership participants helps establish a resilient ecosystem, where each entity plays a crucial role in achieving overall success. Partnership relations are an essential element in the development of Ukraine's hospitality industry within the context of European integration. They contribute not only to economic growth but also ensure social stability and the preservation of cultural heritage. Integration into the European hospitality space through collaboration and experience exchange will help Ukrainian businesses remain competitive in the international market and meet the high demands of modern tourists.

Further research could focus on analysing the impact of digital technologies on the development of partnership relations and the integration of innovations in industry management. Additionally, studies on the role of sustainable development in partnership initiatives, particularly the influence of environmental and social aspects on the competitiveness of Ukrainian hospitality enterprises in the global market, would be promising.

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None.

Conflict of Interest

None.

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Розвиток партнерських відносин між суб'єктами індустрії гостинності в умовах євроінтеграційного вектору України

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Анотація. Розвиток партнерських відносин між суб'єктами індустрії гостинності набуває особливої актуальності в умовах євроінтеграційного курсу України. Співпраця між державними установами, суб'єктами господарювання та місцевими громадами створює нові можливості для підвищення конкурентоспроможності та інтеграції в європейський ринок. Метою дослідження був пошук пропозицій щодо формування партнерських відносин між суб'єктами господарювання на основі аналізу наявних типів партнерств, які сприяють розвитку індустрії гостинності та впливають на економічне зростання регіонів. Основною методологічною базою для дослідження стали економіко-математичний аналіз та порівняльний аналіз, емпіричний, теоретичний методи. У статті проведено аналіз податкових надходжень від суб'єктів індустрії гостинності за період 2021-2023 років, на основі чого визначено тенденцію загального зниження податкових надходжень від індустрії гостинності в цілому. Доведено, що співпраця між державними установами, місцевими громадами, приватним бізнесом та неурядовими організаціями створює умови для збалансованого використання ресурсів та формування інноваційних рішень, що сприяють збереженню природного середовища та культурної спадщини. Здійснено групування стейкхолдерів, яке дозволяє сформувати багаторівневий підхід до розвитку індустрії гостинності, який базується на інтеграції інтересів різних учасників досліджуваного ринку. Визначено та систематизовано структуру взаємовідносин між суб'єктами індустрії гостинності в умовах євроінтеграції (коопераційні відносини, конкурентні відносини, симбіотичні відносини, контрактні відносини, альянсові та кластерні відносини). Доведено ефективність спеціалізованих альянсів та кластерних об'єднань, які базуються на добровільній співпраці між різними учасниками індустрії, що прагнуть досягти довгострокових цілей розвитку. Вивчено та описано вплив партнерських відносин на розвиток туристичних дестинацій України. Дослідження акцентувало увагу на адаптації українських суб'єктів індустрії гостинності до європейських стандартів якості, їхньої співпраці в досягненні сталого розвитку. Практичне значення дослідження полягає в розробці методичних рекомендацій, які можуть бути використані: суб'єктами господарювання для покращення партнерських відносин і підвищення конкурентоспроможності на європейському ринку; органами місцевої влади для сприяння розвитку індустрії гостинності; освітніми установами для підготовки кадрів, відповідних вимогам європейського ринку.

Ключові слова: євроінтеграційні процеси; співпраця суб'єктів гостинності; глобальні цілі сталого розвитку; альянси; кластери; інтеграційні процеси



Areas and tools for regulating spatial and structural changes in the economy of Ukraine's regions in the process of post-war recovery

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Abstract. The relevance of the study was conditioned by the fact that the large-scale invasion of the Russian Federation in Ukraine caused significant imbalances and spatial and structural shifts in the economy of regions, especially front-line ones, which will require the search for effective tools for their regulation in the post-war perspective. The purpose of the study was to investigate the main areas and tools of geographically oriented regulation, which are aimed at stimulating and creating favourable conditions for the post-war modernisation of the structure of the economy of the regions of Ukraine. A number of research methods were used, namely, structural and statistical analysis, and the graphical method. The study focused on the differences in the priorities of post-war economic recovery in the regions of Ukraine, considering the damage caused to them due to military operations. Key problems and priority tasks for regulating the structural and spatial transformation of the post-war economy of Ukraine were identified. In particular, attention was focused on the need to: intensify the use of mineral resource potential of regions; stimulate investment activity and measures to ensure capital investment; increase innovation activity of regions, and develop centres of innovative entrepreneurship. The paper analysed the losses of the resource potential of the regions of Ukraine caused by the war. The main obstacles to the activation of investment activity in Ukraine, both before the large-scale invasion and in 2022-2024, were highlighted. The paper analysed a number of legislative documents developed since the beginning of Russia's large-scale military invasion of Ukraine, aimed at stimulating investment activity, restoration of industrial production, and filling of local budgets. The study focused on the need to improve and expand the innovation infrastructure. In particular, the role and place of start-ups in enhancing the innovative development of regions was analysed; regional centres of start-ups' activities were identified in terms of their key areas of application; the role and place of digitalisation in the post-war economic recovery of Ukraine's regions was determined. The practical significance of the highlighted trends in spatial and structural changes in the Ukrainian economy and proposals for regulating these processes lies in the possibility of considering them in the development of strategic documents on the post-war reconstruction of the country

Keywords: structural shifts; structure of the economy; spatial development; transformation; management tools; resources; digitalisation of the economy

Introduction

The war exacerbated the existing structural imbalances in the Ukrainian economy and caused transformation processes. Against the backdrop of war, new structural changes are emerging due to the need for military

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production, business relocation, and changes in trade models. The success of the post-war economic recovery of Ukraine will depend on the effectiveness of structural reforms and the sequence of regulatory measures aimed at restoring and creating a new infrastructure to ensure the life of Ukrainian society, stimulating the development of entrepreneurship, its innovation and investment activity, and increasing the resource productivity of the economy. Along with preserving the country's agricultural potential, it is necessary to encourage the development of innovative types of economic activity and those that will contribute to strengthening the country's security and sustainability.

Considerable attention of researchers is paid to the problems of studying trends and features of spatial and structural shifts in the economy, determining priority tasks and means of regulating spatial and structural imbalances. Research pay attention to the study of the essence of spatial and structural shifts, the analysis and trends of changes in the specific structure of the economy, and the search for priority tasks and means of regulating them. Thus, S.M. Illyashenko *et al.* (2022) noted the impact of Ukraine's international image on the prospects for its post-war innovative development and structural transformation of the regional economy. The researchers also considered the methodological foundations of the functioning of innovative development strategies. M.V. Kunytska-Ilyash & Ya.P. Berezhivskiy (2023) focused considerable attention on the study of the impact of the international image of Ukraine, on the possibility of its post-war innovative development and structural changes in the economy of the regions, and on the development of the national policy to strengthen the financial and economic security of key sectors of the national economy of Ukraine. V. Levytskyi & S. Radynskiy (2023) emphasised the importance of structural reforms that can transform Ukraine after the end of the war, as it is these reforms that strengthen the market foundations of economic activity. M.I. Melnyk *et al.* (2023) noted that the change in the spatial structure of the economy is associated with a decrease in the business activity of agricultural enterprises whose business is tied to a specific territory. V.V. Mykytenko (2023) investigated the role of critical infrastructure in the post-war recovery of Ukraine's economy. In this paper, the researcher considered an algorithm for the development of critical infrastructure in Ukraine with a detailed selection of tools. V.A. Omelyanenko (2022) considered a wide range of topical issues of recovery and development of countries after armed conflicts and ways to solve them based on innovations. N.M. Pokrovska (2022) investigated various stages of the post-war reconstruction of Ukraine. V.Ye. Khaustova *et al.* (2022) analysed the role and place of the IT sector in the post-war recovery of the Ukrainian economy, the researchers considered the main promising areas of IT development in the world. S. Petran &

V. Shamota (2023) examined the role of innovation in Ukraine's post-war economic recovery. The researchers noted that the study of innovation activities can be useful for developing strategies to support innovative enterprises in the future. N. Shadura-Nykyporets *et al.* (2023) analysed the impact of war on the structural shifts of the modern economic system of Ukraine, investigated the impact of military operations on this process, and determined the prospects for structural adjustment of the economy in the context of post-war recovery. However, despite a significant range of research on this topic, it remains relevant and requires further research, given the large-scale invasion of Russia on the territory of Ukraine, which provoked spatial and structural transformations in the regions. Therefore, it is advisable to examine the main problems and identify priority tasks for regulating the structural and spatial transformation of the post-war economy of Ukraine.

The purpose of the study was to investigate priority areas and tools for regulating spatial and structural shifts in the economy of the regions of Ukraine in the post-war period.

The study used a number of research methods, namely: structural and statistical analysis – to investigate the processes and phenomena of transformation of the economic space of the regions of Ukraine; graphic methods – for visual representation of tools to support the development of start-ups and sectors of the economy in which strategic investment projects are implemented.

Intensification of the use of mineral resource potential in the regions of Ukraine

As of 2024, Ukraine, being heavily dependent on international financial assistance, demonstrates the desire to maximise its own resource opportunities and competitive advantages of the regions, including those related to their location. This also applies to the mineral resource potential of the territories, which in the pre-war period played an important role in the localisation of production and economic specialisation of the regions. In the conditions of a significant share of low- and medium-tech industries, and energy- and resource-intensive industries in Ukraine, the raw material specialisation of the country's economy was formed, which affected the decrease in the level of its diversification. In addition, in the context of the world-declared transition to low-carbon energy in Ukraine, the needs of the economy for the use of mineral raw materials will increase.

Military actions in Ukraine led to the loss of resources of the occupied and close to the areas of military operations of the regions, in particular, a significant number of deposits of gas, oil, coal, lithium, rare earth metals, 70% of which were concentrated in Donetsk, Luhansk, and Dnipropetrovsk oblasts. Almost 50% of all renewable energy sources, including 89% of wind farms and 80% of offshore hydrocarbon reserves, are under the control of the Russian Federation. In addition, in

2022, Russia seized the deposits of the Bilozersky and Priazovsky iron ore districts in Zaporizhzhia and Donetsk oblasts and the Velyko-Tokmatske manganese ore deposit in Zaporizhzhia oblast (Polyovik, 2023). As a result of military operations, more than half of the iron ore deposits are located in uncontrolled territories, or have significant damage as a result of military operations. In addition, in terms of the cost of losses and lost funds, the extractive industry ranks third after infrastructure and destruction of housing stock.

The withdrawal of these resources from economic activities will lead to changes in the structure of the economy not only in the occupied industrial regions, but also in other regions. Solving these problems requires strategic management decisions on the development of the mining industry, in particular, on improving the legislative framework on the use of mineral resources, diversification of mining, in particular, by attracting foreign investment and technologies in the development of the industry. However, according to the guidelines of the Ukraine Facility reform plan, the development of the critical materials and raw materials sector involves increasing its contribution to the national economy by increasing production and investment, strengthening Ukraine's position in the global market for critical materials and value-added products (Ukraine Facility Programme..., 2024).

Even in the conditions of war, during 2022-2024, the interest of foreign investors in the field of subsurface use and extraction of Ukraine significantly increased. An example is a number of facts. For example, the Turkish firm "Onur Group", which in 2023 acquired the company "Rokytné Specialised Quarry", produces granite in the Rivne oblast and announced its intentions to invest USD 50 million in the development of a graphite deposit in the north of Khmelnytskyi oblast. A "BGV Group Management", which has started sand mining in Zhytomyr oblast, is interested in developing uranium deposits in Mykolaiv oblast (Orynychak, 2024).

In favour of the existence of the potential for the development of the extractive sector, it is evidenced by the fact that in 2023 the total income of enterprises in the extractive industry increased by 13% compared to the first year of the war in 2022. Two state-owned companies earned half of the total income of the leaders of the extractive industry – Ukrnafta and UkrGasVydobuvannya. The main enterprises of the industry that ensured the growing dynamics of revenues were also business entities located in Dnipropetrovsk (DTEK Pavlohraduhillya, Northern Mining and Processing Plant), Poltava (Poltava Mining and Processing Plant, Yeristovo Mining and Processing Plant) and Donetsk (Pokrovske Mine Administration, Svyato-Varvarinska Processing Plant) oblasts (Opendatabot, 2024). Enterprises located in the Donetsk oblast may suspend their activities in the context of modern changes at the front, which will have a negative impact on the development of the industry.

The importance of this priority of sectoral reforms is evidenced not only by its potential ability to attract investment, but also by the introduction of innovative technologies. Thus, the reduction of the country's coal potential due to the occupation of the eastern regions will require the transition from the direct use of coal for electricity generation and the development of new technologies for coal gasification and non-energy use of this resource.

In 2021, Ukraine developed National Programme for the Development of the Mineral Resources Base of Ukraine for the period up to 2030 (Draft of the Law of Ukraine, 2021), the implementation of which should meet the country's needs for mineral resources based on its own production, reduce dependence of Ukraine from their import and increase its export potential through the extraction of minerals that are in great demand on the world market. However, the current programme requires improvement, and the policy in the field of subsurface use and extraction requires changes, in particular, to improve the legislative and regulatory framework for simplifying the procedure for obtaining special permits for the use of subsurface resources, rules for the development of gas and oil fields, and other aspects of the process of organising subsurface extraction, creating conditions for attracting investment in the development of minerals "strategic raw materials" and further digitalisation of the industry. This process began in 2022 with the launch of the subsurface user's e-cabinet, state geological web portal, conducting electronic auctions and auctions, etc. As part of Ukraine's European integration progress, it will be crucial for Ukraine to join the implementation of the EU's 2030 Raw Materials Strategy (European Critical Raw Materials Act 2030, 2019).

B. Danylyshyn (2022), noted that given the significant mineral resource potential of Ukraine, such resource-intensive industries as nuclear power, energy production, heavy and transport engineering, titanium, lithium, and aluminium production, ferrous metallurgy, agricultural production and construction will play an important role in accelerating the post-war economic recovery. Each of these areas was a specialisation of the resource-intensive economy of the Ukrainian regions. Thus, the highest values of the resource intensity coefficient of the economy are typical for Dnipropetrovsk (0.18), Kirovohrad (0.17), Rivne (0.16), Vinnytsia (0.13), and the coefficient for Mykolaiv, Poltava, and Khmelnytskyi oblasts was 0.11. Naturally, the leading regions in terms of resource intensity of the economy include agricultural regions and regions with significant deposits of mineral resources.

Structural and regional economic policies will play an important role in the strategy and tactics of post-war reconstruction of Ukraine. These priorities are declared in the reform plan Ukraine Facility. Programme of financial support of Ukraine from the European Union 2024-2027 (2024) which was developed by the European Union to implement the programme of financial support for Ukraine and should become the foundation for

further recovery and development of the country's economy and its successful integration into the EU. According to this document, strengthening the capacity of regions depends on sectoral reforms, which requires the development of strategic management decisions both at the national, regional, and local levels. As part of direct state support, which is a priority of the programme, 20% of grant funds (EUR 1.05 billion) should be directed specifically to the needs of the regions.

Despite the identification and classification of a significant number of factors of spatial development, the impact of war remained almost ignored (military and political factors are mostly limited to the destruction of industrial potential) (Kyzym *et al.*, 2022). As noted by T.A. Zaiats (2023), in order to modernise the system of strategic planning for the development of territories, it is necessary to move from small, inefficient local projects with low efficiency to projects of real strategic importance that will give a new impetus to development during the post-war reconstruction.

In this context, the urgent task will be to attract territorial-oriented regulatory tools that will stimulate and create conditions for post-war modernisation of the regional economy structure in the context of both its traditional and innovative specialisation, which will contribute to improving the economic capacity of regions and territorial communities.

The issue of spatial development is very complex, since it depends on many factors, ranging from the geographical location of the territory to the availability of qualified labour and the level of innovative development of the business entity. Therefore, it is necessary to identify problems and priorities for regulating the structural and spatial transformation of the post-war economy of Ukraine.

Thus, a necessary step in the context of restoring the country's economy should be to improve institutional support in the field of subsurface use. An important aspect of the implementation of the reform strategy to improve the use of the mineral resource potential of the territories is to ensure that national interests, the interests of regions and territorial communities are aligned. This problem raises a number of issues that also need to be clearly resolved. In addition, the development of the list of strategic industries should take place based on intersectoral research on the availability of prospects for the development of certain types of economic activity, considering the situation of internal and foreign markets and the available resource potential of regions and territorial communities.

Investment promotion and measures to ensure capital investment

It is worth noting that the military actions caused different damage to the regions, which in the future will lead to a difference in their priorities for post-war reconstruction. These priorities will be based on an assessment of the degree of infrastructure destruction, the state of

the local economy, distance from the front line, etc. For the "rear regions" of Ukraine bordering the European Union, the diversification of the structure of the economy is partly influenced by relocated enterprises, and the development of the IT sector, creative industries and services, and therefore they can become key areas of post-war reconstruction of these regions. This includes the possibility of attracting foreign investment in joint projects with European partners to develop transport, logistics and border infrastructure, tourism, trade, and consumer services. And the growth of investment attractiveness in these areas will contribute to the construction of new car ports, exhibition centres, transit hubs and modernisation of existing infrastructure.

During 1991-2024, Ukrainian businesses faced the problem of attracting investment. The main volume of investment was attracted in the service sector – in trade, the financial services sector (bank recapitalisation), real estate operations, and the primary and secondary sectors experienced a lack of investment. Thus, in 2021, 69% of the total capital investment was made at the expense of enterprises and organisations' own funds. The main obstacles to the activation of investment activity included: unsettled protection of intellectual property rights; fiscal policy; low level of freedom to move financial resources (Law of Ukraine No. 3497-IX, 2023).

In the context of a full-scale war, the problem of insufficient investment and creating a favourable investment climate in the country has become extremely acute. Despite the war, Ukraine still attracts significant investments in the development of certain sectors and types of economic activity from foreign companies. During 2022-2024, investments are received in: mining and metallurgical complex ("ArcelorMittal Kryvyi Rih" – Kryvyi Rih); mining industry ("Onur Group", Turkey – Khmelnytsky and Rivne oblasts); mechanical engineering ("Amsted Rail", USA – Lviv oblast), energy ("Onur Group", Turkey – Zakarpattia oblast); chemical industry ("Bayer", Germany – Zhytomyr oblast; "Henkel", Germany – Kyiv oblast); building materials industry ("Kingspan Group", Ireland; "Fixit", Germany – Lviv oblast; "Greenmix", Israel – Kyiv oblast), food industry ("Nestlé", Switzerland – Volyn oblast; "Alsberg Ukraine", Denmark – Lviv, Kyiv, Zaporizhzhia; "Philip Morris", USA – Lviv oblast).

Modern investment activity is directly related to the participation of businesses in various European and global platforms. Thus, in July 2024, Ukraine's investment opportunities were presented at the URC MARKETPLACE in London, where strategic investment projects and opportunities to attract debt and equity capital in six key sectors were declared (Fig. 1).

To attract investment in war conditions, it is necessary to introduce measures in the field of debt financing, in particular, to provide state guarantees for their protection. In order to stimulate investment activity and further steps to restore industrial production and fill local budgets, on January 1, 2024, the Law of Ukraine

"On Amendments to the Law of Ukraine "On Financial Mechanisms for Stimulating Export Activities" Concerning Investment Insurance in Ukraine against Military Risks" came into force, which regulates insurance and reinsurance of export loans both international and

Ukrainian for the creation of facilities and infrastructure for the processing industry and export of goods (works, services) of Ukrainian origin, and insurance and reinsurance of direct investments in Ukraine against military or political risks (Law of Ukraine No. 3497-IX, 2023).

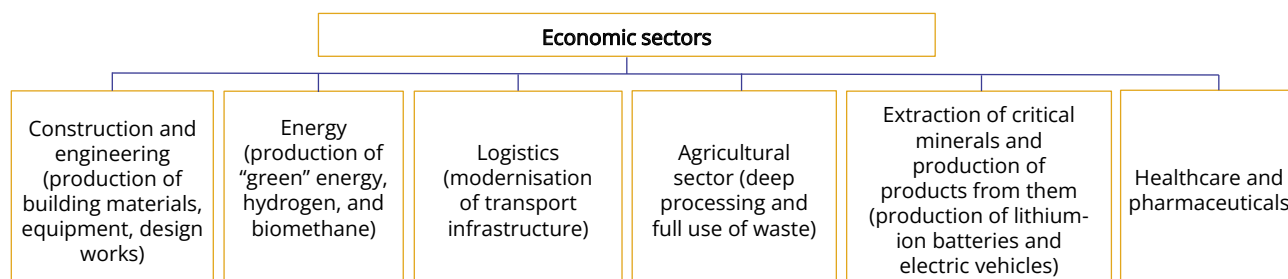


Figure 1. Sectors of the economy between which strategic investment projects were distributed

Source: compiled based on Ukraine recovery digest No. 66. Weekly media review, regulatory acts and statements on the subject of recovery of Ukraine (2023)

According to the Law of Ukraine "On Financial Mechanisms for Stimulating Export Activities for Investment Insurance in Ukraine against Military Risks", Ukraine is introducing a mechanism for insurance of non-property military and political risks, which will be carried out by the export credit agency (ECA), the founder and shareholder of which is the state represented by the Cabinet of Ministers of Ukraine (Law of Ukraine No. 3497-IX, 2023). The purpose of this institution is to support and stimulate large-scale expansion of exports of goods (works, services) and protect exporters from the risks of non-payments and financial losses, and strengthen the credit policy of enterprises. It is worth noting that the specified mechanism is a component of the state economic policy "Made in Ukraine", within the framework of which Ukrainian producers should actively use state support for business activities related to the supply of goods to foreign markets. In 2024, exporters from Kyiv (UAH 1.15 billion of supported exports), Lviv (UAH 1.1 billion), and Vinnytsia (UAH 243 million) oblasts were actively using ECA insurance (Official website of the Ministry of Economy of Ukraine, 2024).

According to the developed insurance mechanism, export-oriented enterprises in Ukraine will be able to obtain an insurance policy that is included in the list of acceptable loan collateral by the National Bank of Ukraine. For foreign companies, this policy is available through the export credit agencies of the UK, Japan, Germany, France, Canada, Australia, Israel, Poland, and specialised organisations ("Support for Ukraine's Reconstruction and Economy" (SURE) trust funds of MIGA, DFC, UKEF, EBRD).

For example, the National Export Credit Agency of the United Kingdom (UKEF) has allocated 200 million pounds to Ukraine to insure political and military risks for British investors who intend to invest in Ukraine. The American International Development Finance Corporation (DFC) has publicly announced a resource of USD

1 billion (Will the insurance..., 2023). This policy has already been used by an industrial park in Lviv oblast and an industrial enterprise in Kyiv oblast (Official website of the political party "Sluha Narody", 2024).

The Cabinet of Ministers of Ukraine considers common insurance risks in international practice: military conflict, in particular, war and armed conflict; armed aggression; military actions; mass uprisings; violent change or overthrow of the constitutional order; seizure of state power; terrorist acts and/or sabotage; occupation; annexation. Political risks include: forced seizure of property or deprivation of ownership of property at the initiative of the state authorities of Ukraine; groundless or illegal revocation of the license by the market regulator or forced termination of the business entity's activities by a court decision that has entered into legal force, except for cases when the termination of activity is caused by a violation of the law by the subject himself; non-fulfilment or refusal of the state to fulfil obligations defined by legislation, strategic or programme documents approved in accordance with the established procedure, or an investment agreement, if the subject has the right to demand the fulfilment of such obligations; introduction by the state of prohibitions on payments (embargoes, moratoria); inability to convert or currency transfers abroad, except in cases stipulated by law (Law of Ukraine No. 3497-IX, 2023).

The use of this tool can have a positive impact on the investment activity of a business, increase investment volumes in difficult business conditions, and provide opportunities. Protecting investments, introducing guarantees for investors, improving transparency and fighting corruption are the main tasks to improve the investment climate. Experts of the insurance market note that the scale of application of the described insurance mechanism will depend on the cost of the insurance policy, which will consider the size and nature of the

investment, the level of risk and the ability of enterprises to pay for them, the solvency of the state and political stability. However, its positive impact on regional and local businesses is undeniable.

It should also be noted that there are different risks for different types of investments, so the set of tools for regulating investment processes will be comprehensive and will include measures to insure risks, provide tax benefits, and ensure transparency in their distribution and use.

In general, attracting investment in the creation of new production chains, new products and the inclusion of the country in complex value chains and the restoration of destroyed and construction of new facilities will contribute not only to investment activity in the regions, but also the level of technological efficiency of the economy and its innovation.

Increasing the innovation activity of regions and developing centres of innovative entrepreneurship

Regional development is significantly affected by the deepening of globalisation, the transformation of production, and the introduction of new technologies that should become the engine of economic growth (Miklova & Horvat, 2021). Under the influence of global digital transformation and the demands put forward by the European Union in the context of European integration, the Ukrainian economy was focused on the development of digital technologies even before the start of the full-scale invasion in 2022. This increased the level of automation of production processes and labour productivity, reduced costs, increased revenues and the overall competitiveness of Ukrainian regions (Pichkurova, 2023).

Modern changes in the structure of the economy of the regions of Ukraine are caused by the introduction of innovations in production, management, educational, and other types of economic activities. Ukraine is an outsider among countries in terms of the level of knowledge intensity of GDP, which is decreasing annually during 2013-2024. Thus, the state budget of Ukraine for research and development in 2024 provides only 0.17% of GDP, or a tenth of the legally established figure, while the average for OECD countries this figure is 2% of GDP; in Switzerland – 3.4%; Korea – 4.2%; Israel – 4.3% of GDP (State Statistics Service of Ukraine 2024; Eurostat, 2024).

The main attention of the authorities should also be focused on improving the innovation infrastructure, stimulating the development of venture entrepreneurship. In addition to activating their own innovative developments, it is also necessary to create special conditions for expanding foreign economic activity and establishing relations between businesses and scientific institutions with partners from advanced countries of the world, and encourage them to transfer technologies. A network of creative industries and modern information and educational centres should be actively developed, which will ensure a systematic exchange of information between

local governments, businesses, and foreign companies. The priority areas of such cooperation should be: transfer of innovative technologies; exchange of experience in the field of energy modernisation of public utilities and the economy as a whole, which will help to reduce the energy costs of business and housing and communal services; development and modernisation of transport and logistics, information, marketing, institutional and innovative infrastructure, and the spread of the practice of creating start-ups.

Start-ups that are a source of new ideas and technologies play an important role in creating innovation centres around the world. Thus, a high concentration of start-ups per capita is typical for Israel, where they are actively developing in the fields of cybersecurity, artificial intelligence, and medical technologies. Among European countries, Estonia is actively developing start-ups.

The development of start-ups in Ukraine is connected with the development of innovative infrastructure, that is, the creation of new incubators, accelerators, coworking spaces that support their development on the ground. The positive aspects of the spread of these entities include an increase in investor interest and a focus on solving local needs. The active development of start-ups will contribute to the establishment of modern information and educational centres, which will allow for a large-scale exchange of information between local governments, business representatives, and foreign companies.

The development of start-ups is also influenced by negative factors, namely: imperfection of the intellectual property rights protection system, unfavourable investment climate, termination of contracts due to the risks of high instability, loss of main partners and suppliers as a result of military operations, and high investment risks and lack of specialists as a result of emigration and mobilisation.

According to a survey conducted by Gradus Research Plus, since the beginning of the war, 47% of projects started face a lack of orders due to market restrictions, 26% called personnel leakage a problem. However, among 18% of the surveyed start-ups in Ukraine, they started their activities from the beginning of a full-scale war, compared to 2% of the openings of new traditional businesses (Shevchenko, 2024)

During 2021-2024, there was an uneven representation of start-ups in different regions of Ukraine, and their high concentration is mainly conditioned by the presence of powerful universities and research institutes, access to various sources of capital (venture funds, state and other grants, etc.) and the development of network connections with investors, mentors and other participants.

In 2021, the largest share of start-ups in Ukraine accounted for three regions: Kyiv city (53.2%), Kharkiv oblast (10.8%) and Lviv oblast (8.2%) (Ukrainian start-up fund, 2024). Table 1 shows the largest centres of concentration of start-ups. The table shows that the activities of start-ups were organised not only in regional centres, but also within regions.

Table 1. Regional centres of activity of start-ups funded by the USF (Ukrainian start-up fund) and their specialisation

Region	Scope of application
Vinnitsia	Artificial intelligence, IT
Dnipro	Healthcare, artificial intelligence, IT, energy and ecology, educational technologies, industry, media and advertising, cybersecurity and security, renewable energy
Donetsk oblast	Retail trade
Zhytomyr	IT, Media and advertising
Zaporizhzhia	Industry, cybersecurity and security
Zaporizhzhia oblast	IT, retail, artificial intelligence
Ivano-Frankivsk	Energy and ecology, industry, retail trade
Kyiv	Educational technologies, IT, industry, artificial intelligence, agricultural technologies, retail trade, media and advertising, healthcare, blockchain, energy and ecology, cybersecurity and security, infrastructure recovery
Kyiv oblast	IT
Lviv	Healthcare, artificial intelligence, educational technologies, IT, retail, smart home, e-commerce, energy and ecology, cybersecurity and security, IT
Lviv oblast	Educational and medical technologies
Odesa	IT, media and advertising, artificial intelligence, industry, retail, blockchain, energy and ecology
Rivne	IT, e-government, healthcare, educational technologies
Ternopil	Healthcare
Kharkiv	Media and advertising, retail trade, educational technologies, healthcare, IT, artificial intelligence, e-government, cybersecurity and security, energy and ecology, agricultural technologies, blockchain
Kherson	Processing industry
Cherkasy	Retail trade
Chernihiv	Retail trade, energy and ecology

Source: compiled by the authors based on research by Ukrainian start-up fund (2024)

Since the beginning of a full-scale war in 2022, start-ups have mostly focused on the needs of: security and cybersecurity (development of tactical military radio systems, mobile applications for cybersecurity); healthcare (manufacturing of bionic prostheses, development of personnel optimisation systems, mobile applications); development of agricultural technologies (development of automatic drones for introduction of plant protection products and integrated solutions based on unmanned aerial vehicles); infrastructure restoration (development of systems for searching and identifying mines and shells).

In 2022, the Ukrainian start-up foundation launched a new programme for grant support for the creation of innovative dual-use products: technologies, processes that distinguish such products from existing analogues on the market or meet the existing demand simultaneously from both individuals and the state. The grant is provided in the amount of up to USD 35000 for the development of start-ups in areas such as: defence; cybersecurity; healthcare; education; infrastructure recovery (Ukrainian start-up fund, 2024). According to the Ministry of Digital Transformation of Ukraine, almost 30% of all applications submitted for a new grant programme from the Ukrainian start-up foundation are military-tech projects. Since 2022, start-ups aimed at the

needs of the Armed Forces of Ukraine (Himera, Zvook, Falcons, Drone Space, Frontline) have been actively developing, and in 2023 the defence-tech cluster Brave1 was created, which combined more than 800 projects for the military-defence complex and cyber-security (Nahorna, 2024). Venture companies are also an important resource for supporting and developing innovative projects in Ukraine, investing heavily both in the initial stages and in the process of developing and scaling projects (Davydenko & Volkov, 2022).

In addition to international support, regional and local authorities should play a decisive role in the development of start-ups, in particular, through the use of a mechanism for voucher support or reimbursement of interest on loans. For example, Lviv City Council has launched a competition for voucher support for business entities that develop, create, implement and sell innovative dual-use products for use in both civilian and military purposes (in the field of healthcare, security, and defence: rehabilitation, prosthetics). Such a voucher for dual-use projects in the amount of up to UAH 300 thousand will be available to legal entities and individuals registered in the Lviv oblast (Official website of Lviv City Council, 2024). Figure 2 shows a list of key tools for supporting start-up activation and development by regional and local authorities.

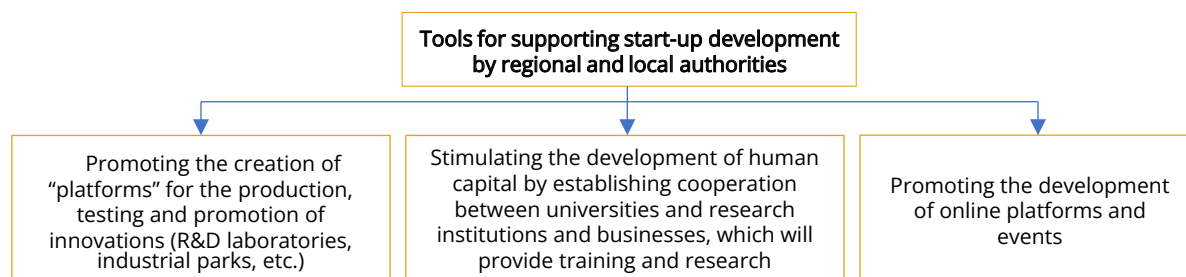


Figure 2. Key tools for regional and local authorities to support start-up activation and development

Source: compiled by the authors

A key aspect of Ukraine's rapid and effective recovery is timely financial support from international partners. Investments in the reconstruction of Ukraine are investments in the security and economic stability of both Europe and the world. Therefore, the main digital products of Ukraine should be aimed at increasing transparency in the use of funds, which will strengthen confidence and contribute to increasing the flow of investment in economic recovery (Pizniak & Turchyna, 2023).

Despite the existing challenges, the prospects for the development of start-ups in the regions of Ukraine remain positive. The growth of the ecosystem, increased investment and focus on local needs will create favourable conditions for the emergence of new successful projects and the establishment of centres of innovative entrepreneurship.

Digitalisation of the economy, state and public administration will be a powerful innovation driver and an important factor in the effective post-war recovery of the regional economy. The digital economy offers many advantages. Digital technologies act as a tool of social elevators, contributing to the growth of social activity of citizens and increasing the accessibility, quality and convenience of public services, and services in key areas such as medicine, education, and culture (Cherep & Sarbiei, 2023).

The introduction of digital technologies in various sectors of the economy should be a catalyst for effective economic recovery and spatial and structural shifts, given that: digital tools will contribute to the reform of industries and sectors of the economy affected by the war (healthcare, education, and professional development); digital transformation in all types of economic activity will contribute to improving the quality of manufactured goods and services while reducing costs for them; the creation of new digital platforms to increase financial support and coordination of innovative projects will make the recovery process more transparent, efficient, and suitable for monitoring by both the authorities and the public and business entities. In addition, the use of digital platforms will facilitate operations, create modern networks of communication and information exchange; the development of the military-tech industry and the use of innovative solutions in this area is important for ensuring the security and defence capability of the

country; improving information support for state and public administration will increase the level of transparency of government actions, improve communication links between the government and the population, and increase the intensity of information exchange between them. In turn, the Ukrainian Institute of Scientific and Technical Expertise and Information has identified the most relevant digital developments in the military sphere, including military robotics, the Internet of Things for the military, combined drones and artillery systems, invisible armour materials (Bolila, 2023).

The Ministry of Digital Transformation of Ukraine has been operating in Ukraine since 2019 and the process of digitalisation of the economy, state and public administration has been launched. After the start of the full-scale invasion, the Ministry of Digital Transformation initiated a number of new digital technology projects in the field of defence and security, such as the digital diplomacy front (in cooperation with global industry leaders such as Meta, Palantir, Amazon), the "Army of Drones", the "IT Army of Ukraine", new features of the Diia application (eVorog, eBayraktar game), and the NFT project "Museum of War". Digital platforms such as Damaged.in.ua, which digitises data for damage assessment and planning of recovery projects, and UNITED 24, created to implement targeted projects to support the army, medicine, and reconstruction of the country (Official website of the government platform UNITED24, 2024).

During 2023, with the assistance of the Office for Entrepreneurship and Export Development in Ukraine, about 70 digital services and more than 3.5 thousand projects were implemented to support business development and 6 educational programmes were introduced for them (Business in 2023..., 2024). Relevant digital projects are implemented at the level of state, regional, and local authorities in the form of creating analytical portals for posting information for business, the scientific and expert community, and the public. This information relates to data on social and economic processes in the regions. These include the Opendatabot, which provides access to various state registers in real time, regional information dashboards, which provide maps of regional investment objects, data on internally displaced persons, a register of functional territories

of regions, analysis of the implementation of regional target programmes, information on the provision of administrative services.

Notably, the Ministry for Communities and Territories Development of Ukraine plans to develop and improve more than 10 new digital tools for a transparent and accountable process of rebuilding Ukraine. These are primarily online platforms, portals, and electronic registers that will allow monitoring the restoration process, receiving services in the field of urban development, etc.

In the field of digitalisation, Ukraine needs to extend and update the current "Strategy for Digital Transformation of Ukraine until 2025" to strengthen measures to protect data and digital infrastructure from cyber-attacks and ensure digital inclusion, and to replenish financial and human resources and build technical infrastructure (Resolution of the Cabinet of Ministers of Ukraine No. 1467-p, 2021). Further digitalisation of the economy and management will contribute to ensuring progressive structural shifts by reducing the use of material resources and switching to information resources, which will help to reduce production costs, produce new technological products, and enter the world market with them, increase the level of competitiveness of territories.

Conclusions

The war worsened the existing structural imbalances and increased spatial and structural changes in the Ukrainian economy. In the pre-war period, structural changes in the Ukrainian economy took place in accordance with global trends, such as an increase in the share of employees in the service sector, a significant differentiation in the level of technological efficiency of economic sectors, and a strategic focus on the development of low-carbon industries. During the war, the spatial and structural imbalances of the country's economy increased and new opportunities were formed to diversify the structure of the economy, including through the development of the military-defence complex.

Highlighting the significant impact of the resource factor and investment and innovation processes on the structural transformation of the regional economy during the post-war development of Ukraine and their regions, it should be noted that the key priorities of economic policy aimed at positive structural shifts in the regional economy should be: focusing structural policy on

priority sectors of the economy and types of industrial activities with significant innovation potential (IT, green energy, biotechnologies, agricultural sector); creating an ecosystem for innovation (development of research institutes, incubators and accelerators, etc.); stimulating external and private investment by introducing tax incentives for investors who invest in innovative projects; introduction of programmes to support start-ups and the development of digital infrastructure.

Overcoming the devastating consequences of the war and building a sustainable, competitive economy of Ukraine requires deep structural reforms and consistent implementation of a comprehensive recovery strategy, the priority tasks of which should be: intensification of the use of mineral resources in the country's regions by improving the legislative framework on the use of mineral resources, diversification of production, attracting investment, in particular foreign ones, in the development of minerals of "strategic raw materials", digitalisation of the industry to increase the efficiency and transparency of its operation. The issue of coordinating state interests, interests of regions and territorial communities in the field of subsurface use becomes significant; stimulating investment activities by introducing measures to guarantee investment protection, in particular, in the field of debt financing and using investment insurance mechanisms against military and political risks. An important area for reviving investment activity should be support for exporters through export credit insurance and other forms of state support; development of innovative and capacious industries based on the introduction of state programmes to support innovation and research activities. Also creating a favourable environment for the development of start-ups and innovative enterprises, state support for technology transfer and implementation of innovative solutions in the production, and preservation, and development of human capital and training of qualified personnel for innovative industries. The prospects for the post-war recovery of the Ukrainian economy will require the search for effective tools for implementing structural reforms.

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Conflict of Interest

None.

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Напрями та інструменти регулювання просторово-структурних зрушень в економіці регіонів України в процесах повоєнного відновлення

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Анотація. Актуальність тематики статті зумовлена тим, що широкомасштабне вторгнення Російської Федерації в Україну зумовило значні дисбаланси та просторово-структурні зрушення в економіці регіонів, особливо прифронтових, що вимагатиме пошуку дієвих інструментів їх регулювання в повоєнній перспективі. Метою статті було дослідження основних напрямів та інструментів територіально орієнтованого регулювання, які націлені на стимулювання і створення сприятливих умов для повоєнної модернізації структури економіки регіонів України. У статті використано низку методів дослідження, а саме структурного і статистичного аналізу та графічний метод. У дослідженні акцентовано увагу на відмінностях пріоритетів повоєнного відновлення економіки регіонів України, з огляду на завдану їм шкоду, зумовлені військовими діями. Визначено ключові проблеми та пріоритетні завдання щодо регулювання структурно-просторової трансформації повоєнної економіки України. Зокрема, акцентовано увагу на необхідності: інтенсифікації використання мінерально-сировинного потенціалу регіонів; стимулювання інвестиційної діяльності та заходи щодо забезпечення капітальних інвестицій; підвищення інноваційної активності регіонів та розвиток центрів інноваційного підприємництва. Проаналізовано втрати ресурсного потенціалу регіонів України, зумовлені війною. Виокремлено основні перешкоди активізації інвестиційної діяльності в Україні, як до широкомасштабного вторгнення, так і у 2022-2024 роки. Проаналізовано низку розроблених з початку широкомасштабного військового вторгнення Росії в Україну законодавчих документів, націлених на стимулювання інвестиційної діяльності, відновлення промислового виробництва та наповнення місцевих бюджетів. У статті акцентовано увагу на необхідності удосконалення та розширення інноваційної інфраструктури. Зокрема, проаналізовано роль і місце стартапів у підвищенні інноваційного розвитку регіонів; виокремлено регіональні центри діяльності стартапів в розрізі ключових сфер їх застосування; визначено роль і місце цифровізації в повоєнній відбудові економіки регіонів України. Практична цінність висвітлених тенденцій просторово-структурних зрушень в економіці України та пропозицій з регулювання цих процесів полягає у можливості їх врахування при розробці стратегічних документів з питань повоєнної відбудови країни.

Ключові слова: структурні зрушення; структура економіки; просторовий розвиток; трансформація; засоби керування; ресурси; цифровізація економіки



Analysis of current investment projects and their economic justification

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Abstract. The purpose of this study was to analyse existing investment projects in Albania and assess their economic feasibility to determine their impact on the country's economic growth and development. The study examined 30 major investment projects in key sectors such as energy, infrastructure, and tourism. The study showed that the main investors in Albania are the Netherlands, Switzerland, Canada, Italy, Turkey and Austria, which are actively investing in the development of renewable energy sources, transport infrastructure and light industry. The analysis confirmed that the volume of investment, macroeconomic stability and government support are key factors in the successful implementation of projects. The SWOT analysis showed that Albania has significant potential to attract foreign investment due to its favourable geographical location, political stability and natural resources, but faces challenges such as underdeveloped infrastructure and high levels of bureaucracy. Investment projects have had a positive economic and social impact, including reducing energy dependence, developing tourism infrastructure, and improving logistics capabilities. Recommendations were made to optimise state support for investors, invest in infrastructure, improve the skills of the workforce, and support small and medium-sized businesses. The proposed recommendations will help improve Albania's investment climate and ensure further growth in foreign investment, which will have a positive impact on the country's economic development. At the same time, these recommendations may also be useful for other countries with similar economic levels of development seeking to attract foreign investment and stimulate their economic growth

Keywords: investment; foreign financing; financial initiatives; sustainable development; country's profitability

Introduction

Investments play a crucial role in driving economic growth in any country. They contribute to the development of infrastructure, job creation, welfare, and technology. In modern globalised world, where countries compete to attract foreign capital, the analysis of investment projects and their economic justification is extremely important. The need for such an analysis becomes apparent due to the growing number of investment projects in various sectors of the economy,

which have a heterogeneous impact on the economic development of countries. The study of investment projects allows determining the efficiency of the invested resources, the degree of their impact on the economy and the feasibility of their implementation.

The global scientific literature has already accumulated a significant amount of research on investment projects and their impact on economic development. Many authors focus on foreign direct investment

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(FDI) as an essential factor in stimulating economic growth. For example, J.G. Djokoto *et al.* (2023) studied the impact of FDI on the development of low- and middle-income countries, emphasising that attracting investment funds significantly contributes to the productivity of these countries' economies through access to advanced technologies and management practices. R. Kastratović (2023) also studied the impact of FDI, but specifically on agricultural exports in developing countries. The author concluded that FDI can have a greater effect on economic growth if the country adopts comprehensive reforms to improve the business environment and infrastructure.

M. Jaworek *et al.* (2019) emphasised that for the successful development of investment projects, it is important to create a transparent legal environment and minimise risks for investors. In their research, they proved that countries with more developed legal institutions and stable economies have a higher chance of attracting large investment flows. At the same time, they pointed out the importance of long-term investment attraction policies that support local enterprises and promote employment.

The authors J. Minović *et al.* (2020) studied the impact of investment projects on the economies of Central and Eastern Europe, pointing out the importance of FDI for the growth of countries' competitiveness in the global economy. Their work showed that the effective attraction of foreign capital depends not only on the country's economic performance, but also on political stability and the ability of the state to create an infrastructure that attracts investors. They also emphasised that investment projects in the energy and infrastructure sectors are key for regions seeking to modernise their economies.

Researchers B. Deng *et al.* (2023) studied the impact of infrastructure investment on economic growth in Africa and Latin America, noting that these projects not only contribute to economic growth but also help reduce poverty and inequality. Their research indicates that investment projects aimed at developing transport networks, energy, and water supply have a lasting positive effect on low-income countries. A. Gu & X. Zhou (2020) analysed the environmental impacts of investment projects in their research, emphasising that projects that do not take into account environmental factors can have a negative impact on the environment and create additional socio-economic problems. Their work highlights the importance of applying sustainable development approaches that balance the economic benefits of investments with their environmental impact.

The study of regional peculiarities of investment projects was also carried out by A. Maček *et al.* (2020), who investigated how local characteristics can affect the success of investments in European countries. Their research has shown that different countries have their own institutional and cultural differences that can

either facilitate or hinder the implementation of investment projects. For example, the success of projects in Southern Europe, in their opinion, depends on political stability, the level of corruption and the effectiveness of government institutions.

Many studies focus on general trends in investment, without adequate consideration of the specific characteristics of developing countries. The academic literature often lacks detailed studies of the impact of investment on specific sectors of the economy of particular countries, such as tourism, energy or agriculture, which are important components for the development of the economy of many countries, including Albania. In addition, there are gaps in the study of the relationship between investment and socio-economic impacts, such as increased employment, and reduced inequality in access to education and health-care. Studies by authors such as M.O. Faruque (2021) and R. Merino & A. Chinchay (2022) emphasise that investment projects often do not take into account long-term social impacts, which leads to an uneven distribution of economic benefits among the population.

The purpose of this article is to analyse the current investment projects in Albania and their economic justification in the light of current global challenges, in particular, for developing countries. In accordance with the goal, the objectives of the study were:

- ▣ analysing existing investment projects;
- ▣ studying the efficiency and economic justification of investment projects;
- ▣ studying challenges and risks, and formulating recommendations for improving investment policy.

Materials and Methods

The study used combined methods to analyse investment projects in Albania for 2020-2024 and their economic justification. The main focus was on collecting and analysing statistical data related to investment flows, project implementation efficiency and risks associated with investment processes in the country. The analysis was carried out using the standard Ordinary Least Squares method, which allowed to assess the relationship between variables and measure the effectiveness of project implementation based on such key financial indicators as return on investment (ROI), socio-economic indicators and contribution to gross domestic product (GDP) growth. Secondary data collected from official sources, such as analytical reports of international organisations, including the World Bank Group (2024) and the European Bank for Reconstruction and Development (2024) (EBRD), were used. These data provided a comprehensive picture of the investment environment in the country and its key characteristics.

The sample for the analysis included the 30 largest investment projects in Albania, which were selected based on their importance to the national economy, investment volume and socio-economic impact. The

projects in the sample covered key sectors such as infrastructure, energy, tourism, and agriculture. The selected projects were characterised by a significant amount of investment (at least EUR 10 million), making them strategically important for the country's economic development. An additional selection criterion was the availability of data on the economic feasibility of the projects, which ensured the comprehensiveness of the analysis.

In addition, multiple regression analysis was used to simultaneously take into account several factors affecting the success of investment projects. This method made it possible to determine the impact of such variables as investment volume, macroeconomic stability and the availability of supportive government policies on project performance. In particular, the indicators of project profitability, job creation and socio-economic impact on regional development were studied.

A SWOT analysis was conducted to assess Albania's investment environment and policies. This method allowed to identify the country's strengths and weaknesses in the context of attracting investment, as well as to identify the main threats and opportunities that affect the success of projects. The SWOT analysis was based on data from analytical reports of international organisations such as the EBRD and the World Bank Group, as well as information from national sources on Albania's economic development and political stability. This helped to create an objective picture of the strengths and weaknesses of the country's investment climate.

The study also examined the challenges and risks that arise during the implementation of investment projects. These include both macroeconomic and political risks, as well as problems associated with insufficient infrastructure development and labour force qualifications. For a more in-depth analysis, recommendations for improving the country's investment policy were formulated. These recommendations are aimed at increasing the stability and attractiveness of the investment environment by strengthening the legal framework, developing infrastructure, improving the skills of the workforce and stimulating entrepreneurial activity.

Results

The state of investment projects in Albania in 2020-2024 shows significant activity from several key investor countries, which are actively investing in various sectors of the economy. The main investors that continue to support the country's economic growth in 2023 are the Netherlands, Switzerland, Canada, Italy, Turkey, and Austria. These countries make a significant contribution to the development of infrastructure, energy, real estate, and the banking sector. Based on the collected data, a chart was created, which visualises the percentage distribution of investments from these countries in various sectors of the Albanian economy (Fig. 1).

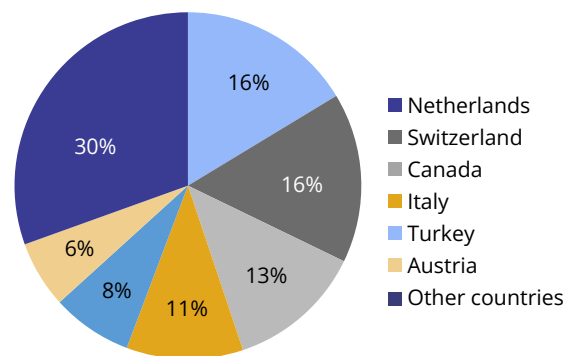


Figure 1. Distribution of investments

from major investor countries in Albania in 2023

Source: created by the authors based on data from Bank of Albania (2024), Albania Foreign Direct Investment (2024), Albania: Investing in Albania (2024)

The Netherlands is the largest investor, accounting for 16.5% of total FDI. Dutch investments are mainly directed to the extractive industry and energy projects, including the development of renewable energy sources. Dutch companies are playing a key role in the development of hydroelectric power plants and solar energy projects, which is helping Albania to reduce its dependence on energy imports.

Switzerland, with a share of 16.0%, is also a major investor, with capital mostly invested in the banking and insurance sectors. Swiss banks are active in Albania, providing financial services and support to local businesses. In addition, Swiss investors are involved in social projects related to environmental sustainability and healthcare.

Canada owns 12.8% of the investment portfolio, mostly investing in the mining industry and information technology. Canadian investors are also interested in developing innovative projects aimed at digitalising Albania's economy. Italy, with 11.0% of investments, focuses on light industry and manufacturing. Its companies are active in the textile, footwear and trade sectors. Italian investors are also involved in projects related to the modernisation of the country's transport infrastructure.

Turkey, with 7.6% of investments, is an important partner in the energy and construction sectors. Turkish companies are investing in residential complexes, hotels, and infrastructure projects. Turkish capital is helping Albania develop its urban environment and improve living standards.

Austria, with a 6.3% share in investments, focuses its investments on the development of transport infrastructure and banking services. Austrian investors are actively involved in projects to expand transport corridors in the country, which contributes to improving Albania's logistics capabilities.

In addition to the main investor countries, a significant share of investments (approximately 30.8%) comes from other countries. This group includes investors from various countries that actively support Albania's

development through projects in various sectors of the economy, such as information technology, energy and real estate. Although the share of these countries is not as large as that of the leading investors, their contribution is crucial for ensuring sustainable economic growth.

Based on this data, investments in 2023 continue to grow, especially in strategically critical sectors such as energy, infrastructure and financial services. Total FDI in the first three quarters of 2023 was EUR 1.08 billion, representing a 10.6% increase year-on-year (Bank of Albania, 2024).

The study conducted a detailed analysis of current investment projects in Albania to assess their economic

efficiency and justification based on available statistics and analytical reports. The main focus was on projects that have a significant impact on the country's economy, particularly in the energy, infrastructure, tourism, and agriculture sectors. The selected projects cover key sectors of the Albanian economy, including energy, infrastructure, tourism, and agriculture. This allowed to provide a comprehensive overview of investment activity in the country, as well as assess their impact on various aspects of the economy. Below is an overview of the main investment projects by economic sector included in the analysis (Table 1).

Table 1. Overview of major investment projects in Albania by economic sector (2023)

Industry	Number of projects	Total investment (EUR million)	Impact on the economy
Energy	12	150	Increasing energy independence, developing renewable energy sources
Tourism	5	60	Creation of new jobs, development of tourism infrastructure
Infrastructure	8	100	Improvement of transport and logistics infrastructure, integration with the EU
Agriculture	5	35	Improvement of transport and logistics infrastructure, integration with the EU

Source: created by the authors based on data from World Bank Group (2024)

All the projects have a significant impact on the Albanian economy, including increased employment, improved infrastructure and national GDP. Investment activity in different sectors of the Albanian economy shows significant differences in terms of both volume and performance. The main areas of investment are energy, infrastructure, and tourism. During 2020-2024, there was a steady increase in investment in these sectors, which demonstrates their importance for the country's economic development. Below is a graph showing the volume of investments by year in the energy, tourism, and infrastructure sectors (Fig. 2).

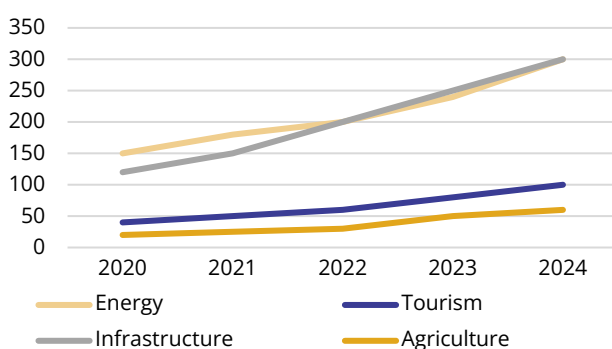


Figure 1. Dynamics of investments in key sectors of the Albanian economy (2020-2024)

Source: created by the authors based on data from 2024 Investment Climate Statements: Albania (2024)

The graph shows that the largest investment flows are directed to the energy sector, due to the strategic importance of developing the country's energy independence. In particular, projects related to renewable energy

sources, such as hydroelectric power plants and solar power plants, receive significant support from both the government and international donors.

Infrastructure projects also play a pivotal role in Albania's investment strategy. They are aimed at improving transport and logistics infrastructure, which is important for the country's economic integration with the EU. Tourism is the third most relevant sector for attracting investment. Albania is actively developing its tourism potential, and investments in tourism infrastructure have created new jobs and increased the inflow of foreign tourists.

The investment projects analysed in this study have a significant impact on the economic and social life of the country. They contribute to increased employment, higher incomes, and the development of new sectors of the economy. Particular attention should be paid to energy projects that aim to ensure Albania's energy security and reduce dependence on energy imports. The economic benefits of these projects include lower energy costs and the creation of new jobs in the production and maintenance of new energy facilities.

One of the key aspects of the study was to determine the effectiveness of investment projects in Albania. The assessment was based on the following key financial indicators: ROI; socio-economic indicator; contribution to GDP growth.

The results of the analysis of the efficiency of 30 major investment projects showed that most of them have high profitability and have a positive impact on the country's economic development (Table 2). In particular, projects in the energy and infrastructure sectors demonstrate the highest profitability due to long-term investments and stable profits.

Table 2. Investment project implementation efficiency indicators

Industry	ROI (%)	Number of jobs created	Contribution to GDP (%)
Energy	15-20	500-600	2.5-2.8
Tourism	10-12	300-400	1.2-1.5
Infrastructure	18-20	600-800	3-3.5
Agriculture	10-12	200-250	1-1.2

Source: created by the authors based on data from International Labour Organization (2024), World Bank Group (2024)

Energy projects have the highest profitability due to their long life and stable energy revenues. Infrastructure projects also have high performance indicators due to their impact on the country's transport and logistics system.

Multiple regression analysis was used to comprehensively assess the factors influencing the success of investment projects. This method allowed to assess the impact of independent variables, such as: investment volume, macroeconomic stability, government support and policies. The dependent variable is project success, which is measured as a percentage and reflects the level of success in project implementation. The data for

the analysis included indicators of investment volume, macroeconomic stability and government support for each investment project. A total of three observations were used. The standard least squares method was used for the calculation. In the analysis, each variable was considered as a contribution to the overall success of the project.

The results of the regression analysis showed that the key factors for the success of investment projects are economic stability and the existence of effective government initiatives that facilitate the attraction of foreign capital and simplify conditions for investors (Table 3).

Table 3. Influence of key factors on the success of investment projects

Factor	Statistical indicator	Impact on project success (%)
Investment volume	0.85	40
Macroeconomic stability	0.8	35
Government support	0.75	25

Source: created by the authors

According to the results, the amount of investment is the most important factor affecting the success of projects (40%), but macroeconomic stability and government support also play a major role. This suggests that to achieve maximum results, Albania needs to not only attract investment, but also ensure a stable macroeconomic environment and support from the government.

To assess Albania's investment climate, a SWOT analysis was conducted, which identified the country's strengths and weaknesses in terms of attracting foreign investment, as well as key opportunities and threats affecting investment processes (Table 4). The SWOT analysis was based on data from international organisations such as the EBRD and the World Bank Group, as well as national statistics.

Table 4. SWOT analysis of the investment environment in Albania

Strengths	Weaknesses
1. Albania's geographical location – proximity to the EU. 2. Political stability and aspirations for integration with the EU. 3. Availability of natural resources, especially in the energy sector. 4. High potential for tourism development. 5. Developed agricultural sector with high potential for the production of environmentally friendly products.	1. Low level of infrastructure development. 2. High level of bureaucracy. 3. Insufficient involvement of technological innovations. 4. Limited access to finance for small businesses. 5. Limited mechanisation and technological upgrading in agriculture, which hinders productivity growth.
Opportunities	Threats
1. Attracting international investors through EU support programmes. 2. Development of renewable energy sources. 3. Investments in infrastructure projects and logistics network. 4. Development of the IT sector and digital infrastructure. 5. Increase exports of environmentally friendly products.	1. Economic instability in the Balkans region. 2. External economic risks (rising cost of resources, currency fluctuations). 3. Changes in global markets that affect foreign trade. 4. Competition from other countries with more developed tourism and agricultural infrastructure.

Source: created by the authors

The results of the SWOT analysis showed that Albania has significant potential for attracting investment, which is an essential factor for the country's economic development. The main strengths are Albania's geographical location, which provides favourable conditions

for integration with the EU and neighbouring markets. This allows the country to act as an important logistics centre in the Balkans, which is especially critical for the development of infrastructure projects and facilitating trade with EU countries. In addition, political stability

and a commitment to EU integration create a predictable environment for investors, which helps to increase confidence on the part of international companies.

Another significant strength of Albania is the availability of natural resources, particularly in the energy sector. The development of renewable energy sources, such as hydro and solar power, is an attractive area for investment, especially given the global trend towards clean energy. Environmentally friendly projects can attract foreign investment from companies seeking to comply with international environmental standards.

At the same time, the country's tourism potential plays a pivotal role. Albania's natural and cultural resources, especially the Adriatic and Ionian coasts, make it attractive for tourism development (Choi & Minondo, 2019). The sector is seeing growing interest from foreign investors as Albania becomes an increasingly popular tourist destination in Europe. This creates new opportunities for investment in the development of tourism infrastructure, hotels, resorts and related services.

However, along with significant opportunities, the country faces serious challenges that may hinder the development of investment projects. One of the main disadvantages is the insufficient level of infrastructure development, especially in the transport and logistics sectors. This increases project implementation costs and makes it difficult to implement projects in remote regions of the country where access to infrastructure is limited. Improving infrastructure could significantly increase Albania's competitiveness in the international market and ensure more efficient implementation of investment projects.

Another significant problem is the high level of bureaucracy, which complicates the process of obtaining project permits and investors' interaction with government agencies (Rrapaj Kolasi & Kolasi, 2023). This can deter potential investors and create delays in project implementation, which negatively affects their profitability. Simplification of administrative procedures and increased transparency in the interaction between public authorities and investors are necessary to attract more investment.

In addition, limited access to finance, especially for small enterprises, is another factor that hinders business development and project implementation. Small and medium-sized enterprises (SMEs) often do not have sufficient resources to attract investment or expand their capabilities, which can slow down the country's economic growth (Rrapaj Kolasi & Kolasi, 2023). Increased access to credit and financial support, including through international institutions such as the EBRD, can help address this problem.

Threats, such as economic instability in the Balkans region and external economic risks, may also negatively affect Albania's investment attractiveness. Rising resource costs, currency fluctuations and changes in global markets may pose additional challenges for investors.

In addition, competition from other countries with more developed infrastructure, such as Croatia or Greece, may draw investors away from Albania in favour of more stable and predictable markets.

Therefore, in order for Albania to realise its investment potential, the country needs to overcome these challenges. This includes improving infrastructure, reforming the administrative system, simplifying bureaucratic procedures and providing more support to small businesses. Only then will Albania be able to take advantage of its geographical location, natural resources and tourism potential to attract significant investment and ensure sustainable economic growth.

Investments in key sectors of Albania's economy, such as energy, tourism and infrastructure, make a strong economic case for their impact on national economic growth. The energy sector, in particular renewable energy, is a priority for the country. In particular, hydroelectric and solar power projects are significantly reducing Albania's dependence on energy imports. For example, hydroelectric power plants provide a reliable domestic energy supply, while solar energy projects, such as the Karavasta plant, help to increase the share of electricity production from clean sources, which is in line with Albania's long-term climate goals. These projects are expected to not only generate stable income but also create new jobs (especially in construction and operation) (Dedi, 2024).

The tourism sector also shows significant potential for growth, contributing to infrastructure development and attracting foreign tourists. Investments in this sector increase the country's regional attractiveness and stimulate economic development through increased tourism revenues and the creation of jobs in the service sector.

Infrastructure projects, such as road modernisation and port infrastructure development, are strategically important for Albania's economy. They facilitate the country's integration with European markets and improve the business environment. In particular, projects such as Porto Romano will have a significant impact on regional trade and economic growth by improving logistics capabilities (Rrapaj Kolasi & Kolasi, 2023).

Investment in rural tourism is another critical component of Albania's economic development. This segment of the tourism industry contributes to the development of remote regions of the country, attracting both internal and foreign tourists to authentic rural locations. Rural tourism creates new jobs in the areas of hospitality, local crafts and agritourism, which has a positive impact on the living standards of the rural population.

One of the key aspects of the sector's development is investment in improving infrastructure, including access routes to tourist attractions, as well as creating conditions for recreation and accommodation in rural areas. Programmes to support rural tourism often receive funding from international organisations

such as the EBRD, which helps to ensure sustainable development of regions and promote economic diversification. The inclusion of rural tourism in the investment strategy also supports the preservation of the country's cultural heritage and natural resources, which increases its attractiveness to tourists.

The implementation of investment projects in Albania faces a number of challenges that affect their efficiency, speed, and profitability. One of the most significant challenges is the underdevelopment of infrastructure, including transport and logistics. This complicates the delivery of inputs and materials, which increases logistics costs, especially for projects in remote regions of the country where infrastructure is limited.

Another challenge is the high level of bureaucracy. Administrative procedures take a long time to obtain construction and project permits, which can reduce the attractiveness of Albania's investment climate. These processes often delay the launch of new projects by several months or even years. In addition, the shortage of skilled labour in some sectors of the economy, such as technology and innovation, is a significant problem. This reduces the efficiency of projects, as companies have to invest significant resources in training employees or attracting foreign specialists.

There are also external economic challenges, including currency fluctuations and volatility in global markets. These factors may have a significant impact on the financial stability of investment projects, particularly those that depend on imports of materials and technology or are financed by international loans.

The risks faced by investment projects can be classified into internal and external. Internal risks include political instability and financial instability. Although Albania is showing progress in strengthening political stability, any internal political conflicts or changes in government could lead to a revision of investment policy, which could negatively affect the implementation of ongoing projects. Financial instability, such as problems in the banking sector or budgetary shortfalls, could also limit the availability of public financing for projects.

External risks include fluctuations in global markets and the geopolitical situation in the Balkans region. Changes in global markets, in particular fluctuations in energy and other commodity prices, could have a significant impact on projects, particularly those that are import-dependent. Geopolitical risks also remain relevant due to the unstable situation in some countries in the region. Several strategies can be applied to minimise these risks. First, simplifying administrative procedures and reducing bureaucracy will speed up project implementation and make the investment climate more attractive to foreign investors. Another important strategy is the development of infrastructure, including transport and logistics, which will facilitate the country's better integration into international economic processes and facilitate the delivery of goods and services.

Another essential step is to invest in the training and development of the workforce. The development of educational programmes, especially in the industries that attract the most investment, will help to improve the skills of workers and reduce the cost of training specialists. In addition, ensuring macroeconomic stability through inflation control, exchange rate stabilisation and strengthening the financial system will help create a predictable environment for investors. Government investment support programmes, such as tax incentives and financial support for foreign and local investors, can also significantly improve the investment environment. The introduction of such programmes will help attract more capital and stimulate economic growth.

In the longer term, risks such as bureaucracy and a lack of skilled labour may be mitigated by the government's ongoing reforms. However, external risks, such as fluctuations in global markets and geopolitical factors, will remain critical elements to consider when planning investment projects. Therefore, to ensure stability and successful investment attraction, the government should continue to strengthen macroeconomic policies and create a favourable environment for investors.

Based on the analysis of investment projects in Albania and the assessment of their economic impact, a number of recommendations can be made that will help improve the country's investment policy and attract more foreign investment. These recommendations are based on the research findings and take into account the challenges, risks, and opportunities identified in the previous sections.

One of the main recommendations is the need to optimise the state investment policy. Albania should more actively implement programmes to support foreign investors, including tax incentives, simplification of regulatory procedures and transparency of administrative processes. It is especially important to focus on facilitating the obtaining of permits for investment projects and reducing the time for approving documents. This will increase the country's attractiveness to international investors and stimulate foreign capital inflows.

To attract more investment, it is relevant to continue developing infrastructure, including transport and energy. Investments in infrastructure projects, such as the modernisation of the road network, port infrastructure and transport corridors, will help to better integrate Albania into the international economy. Improved infrastructure will facilitate the implementation of investment projects in various sectors, as it will reduce transport and logistics costs. In particular, it is worth investing in energy projects aimed at developing renewable energy sources. This will not only ensure the stability of energy supplies, but also help reduce dependence on imported energy, which is a critical factor for the country's long-term economic security.

The development of a skilled workforce is an essential aspect for the successful implementation of investment

projects, especially in technologically sophisticated sectors such as energy, tourism, and infrastructure. Albania should focus on implementing vocational training and retraining programmes. Such programmes could be implemented in cooperation with international organisations and private investors, which would increase employment and productivity. Investing in labour force training will not only improve the quality of investment projects, but also reduce the need to engage foreign specialists, which will lower project implementation costs.

SMEs are a critical element of the economy, and their support should be a priority for the Albanian government. Providing tax incentives, access to finance and simplified administrative procedures for SMEs can help create new jobs and stimulate economic growth. In addition, SMEs can play a significant role in regional development, especially in the tourism and agricultural sectors. Government support programmes should be focused on creating favourable conditions for the development of local entrepreneurs, which can also increase the interest of foreign companies in investing in the economy, which will cooperate with local partners.

Macroeconomic stability is one of the key factors for a positive investment climate. Albania should continue its efforts to maintain low inflation, exchange rate stability and reduce external debt. This will create a predictable environment for investors and reduce the risks associated with economic instability. In addition, the country's financial system should be developed to ensure access to credit and financing for SMEs. A sound banking system and transparent financial mechanisms will also increase investor confidence in the country's economy.

To stimulate economic growth, Albania could focus on supporting innovative projects and digitalisation of various sectors of the economy. The development of the IT sector, the introduction of digital solutions in public administration and the business environment can significantly increase the efficiency of the economy and create new opportunities for investors. The government can support innovative projects through special grants, tax incentives, and the creation of technology parks that will provide opportunities for start-ups and technology companies. This will help to develop new industries and diversify the economy, making Albania more competitive on the international stage. Albania should continue to strengthen its international relations, in particular with the EU and international financial institutions such as the World Bank Group and the EBRD. Cooperation with these organisations can help attract investment, access international markets, and adopt advanced technologies. International partnerships can also be useful in implementing reforms aimed at improving the investment climate and obtaining technical assistance for the development of key sectors of the economy.

A long-term assessment of the impact of investment projects on the national economy is an important aspect of investment policymaking. Conducting regular

analyses and monitoring of implemented projects will allow the Albanian government to better understand the economic effects of the investments attracted and identify the most promising areas for further development. Such assessments can help identify projects that have the greatest economic and social impact and direct resources to their further support. This will contribute to the formation of a long-term development strategy for the country, based on effective investment and sustainable economic growth.

Discussion

The study analysed investment projects in Albania to assess their effectiveness and economic feasibility. The results of the study show the activity of key investor countries in 2023, including the Netherlands, Switzerland, Canada, Italy, Turkey, and Austria. This is in line with the findings of R. Grieveson *et al.* (2020), who also noted the activity of foreign investors in the Western Balkans, especially in the infrastructure and energy sectors.

The Netherlands is a leader in renewable energy investments, which is in line with global trends in the transition to green energy. P. D'Orazio & P. Löwenstein (2020) noted that such investments are crucial for economic stabilisation, which is also confirmed in Albania. Swiss investments focused on the banking and insurance sectors play a key role in supporting local enterprises, as confirmed by R. Venkataramani & P. Kayal (2021), who compare systematic investment plans with investments made in a market environment. They emphasised the importance of the banking sector in attracting capital in transition economies.

Canadian investments in the extractive industry and IT sector contribute to the modernisation of the economy, which is consistent with the research of M.O. Faruque (2021). Italian investments in light industry stimulate exports and job creation, which is consistent with the results of A. Matuka & S.S. Asafo (2021), who noted that manufacturing development contributes to economic growth. Turkey and Austria are also actively investing in transport infrastructure and energy, which underscores the importance of infrastructure modernisation for trade efficiency, as noted by O. Alp & M. Ajam (2024).

The results of the analysis of investment projects in Albania show a significant impact on the development of key sectors of the economy, such as energy, infrastructure, tourism, and agriculture. The projects contribute to economic growth and address social issues, including employment and improving living standards. The focus on energy projects is in line with global trends towards renewable energy sources, which is important for Albania's energy independence.

According to P.T. Fliers (2024), investments in energy have a long-term positive effect, reducing dependence on energy imports. The study confirms that a significant portion of investments is directed to the development

of hydro and solar energy, which contributes to job creation. However, unlike N.G. Paterson-Jones (2019), who sees the European Strategic Investment Fund as a mechanism to meet the needs for large infrastructure projects in Europe, the study found that employment in other sectors remains unsatisfactory.

Investments in infrastructure, especially transport, are critical for improving logistics and the country's integration into the EU, as confirmed by K.-I. Inaba (2020). At the same time, the effectiveness of these projects is hampered by administrative obstacles. Investments in tourism have a positive impact on employment and infrastructure development, as evidenced by A.A. Erakhtina (2022). However, this study indicates that tourism does not provide a quick economic impact due to the need for long-term investment. Agriculture, although receiving less investment, plays a pivotal role. According to J.C. Sharmiladevi (2023), foreign investment can increase productivity and exports, which is supported by the study. However, the findings of this study do not necessarily imply that the agricultural sector will become the main driver of the economy without significant reforms.

An analysis of the effectiveness of investment projects in Albania has shown that most of them have high profitability and a positive impact on the economy. Energy and infrastructure projects are the most profitable due to their stable income and long service life. This is confirmed by research by J. Merlin *et al.* (2021), who emphasise that investments in renewable energy sources are not only economically viable but also strategically important for achieving energy independence.

Infrastructure projects also demonstrate high profitability, improving the transport system and facilitating economic integration with the EU. This is in line with the findings of P.B. Kodali (2023), who noted the importance of infrastructure for access to international markets and export growth. Investments in tourism and agriculture have lower rates of return but play a major role in regional development and job creation. S. Mora (2023) notes that although these sectors do not have an immediate impact, their socio-economic impact is significant due to the employment of local people.

However, the results of this study do not coincide with the findings of A. Sahab *et al.* (2024), who find a greater impact of foreign investment on reducing unemployment in other regions. In Albania, new investment has a lower impact on job creation, which may be related to the lower unemployment rate. The findings highlight the importance of investment volume and macroeconomic stability for the success of projects, which is in line with the research of J. Minović *et al.* (2020), who noted that macroeconomic conditions are a key factor in the success of investments.

The results of the SWOT analysis of Albania's investment climate show great potential for attracting foreign investment, but also point to challenges that hinder this

process. Among the country's strengths is its geographical location, which makes it strategically crucial for infrastructure and logistics projects. This is confirmed by the study by B. Ramasamy & M. Yeung (2020), which notes that the Balkans region has advantages for investment due to its proximity to the EU and stable political situation.

Albania also has natural resources, especially in the field of renewable energy, which attracts investors. As noted by E.P. Lopes Júnior *et al.* (2024), investments in environmental projects such as hydroelectric power plants are important for energy independence. The country's tourism potential is also attractive to foreign investors, as confirmed by S. Er *et al.* (2024), which emphasises the role of investment in the development of tourism infrastructure.

Challenges include insufficient infrastructure development, which increases project implementation costs, especially in remote regions. This is confirmed by the findings of O. Jacques (2020), who notes that weak transport infrastructure complicates integration with the EU and hinders competitiveness. High levels of bureaucracy and corruption are also a serious problem that delays project implementation, as noted by G. Petersen (2020).

Access to finance for SMEs is also limited, which hinders the development of innovative projects. The research by O. Mikheeva (2023) confirms that access to finance is critical for the development of entrepreneurial activity. Economic instability in the region and external risks, such as currency fluctuations, also pose threats to investors, as noted by A. Maček *et al.* (2020).

The results of the study confirm that investments in the energy sector of Albania, in particular in renewable energy sources, have a positive impact on economic growth and energy independence. This is in line with the findings of M. Kim *et al.* (2020), who emphasise the importance of such projects for the country's development strategy. In the tourism sector, there is a gradual economic effect of investment, which is consistent with the views of X. Zhao & D. Lin (2020), but differs from the findings of J.G. Djokoto *et al.* (2023), which noted the rapid impact of tourism on the economy. In this case, tourism development requires longer-term infrastructure investment. Infrastructure investments in ports and transport routes are also important for increasing export potential, as confirmed by J. Yfantopoulos (2023). However, unlike B. Ramasamy & M. Yeung (2020), this study found that the long-term benefits of infrastructure upgrades are significant. Investments in rural tourism and agritourism contribute to regional development and improve living standards, which is supported by the research of L.F.C. da Costa & J.P. Kropp (2019). Nevertheless, unlike other authors, this study noted that the economic effect is slower to manifest.

Investment projects in Albania face a number of challenges that affect their efficiency and profitability. This study confirms that one of the main challenges is the underdeveloped infrastructure, including transport,

which increases logistics costs. This is consistent with the findings of S. Ağazade & B. Karasakaloğlu (2022), who emphasise the importance of infrastructure investment to reduce logistics costs and improve economic integration. The lack of developed infrastructure reduces the investment attractiveness of regions, especially remote ones.

In terms of bureaucracy, this study agrees with S. Engler (2020), who notes that lengthy administrative procedures delay project implementation and reduce their attractiveness to investors. It was also noted that these delays can significantly affect the overall profitability of projects by delaying their launch. In order to reduce these challenges, it was suggested that the Albanian government should simplify bureaucratic procedures, invest in infrastructure and develop training programmes to improve project implementation and attract more investment.

Based on the analysis of investment projects in Albania, several recommendations have been developed to improve investment policy. One of the key ones is to optimise support for foreign investors through tax incentives and simplification of administrative procedures. This recommendation coincides with the opinion of J. Rrapaj Kolasi & K. Kolasi (2023), who note that reducing bureaucracy stimulates investment inflows.

Infrastructure development, especially transport and energy, is also important. As noted by M.Y. Toh *et al.* (2023), the infrastructure investment helps to reduce logistics costs and improve international integration, which is fully consistent with the results of this paper. At the same time, this study does not fully coincide with the findings of K. Shanmugam *et al.* (2022), who argue that energy investments bring economic benefits quickly. It was found that in the initial stages, profitability may be limited due to high costs.

Improving the skills of the workforce through vocational training programmes is also an essential step, and this is in line with the findings of W. Atilaw Woldetensaye *et al.* (2022), who examine the impact of foreign investment on unemployment in East African countries and highlight the importance of training for sustainable economic growth. Supporting small and medium-sized businesses, especially in tourism and agriculture, is also critical for the economy, which is consistent with the findings of K. Shanmugam *et al.* (2022). Macroeconomic stability, as noted by H. Li *et al.* (2021), is a crucial condition for attracting investors. This study supports this finding and adds that controlling inflation and the exchange rate creates a stable environment for investment.

In general, the results of this study coincide with the opinions of the scholars whose work was analysed. They emphasise that investments in key sectors of the economy, such as energy, infrastructure, agriculture and tourism, have a significant impact on a country's economic growth. As many other studies have shown, the implementation of effective measures to attract investment,

such as optimising regulatory processes and developing infrastructure, is important for increasing the profitability of projects and creating new economic opportunities.

Thus, the results of the study deepen the understanding of the effectiveness of investment projects not only in Albania, but also in countries with similar economies. They offer specific recommendations for improving the economic efficiency of such projects, in particular through optimising regulatory processes, developing infrastructure and supporting key sectors of the economy.

Conclusions

The status of investment projects in Albania in 2020-2024 shows significant activity from several key investor countries, such as the Netherlands, Switzerland, Canada, Italy, Turkey and Austria, which are actively investing in the development of energy, infrastructure, banking, and other strategic sectors. The largest investments are in renewable energy sources, transport infrastructure and light industry, which support the country's economic growth. This study confirms the importance of investment projects in Albania, particularly in the energy, infrastructure and tourism sectors, which play a key role in the country's economic growth. The investment projects analysed in this study have shown a significant positive impact on the Albanian economy and social sphere. The results of the regression analysis indicate that the key success factors for investment projects are the volume of investment, macroeconomic stability and government support.

The SWOT analysis showed that Albania has the potential to attract foreign investment due to its favourable geographical location, political stability and natural resources, especially in the energy and tourism sectors. However, the country faces challenges such as insufficient infrastructure development, high levels of bureaucracy and limited access to finance for small businesses. Despite these obstacles, opportunities in renewable energy, tourism infrastructure and the IT sector could significantly increase the country's competitiveness. To succeed, Albania needs to reform its administrative system, simplify bureaucratic procedures, and improve infrastructure to attract more investment and ensure economic growth.

Investments in Albania's key economic sectors play a critical role in ensuring sustainable economic growth. Renewable energy projects reduce dependence on energy imports and support the country's climate goals. Tourism, particularly rural tourism, contributes to regional development, job creation and the country's attractiveness to foreign investors. Infrastructure projects facilitate integration with European markets, further boosting trade and economic activity.

Investment projects in Albania face a number of challenges that reduce their efficiency and profitability. The main problems include the lack of transport and

logistics infrastructure, which increases the cost of delivering materials, and the high level of bureaucracy, which delays the launch of projects. A shortage of skilled labour in the technology sectors also hampers project implementation. In addition to internal challenges, external risks, such as currency fluctuations and volatility in global markets, can affect the financial stability of projects. Statistics for 2019-2023 reflecting the dynamics of tourist flows may be distorted by the impact of the COVID-19 pandemic.

Based on the analysis of investment projects in Albania, several essential recommendations can be made to improve investment policy. It is necessary to optimise government support for investors by simplifying administrative procedures and introducing tax incentives.

Investments should also be made in infrastructure and renewable energy development to reduce energy dependence. Developing a skilled workforce through vocational training programmes is key to the successful implementation of projects. It is important to support small and medium-sized businesses by providing access to finance. Macroeconomic stability and the development of the IT sector should also be priorities to attract investment and stimulate economic growth.

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Conflict of Interest

None.

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Аналіз поточних інвестиційних проєктів та їх економічне обґрунтування

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Анотація. Метою цього дослідження був аналіз наявних інвестиційних проєктів в Албанії та оцінка їх економічної доцільності для визначення їх впливу на економічне зростання та розвиток країни. У дослідженні було розглянуто 30 великих інвестиційних проєктів у таких ключових секторах, як енергетика, інфраструктура та туризм. Дослідження показало, що основними інвесторами в Албанії є Нідерланди, Швейцарія, Канада, Італія, Туреччина та Австрія, які активно вкладали кошти в розвиток відновлюваних джерел енергії, транспортної інфраструктури та легкої промисловості. Аналіз підтвердив, що обсяг інвестицій, макроекономічна стабільність та державна підтримка є ключовими факторами успішної реалізації проєктів. SWOT-аналіз показав, що Албанія має значний потенціал для залучення іноземних інвестицій завдяки своєму вигідному географічному розташуванню, політичній стабільності та природним ресурсам, але стикається з такими проблемами, як недостатньо розвинена інфраструктура та високий рівень бюрократії. Інвестиційні проєкти мали позитивний економічний та соціальний вплив, включаючи зменшення енергетичної залежності, розвиток туристичної інфраструктури та покращення логістичних можливостей. Були надані рекомендації щодо оптимізації державної підтримки інвесторів, інвестування в інфраструктуру, підвищення кваліфікації робочої сили та підтримки малого і середнього бізнесу. Запропоновані рекомендації допоможуть покращити інвестиційний клімат Албанії та забезпечити подальше зростання іноземних інвестицій, що позитивно вплине на економічний розвиток країни. Водночас ці рекомендації можуть бути корисними для інших країн зі схожим рівнем економічного розвитку, які прагнуть залучити іноземні інвестиції та стимулювати своє економічне зростання.

Ключові слова: гральний бізнес; азартні ігри; законодавство; бюджет; фінансування



A model of synergistic management of a medical project portfolio based on the telegraphic equation

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Abstract. The relevance of the study was the need to improve the efficiency of managing the portfolio of medical projects for the development of hospital districts. The purpose of the article was to develop and use a model of synergistic management of a portfolio of medical projects for the development of hospital districts based on the telegraphic equation, which takes into account the synergistic relationships between projects and ensures maximum value from their implementation. The paper used the method of critical analysis of scientific literature on project management, information technology, synergistic management and medical project management, a model of synergistic management of a portfolio of medical projects based on the telegraphic equation, numerical methods, and the method of hierarchy analysis. An analysis of scientific papers on the available tools for managing medical projects was carried out. It was found that in 2024 there are no management tools that provide modelling of dynamic processes in systems with spatial and temporal interactions. The expediency of developing a model for synergistic management of a portfolio of medical projects using the telegraphic equation is substantiated. A model of synergistic management of a portfolio of medical projects based on the telegraphic equation is proposed. It involved 6 stages, which are based on the formation of a system of interconnected ordinary differential equations, which are a discrete analogy of the telegraph equation. Based on the developed model, a computer program was created that significantly speeds up the process of making management decisions on the implementation of project portfolios when their project environment changes. The adequacy of the computer program was checked. It was found that the created decision support tool provides accurate results in solving the problems of managing a portfolio of medical projects. The error between numerical and analytical solutions did not exceed 5%, which meets the requirements for such

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models. Based on the research, the status and synergistic effects of medical projects included in the hospital district development portfolio were quantified, and recommendations for project managers were developed. The obtained research results provide project managers with tools to quantify the status and synergies of healthcare projects in hospital district development portfolios in a given project environment, and recommendations for effective management of these portfolios have been developed

Keywords: portfolio management; synergistic effect; modelling; differential equations; partial derivatives

Introduction

The development and implementation of a model for synergistic management of a portfolio of medical projects based on the telegraphic equation is an urgent and scientific and applied task. The development of a model based on the telegraphic equation makes it possible to increase the efficiency of synergistic management of a portfolio of medical projects. In the current conditions of the healthcare system development, the management of medical project portfolios is important for improving the quality of medical services in the territory of the created hospital districts.

In his scientific work, M.P. Stovban (2023) substantiated the peculiarities of the introduction of a hospital district and changes in the finances of a medical institution. At the same time, it is necessary to ensure the optimisation of the use of available resources and the effective development of medical institutions that are part of hospital districts. J. Varajão *et al.* (2025) indicate that the growing number of projects and the complexity of the project environment, as well as the requirements for limited resources, necessitate the development of new approaches to project portfolio management. Such approaches should take into account the systemic interaction and synergies between implemented projects, as well as the ability of hospital districts to adapt to changes in dynamic project environment. One such approach is synergistic project management based on the use of mathematical modelling methods. Synergistic project management involves a systematic consideration of the impact of each individual project on the overall efficiency of the project portfolio. This takes into account the interdependence between individual projects and their resource constraints.

Scientists U. Ojiako *et al.* (2021) note that in 2015–2021, there was a growing interest among scientists in the use of systematic approaches and mathematical models for project management. This is especially true in the healthcare sector, which determines the complexity of medical projects, and the need to optimise limited resources and improve the efficiency of medical services for the population. Scientists K. Wahl & M. Wiese (2024) propose various models for project management. In particular, these are deterministic, stochastic and dynamic models of project portfolio management aimed at improving the efficiency of project implementation through optimal resource allocation and monitoring of their implementation.

Many researchers emphasise the importance of taking into account the interaction between projects in a portfolio since managing individual projects does not allow achieving the desired result and maximising value. In their works, S. Singh *et al.* (2019) and H. Li *et al.* (2021) consider the concept of synergistic management, which is based on the joint implementation of projects, leading to an additional effect due to their interaction and sharing of resources. Synergy in a project portfolio can increase the efficiency of the entire portfolio, which is especially important in conditions of limited resources and the need to adapt to changes in the project environment quickly.

Another area of research focuses on mathematical modelling of dynamic processes in project management. In the works of L. Sales & S. Barbalho (2021), researchers propose dynamic project management models that allow predicting changes in the project implementation process and timely adjusting previously justified plans. However, most of these models do not take into account the spatial and temporal interactions between projects and their dependence on external factors of the project environment, which are basic components in medical project management.

The telegraphic equation, which is used to model dynamic processes with space-time interactions, has been successfully applied in various fields such as physics, economics, and computer science. In the scientific works of T. Wang & H.-M. Chen (2023) and K.S. Albala-wi *et al.* (2023), the telegraph equation is used to model the propagation of signals and information in complex systems. This approach makes it possible to take into account the relationship between system elements at different points in time, which makes it effective for describing dynamic processes with existing changes. In the field of project management, especially medical projects, this approach can be useful for modelling the impact of one project on others through resources or other variables that change in time and space.

Based on the analysis of modern scientific literature, it can be noted that it is advisable to develop a model of synergistic management of a portfolio of medical projects using the telegraphic equation. Such a model will allow to consider the interrelationships between projects in the hospital district development portfolio, which will make it possible to identify additional synergies and increase the efficiency of managing these portfolios. In

addition, this model will make it possible to increase the adaptability of the hospital district's medical project management system to changes in their project environment, as well as to respond quickly to these changes.

Therefore, it is worth noting that it is necessary to solve the scientific and practical problem of developing and implementing a model of synergistic management of a portfolio of medical projects for the development of hospital districts using the telegraph equation. It will ensure that the synergistic relationships between projects are taken into account, which is the basis for maximising the value of their implementation.

Materials and Methods

The model of synergistic management of a portfolio of medical projects is based on a system of interconnected ordinary differential equations, which are a discrete analogy of the telegraph equation. In a particular hospital district, a set of medical projects is implemented that use common resources allocated to the hospital district of a particular region. In particular, O. Malanchuk *et al.* (2023a) substantiated the feasibility of allocating common resources of hospital districts. The proposed model, in the form of a system of differential equations, allows for the taking into account of both the use of resources and their distribution between projects and the synergistic effects arising from the interaction of medical projects. The model of synergistic management of a portfolio of medical projects is based on the classical telegraph equation:

$$\frac{\partial^2 u}{\partial t^2} + 2\lambda \frac{\partial u}{\partial t} = c^2 \frac{\partial^2 u}{\partial x^2} + S(t, x), \quad (1)$$

where $u(t, x)$ – is a function that describes the state of the system (including a medical project) in time t and space x ; λ – dissipation coefficient (reflects losses or delays in project implementation); c – rate of spread of impact or resources; $S(t, x)$ – sources or absorption of resources.

In the adapted management of medical projects, space x reflects resources or relationships between medical projects, and time t – reflects the process of implementing medical projects (life cycle stages). In the work of R. Czahajda (2019) substantiates the stages and feasibility of adapted management of medical projects at different stages of their life cycle. Taking this into account, a mathematical model for a portfolio of medical projects can be written, and the system of differential equations takes the form:

$$\frac{d^2 u_i}{dt^2} + \lambda_i \frac{du_i}{dt} = c^2 \sum_{j=1}^n A_{ij} u_j + S_i(t), \quad (2)$$

where $u_i(t)$ – is the state of the i -th project in time t ; λ_i – is the dissipation coefficient for the i -th project; A_{ij} – is the matrix of dependencies between projects, which reflects the impact of the j -th project on the i -th project; $S_i(t)$ – is external factors of the project environment or sources of resources for the i -th project.

In the classical telegraphic equation (1), the coordinate represents space (the amount of resources, or the relationships between projects in the hospital district development portfolio). In the modified model (2), for synergistic management of healthcare project x portfolios, the index of projects is replaced by i , and now each project has its own parameters. Therefore x this formulation is no longer used, since the project space is modelled through indices i and j in the corresponding equation (2). Thus, this equation for the healthcare project portfolio does not need to be used x , since each project is already described through the index i and its interactions with other projects through the dependency matrix A_{ij} .

In the presented model (2), the status of each project $u_i(t)$ reflects its execution, which is described by such indicators as the degree of completion, resource efficiency, or other indicators. The dissipation rate λ_i determines how quickly a project loses its effectiveness due to delays, risks, or other negative factors in the project environment. The project dependency matrix A_{ij} reflects the impact of one project on another. High values in the matrix A_{ij} indicate a strong interdependence between the i -th and j -th healthcare projects. External factors of the project environment $S_i(t)$ include economic conditions, political decisions, technological changes, and other factors that affect the implementation of healthcare projects.

To use the model, you need to specify the size of the project portfolio in the form of the number n of healthcare projects. In addition, you should specify the synergy coefficient k , which affects the interaction between projects, enhancing or reducing their impact on each other, and the dissipation coefficient λ_i , which reflects the loss of efficiency of the i -th project over time.

To determine the coefficient of synergy k in the model of interaction between medical projects, mathematical expressions are used that reflect the impact of joint project implementation on their aggregate result. That is, the result of the implementation of a portfolio of medical projects. The basic formula for determining the synergy coefficient is used if there are two projects P_1 and P_2 , and their individual results are R_1 and R_2 . Then the total result from the simultaneous implementation of both medical projects can be denoted as R_{total} . In this case, the synergy coefficient k is defined as the ratio of the total result to the sum of the individual project results:

$$k = \frac{R_{total}}{R_1 + R_2}. \quad (3)$$

If $k > 1$, it indicates positive synergy – the result of joint implementation of medical projects is greater than the sum of their individual effects. If $k = 1$, it means no synergy. In this case, the result of project implementation is equal to the sum of individual results. If $k < 1$, it indicates negative synergy, i.e. joint implementation of medical projects worsens the overall result of their implementation in the portfolio.

The study assumes that for a given value of $k=0.1$, there is a high negative synergy, as noted in O. Malanchuk *et al.* (2023b). Without this, the overall efficiency of the portfolio with these projects is significantly reduced. L. Wang *et al.* (2023) found that for a given value of $k=0.2...0.3$, there is an average negative synergy. At the same time, there is moderate competition for resources between healthcare projects, which partially reduces the efficiency of the portfolio with these projects. For a given value of $k=0.4...0.5$, there is a low negative synergy. At the same time, there is weak competition for resources between projects, which minimally affects the overall efficiency of the portfolio with these projects.

If there are multiple projects $P_1, P_2, \dots, P_n$, their results have different weights when forming the overall result of the project portfolio. Taking into account the weights of medical projects $w_1, w_2, \dots, w_n$, the formula for determining the synergy coefficient looks like this:

$$k = \frac{R_{\text{total}}}{\sum_{i=1}^n w_i R_i} \quad (4)$$

where R_{total} – total result from the implementation of all projects included in the portfolio; w_i – weight of the i -th medical project; R_i – results of the i -th medical project.

In a dynamic project environment, the value of synergy can change over time. If we take into account the variability of the results of medical projects over time, then the synergy coefficient k depends on time t :

$$k(t) = \frac{R_{\text{total}}(t)}{R_1(t) + R_2(t) + \dots + R_n(t)}. \quad (5)$$

Formula (4) allows modelling the dynamics of changes in the synergistic effect of forming a portfolio of medical projects during a given period of its implementation. Provided that the model takes into account the level of risk Risk_i for each i -th medical project, the synergy coefficient k takes into account the risks through the function of reducing the overall result due to risks:

$$k = \frac{R_{\text{total}}}{\sum_{i=1}^n (1 - \text{Risk}_i) R_i} \quad (6)$$

where Risk_i – is the risk associated with the i -th medical project (values in the range from 0 to 1).

If healthcare projects share resources allocated to the portfolio, this also affects the value of the synergy coefficient k . For example, C_i – is the resources used by the i -th project. Then the synergy coefficient k , taking into account the feasibility of resource optimisation, is written as follows:

$$k = \frac{R_{\text{total}}}{\sum_{i=1}^n R_i - \alpha \cdot \sum_{i=1}^n C_i} \quad (7)$$

where α – is the resource sharing impact factor (determines how effectively healthcare projects can reduce resource consumption through joint implementation in the portfolio).

Thus, the synergy coefficient k from the joint implementation of medical projects in a portfolio can be determined in different ways, depending on the level of management and the state of the project environment. The basic formula (3) reflects the interaction of the results of medical projects, and other modified formulas (4-6) take into account time factors, risks, and efficiency of resource sharing in the portfolio. For each specific portfolio of healthcare projects, the formula that best suits the characteristics of the projects and their project environment should be chosen.

When modelling the interaction between healthcare projects in a portfolio, the dissipation coefficient λ plays an important role. This coefficient reflects the loss or reduction of effects in a portfolio of healthcare projects due to various factors, such as resource constraints, delays in project implementation, or external influences. Using the telegraphic equation (1), which combines the characteristics of wave and diffusion processes, the dissipation coefficient λ determines how quickly the energy (or effects of interaction between healthcare projects) decreases over time. Dissipation λ is related to the expenditure of resources for the implementation of medical projects, then the formula for determining it will be as follows:

$$\lambda = \frac{\sum_{i=1}^n C_i}{\sum_{i=1}^n R_i} \quad (8)$$

where C_i – is the cost of resources for the implementation of the i -th medical project; R_i – is the effectiveness of the i -th medical project; n – is the number of medical projects in the portfolio. Provided that the dissipation λ takes into account the risks and uncertainties that affect medical projects, then the quantitative value λ will be determined by the formula:

$$\lambda = \frac{\sum_{i=1}^n \text{Risk}_i}{n}, \quad (9)$$

where Risk_i – is the risk level for the i -th medical project (values in the range from 0 to 1); n – is the number of medical projects in the portfolio. Provided that the dissipation λ takes into account time delays in the implementation of medical projects, the formula for determining this coefficient will be as follows:

$$\lambda = \frac{1}{\tau}, \quad (10)$$

where τ – is the typical delay time in the implementation of a medical project portfolio.

The value of the dissipation λ depends on the specifics of the healthcare project portfolio and the conditions of their implementation. A high value of dissipation λ indicates significant losses or a rapid decline in the effects of the projects in the portfolio. This may be the result of high risks, high resource costs or strong external influences. The average value of dissipation λ indicates moderate losses or a steady decline in the effects of the projects in the portfolio. At the same time,

the project portfolio is characterised by a balanced level of risks and resource costs. A low value of dissipation λ indicates minimal losses or a slow decline in the effects of implementing projects in the portfolio. This is the result of efficient resource management, low risks, or favourable conditions for the implementation of medical projects.

The dissipation ratio λ plays a key role in determining the dynamics of the implementation of medical project portfolios. A high value λ leads to a rapid decrease in the interaction between medical projects, which reduces the value of synergy and the efficiency of the medical project portfolio. The optimal value strikes a balance between preserving the effects of interaction and adapting to the changing conditions of the project environment of medical project portfolios. In addition, known quantitative knowledge λ allows to predict how changes in the interaction between healthcare projects affect the overall performance of their portfolio over time.

The dissipation λ factor is an important parameter that reflects the interaction between medical projects in a portfolio. It allows to take into account efficiency losses due to various factors such as resource constraints, risks and time delays. The quantitative value λ is determined based on the results of the preliminary analysis of resource costs, risk levels, and time characteristics of the medical project portfolio. The determination of this coefficient is the basis for accurate modelling of the dynamics of interaction between medical projects, which contributes to more efficient management of the portfolio and achievement of optimal results in the activities of hospital districts.

The main indicators of the initial state of each medical project include the degree of completion, project budget, share of available resources and probability of risks, and a dependency matrix is formed based on the analysis of the relationships between projects. This dependency matrix A_{ij} is a square matrix of size $n \times n$ (where n – is the number of projects in the portfolio), which reflects the elements A_{ij} of the degree of influence of the j -th project on the i -th project. When constructing the matrix, it is important $A_{ij} = 0$ to ensure that the values for all i -th projects are the same. This is due to the fact that the individual i -th project does not affect itself:

$$A = \begin{bmatrix} 0 & A_{12} & A_{13} & \dots & A_{1n} \\ A_{21} & 0 & A_{23} & \dots & A_{2n} \\ A_{31} & A_{32} & 0 & \dots & A_{3n} \\ \vdots & \vdots & \vdots & \ddots & \vdots \\ A_{n1} & A_{n2} & A_{n3} & \dots & 0 \end{bmatrix}. \quad (11)$$

Subsequently, the impact is quantified A_{ij} . For each pair of projects (i, j) , the degree of impact of the i -th project on the j -th project is assessed on a scale from 0 to 1 (0 – no impact, 1 – maximum impact). Fractional values are used to reflect different degrees of impact. That is, for some pairs of medical projects, the degree of influence of the i -th project on the j -th project is $-A_{ij} \in [0, 1]$.

The next step is to normalise the dependency matrix A between individual projects. The sum of all the influences on a given medical project is normalised to avoid excessive influence from other projects. The normalisation formula is written for each i -th row of the matrix A :

$$A'_{ij} = \frac{A_{ij}}{\sum_{k=1}^n A_{ik}}, \text{ subject to } j \neq i. \quad (12)$$

If the sum is $\sum_{k=1}^n A_{ik} = 0$, then the value is $A'_{ij} = 0$. As a result, a matrix A'_{ij} is formed, which is used to determine the degree of influence of the i -th project on the j -th project.

L. Chernova *et al.* (2022) substantiate the external factors $S_i(t)$ that play an important role in modelling the implementation of medical projects in their portfolios. They reflect influences that do not directly depend on the internal processes of projects, but significantly affect their implementation and efficiency. In the model of synergistic management of a medical project portfolio, $S_i(t)$ they are time functions that describe external influences on each individual i -th project. External factors are mathematically described as functions of time for each i -th project:

$$S_i(t) \text{ for projects } i = 1, 2, \dots, n, \quad (13)$$

where $S_i(t)$ – is an external factor that affects the i -th project at a given time t ; t – time, which is displayed in months, years, etc.

In order to model external factors, it is proposed to consider their values in a combined manner, both deterministic (predictable trends) and stochastic (presence of random fluctuations):

$$S_i(t) = A_i \sin(\omega_i t + \phi_i) + \sigma_i(t), \quad (14)$$

where A_i – is the amplitude of the impact; ω_i – is the frequency of oscillations; ϕ_i – is the phase shift.

External factors are integrated into the telegraphic equation (2) for each i -th project, affecting the dynamics of its state. For projects affected by seasonal factors (e.g., changes in demand for medical services, etc.), they are described:

$$S_i(t) = A_i \sin\left(\frac{2\pi t}{T}\right), \quad (15)$$

where T – is the period of fluctuations (usually set during the calendar year – 12 months for seasonal changes).

It is important in the synergistic management of healthcare project portfolios to take into account the impact of seasonal changes on resource requirements or demand for certain services. Conditionalities are used to model sudden changes, such as the introduction of new regulations:

$$S_i(t) = \begin{cases} S_{i0}, & t < t_0 \\ S_{i1}, & t \geq t_0, \end{cases} \quad (16)$$

where t_0 – is the point in time in the life cycle of the i -th medical project when the change occurs.

The following expression is used to model unpredictable economic changes:

$$S_i(t) = \sigma_i \varepsilon(t), \quad (17)$$

where $\varepsilon(t)$ – is white noise with mean 0 and correlation $\delta(t - t')$.

For the complex modelling of the project environment components, taking into account expressions (14) and (16), which describe both predictable trends and random influences, the expression is used:

$$S_i(t) = A_i \sin\left(\frac{2\pi t}{T}\right) + \sigma_i \varepsilon(t). \quad (18)$$

The choice of a specific form for definition $S_i(t)$ depends on the characteristics of medical projects and their external project environment. If there are predictable and cyclical components of the project environment, then deterministic functions are used. If there are random and unpredictable components of the project environment, stochastic functions are used.

Taking into account external factors of the project environment $S_i(t)$ is an important component of the proposed model of synergistic management of a portfolio of medical projects. It reflects the influence of project environment components that do not depend on the internal components of medical projects but significantly affect their effectiveness. Mathematical modelling of these factors allows to create an adaptive model that takes into account both predictable and random influences of the external project environment. The choice of a specific formula for determining $S_i(t)$ depends on the characteristics of medical projects and their project environment. For the study, were selected the data officially published as of year 2021.

Results and Discussion

In the course of the study, a model of synergistic management of a medical project portfolio based on the telegraphic equation was built. It involves the systematic implementation of 6 stages, each of which reflects the main steps in data generation, analysis, numerical calculations, and project portfolio optimisation (Fig. 1).

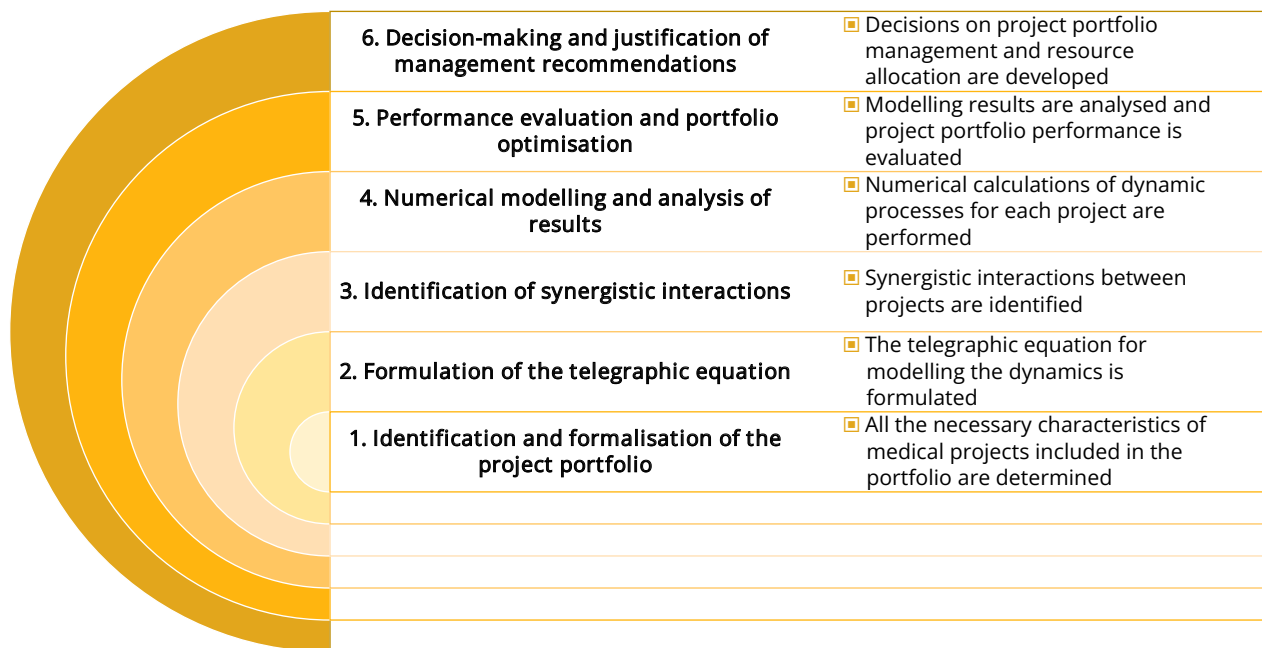


Figure 1. Schematic of the model of synergistic management of a medical project portfolio based on the telegraphic equation
Source: developed by the authors

At the first stage of the proposed model, the medical projects included in the hospital district development portfolio are identified. At the same time, their respective characteristics are recorded: resources, budget, deadlines, expected results, risks, and interrelationships between projects. Based on this, the main factors describing the status of each healthcare project (health status of the population, amount of resources used, implementation status, etc.)

Stage 2 of the proposed model involves the formulation of the telegraphic equation (1-2), which describes dynamic changes in the state of projects and the interaction between them. The telegraphic equation is a second-order differential equation used to model changing processes and dynamic changes in the project environment. The equation provides adaptation to a changing project environment and describes the dynamics of changes in the state of medical

projects and the interdependencies between them in space and time.

Stage 3 of the model analyses the interrelationships between the medical projects included in the hospital district's development portfolio. It takes into account such components as the exchange of resources between projects, the impact of changes in one project on the effectiveness of others. This makes it possible to identify positive and negative synergies. For example, if two projects share resources or complement each other, this increases the overall efficiency of the healthcare project portfolio.

At the fourth stage of the presented model, numerical calculations are carried out to simulate the dynamics of changes in the project portfolio, taking into account the telegraphic equation. The paper assumes that the coefficient characterises a low level of dissipation. At the same time, projects, when implemented together in a portfolio, lose efficiency slowly, which is typical for stable and well-managed projects. If the coefficient has a medium level of dissipation, it indicates a moderate level of efficiency losses in the healthcare project portfolio, which is a result of risks and delays. If the coefficient has a high level of dissipation, portfolios with medical projects quickly lose efficiency due to high risks or inefficient use of resources.

At stage 5 of the presented model, the efficiency and optimisation of the portfolio of hospital district development projects is assessed. Calculations are made to assess the overall efficiency of the project portfolio, taking into account synergies. In addition, the project portfolio management strategy is justified in order to maximise synergies and minimise resource costs.

At stage 6 of the proposed model, decisions are made and management recommendations are substantiated. Based on the results obtained, recommendations

for the effective management of the portfolio of hospital district development projects are developed. The optimal strategies for resource allocation and interaction between projects are determined.

On the basis of the proposed model of synergistic management of a portfolio of medical projects using the telegraphic equation, a computer programme has been created. It allows the user to enter initial data, perform calculations and obtain visual results to support decision-making. To ensure that the computer programme implementing the model of synergistic management of a medical project portfolio based on the telegraphic equation is working correctly, were tested its adequacy. Such verification involves comparing the results obtained with the help of a computer program with analytical solutions of the telegraphic equation and real data. For this purpose, the telegraphic equation has the form:

$$\frac{\partial^2 P(x,t)}{\partial t^2} - c^2 \frac{\partial^2 P(x,t)}{\partial x^2} = f(x,t), \quad (19)$$

where $P(x, t)$ – is the degree of project completion at a given time t at a distance x ; c – is the rate of spread of influence or resources; $f(x, t)$ – is a function of external influences and synergies.

For the given initial data with the characteristics of the design environment, equation (18) has an analytical solution, the results of which can be used to compare with the results obtained by using a computer program. It is tested on data sets for which the analytical solution of the equation is known. For each of the datasets, the results of the programme (the value of the project completion rate) were compared with the analytical solution (Table 1). In addition, a formula was used to calculate the error:

$$\Delta P = \frac{|P_{\text{num}}(x,t) - P_{\text{an}}(x,t)|}{P_{\text{an}}(x,t)} \times 100\%. \quad (20)$$

Table 1. Results of the adequacy test of a computer program that implements a model of synergistic management of a portfolio of medical projects based on the telegraphic equation (data for 2021)

Project name	Duration, t , months	Degree of project completion		Error, ΔP , %
		$P_{\text{num}}(x, t)$ %	$P_{\text{an}}(x, t)$ %	
Hospital A	3	35.2	34.8	1.15
Hospital A	6	57.3	56.9	0.70
Hospital A	9	76.4	75.8	0.79
Polyclinic B	3	42.1	41.6	1.20
Polyclinic B	6	63.5	62.9	0.95
Polyclinic B	9	82.8	81.9	1.10
Diagnostic centre	3	29.7	29.3	1.37
Diagnostic centre	6	49.8	49.1	1.43
Diagnostic centre	9	67.4	66.5	1.35
Surgical centre	3	33.4	32.7	2.14
Surgical centre	6	55.6	54.8	1.46
Surgical centre	9	73.5	72.3	1.66
Rehabilitation centre	3	21.7	21.3	1.88
Rehabilitation centre	6	41.5	40.9	1.47
Rehabilitation centre	9	58.2	57.3	1.57

Source: calculated by the authors

Verification of the adequacy of the computer programme developed on the basis of the telegraphic equation showed that the created decision support tool provides accurate results in solving the tasks of managing a portfolio of medical projects. The difference between numerical and analytical solutions did

not exceed 5%, which meets the requirements for such models.

To use the developed computer program based on the model of synergistic management of a medical project portfolio, the indicators for each project are presented in Table 2.

Table 2. Initial data for the synergistic management of a medical project portfolio (data for 2021)

No.	Project	Degree of completion, $P(x, t)\%$	Budget, $B(x)$, UAH million	Resources $R(x)$, %	Risks $p(x, t)\%$
1	Hospital A	40	50	80	30
2	Polyclinic B	60	30	70	25
3	Diagnostic centre	30	70	60	40
4	Surgical centre	50	40	75	35
5	Rehabilitation centre	20	60	65	50

Source: compiled by the authors

Table 2 shows the degree of project completion as a percentage of the project's start to the point in time. For example, for the Hospital A project, this indicates that the project is 40% complete from the set goals. The project budget describes the amount of funding allocated to the project. Resources reflect the proportion of available material and human resources used to implement the project. For example, for the Hospital A project, only 80% of the available resources are used. Risks characterise the quantitative value of risks that

may affect the success of the healthcare project. This indicator is presented as a percentage, where 100% means maximum risks.

Based on the initial data in Table 2 and using the developed computer program that implements the model of synergistic management of a portfolio of medical projects based on the telegraphic equation, were modelled and forecasted the results of medical projects, taking into account synergistic interactions and their impact on the overall state of the portfolio of medical projects (Fig. 2).

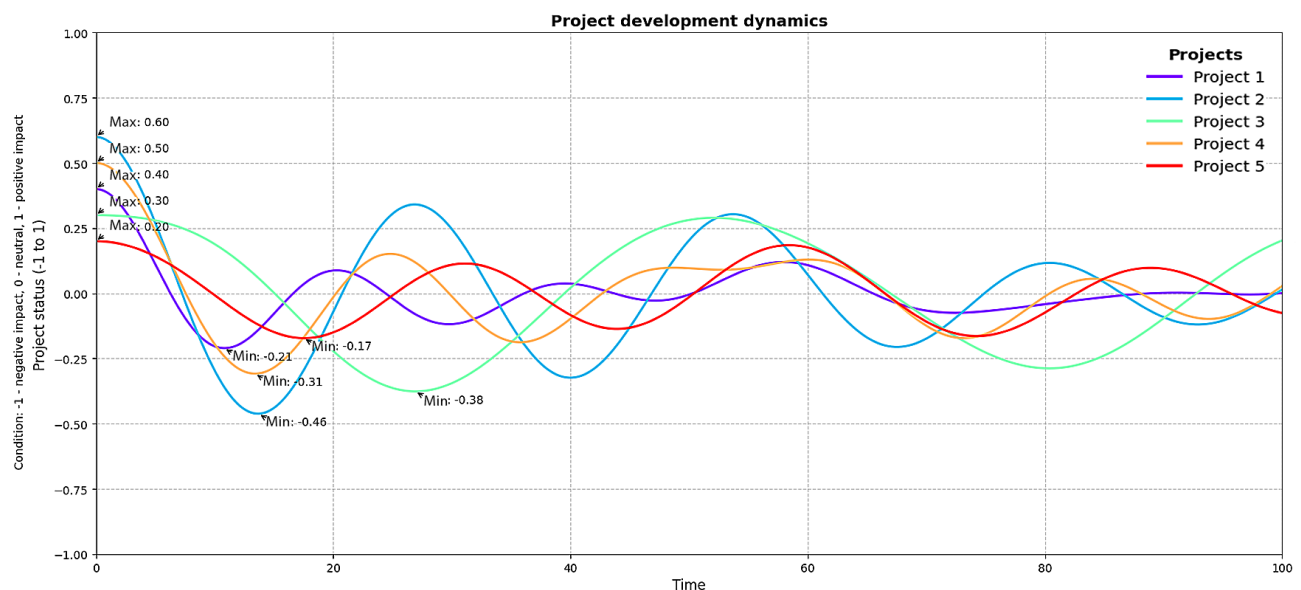


Figure 2. Trends in the status of medical projects included in the hospital district development portfolio (data for 2021)

Source: developed by the authors

Figure 2 shows the trends in the status of medical projects included in the hospital district's development portfolio over time as a result of the impact of project environment factors. The ordinate axis shows the status of medical projects (-1 means negative impact (due to delays, insufficient resources and high risks), 0 means neutral (no significant positive or negative changes),

+1 means positive impact (effective implementation, improved use of resources, reduced risks)). At the beginning of the monitoring of the Hospital District Development Portfolio, all of its projects are in the positive zone with the maximum value of their positive status, except for project 5 'Rehabilitation Centre'. This project reaches the maximum value of +0.34 approximately one month

after the start of the monitoring. At the same time, due to the negative impact of external project environment factors, all projects move to the negative zone. Project 2, Polyclinic B, acquires the highest negative value with an indicator of -0.52, which indicates a lack of resources or problems with financing. Most of the projects (project 1, project 2, project 4) demonstrate positive dynamics

of implementation after two months of implementation due to the right management decisions, even with initial difficulties, which confirms the effectiveness of synergistic project portfolio management.

The study quantified the synergistic effects of the systematic management of medical projects included in the hospital district's development portfolio (Fig. 3).

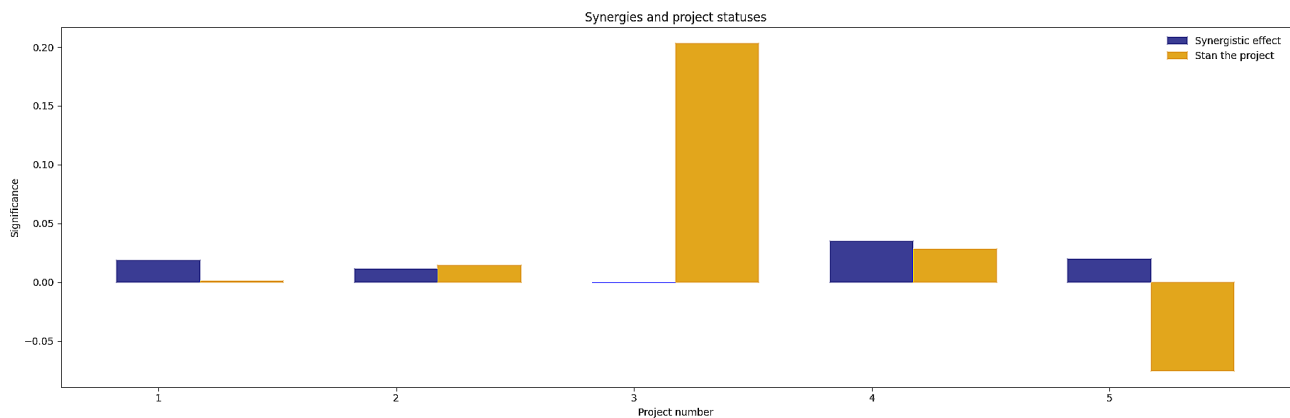


Figure 3. Histogram of the status and synergies of medical projects included in the hospital district development portfolio
Source: developed by the authors

Also were analysed the results (Fig. 3) regarding the status and synergies of the medical projects included in the hospital district development portfolio. It was found that projects 1 and 5 have a negative impact (-0.025 and -0.08) on the portfolio. This indicates that there are problems in the management or implementation of these projects. This situation is caused by a lack of resources, budgetary constraints or a high level of risk. At the same time, projects 2, 3 and 4 have a positive impact (+0.025, +0.12 and +0.015) on the portfolio. The synergistic effect reflects the extent to which one project affects the others during their systematic implementation in the portfolio. It was found that project 1 has a zero synergistic effect, which does not contribute to the improvement of other projects. However, the impact on other projects is significant. In particular, on project 2 – 0.68, project 3 – 0.24, project 4 – 0.78, project 5 – 0.71. Project managers should reconsider the approach to managing Project 1. It has a negative impact on its own status, its impact on other projects is important, but it requires additional resources or management interventions. Project 2 has a synergistic effect of +0.01, which indicates a slight positive impact on other projects. At the same time, its impact on other projects is also significant. In particular, on project 1 – 0.91, project 3 – 0.84, project 4 – 0.78, project 5 – 0.13. At the same time, project 2 has the greatest impact on project 1, which helps to improve its condition. Support from other projects should also be increased. Project 3 has an insignificant synergistic effect of -0.01, which indicates a slight negative impact, but it does have an impact on other projects. In particular,

on project 1 – 0.83, project 2 – 0.38, project 4 – 0.09, project 5 – 0.63. Project 3 requires additional efforts to eliminate the negative effects that affect its status and potentially interfere with other projects. Project managers should pay special attention to resource management. Project 4 has a positive synergy effect of +0.01 and a positive impact on other projects. In particular, on project 1 – 0.63, project 2 – 0.88, project 3 – 0.77, project 5 – 0.39. Project 4 is stable and contributes to the development of other projects, in particular project 2. It is recommended to continue to actively support it. Project 5, despite its negative status of -0.8, has a positive synergistic effect of +0.01. However, the impact on other projects is significant. In particular, on project 1 – 0.94, project 2 – 0.79, project 3 – 0.42, project 4 – 0.67. Project 5 has great potential for recovery if supported by other projects. It has a significant impact on project 1, and coordination between the two projects should be strengthened.

In general, project managers should pay attention to project 5, which requires immediate intervention to overcome the negative factors of the project environment, given its strong impact on other projects. Projects 2 and 4 demonstrate stable positive development and can serve as models for implementing management decisions in other projects. Project 1 is also worthy of note, as it has a significant impact on other projects despite its poor condition. Additional resources and improved management will have a positive effect on the entire portfolio. It is important to strengthen coordination between projects, as synergies contribute to the overall success of the portfolio.

Based on the analysis of the results and indicators of the mutual impact of healthcare projects in the hospital

district development portfolio, recommendations for project managers were substantiated, as shown in Table 3.

Table 3. Recommendations for project managers on the synergistic management of portfolios of medical projects for the development of hospital districts

Recommendations	Project 1	Project 2	Project 3	Project 4	Project 5
Manage the relationships between projects	Interaction with projects 2, 4, 5	Interaction with projects 1, 3, 4	Interaction with projects 1, 5	Interaction with projects 1, 2, 3	Interaction with projects 1, 2, 4
Prioritisation of resources	–	Important	–	Important	Important
Planning flexibility	Yes	Yes	Yes	Yes	Yes
Control and monitoring of risks	Yes	Yes	Yes	Yes	Yes
Timing of implementation	Speed up	Speed up	Speed up	Speed up	Speed up

Source: compiled by the authors

The article analyses the recommendations provided for project managers who manage portfolios of medical projects. The interrelationships between medical projects that influence each other are important and can be assessed by synergistic effects. The most influential are projects 1, 2, and 4, which have a strong mutual impact. This means that coordination between these projects is fundamental to the successful completion of the Hospital District Health Project Portfolio. For example, strengthening the interaction between projects 1 and 4 improves the effectiveness of the portfolio. The greatest attention should be paid to projects 2, 4 and 5 as they lack resources. This may reduce their effectiveness and increase risks, so it is recommended to increase funding or reallocate existing resources. It is important for project managers to constantly review the plans of all healthcare projects, as the dynamics of changes affect the effectiveness of their implementation. A mechanism should be put in place to regularly adapt strategies in line with current data and the results of monitoring the project environment. All healthcare projects require ongoing risk monitoring. It is especially important to monitor risks in projects with high negative impact (e.g. project 5) to ensure timely response to them. For all projects, consider accelerating their implementation to reduce risks and increase positive synergies.

Project managers are advised to focus on increasing the interaction between core projects that have strong synergies with each other. This will help improve the overall success of the portfolio. In addition, it is important to ensure that sufficient resources are allocated to the most challenging projects and to continue to plan and control risks flexibly to avoid potential threats.

The model of synergistic management of a medical project portfolio based on the telegraphic equation has significant potential to improve the efficiency of medical project management. This is especially true in a dynamic and complex project environment in which medical projects are implemented. The analysis shows that the use of the telegraphic equation allows taking into account

the temporal and spatial aspects of interaction between projects, which contributes to more accurate risk prediction and assessment of results. The results of the study were analysed in comparison with the existing scientific approaches and studies conducted by other researchers. One of the basic aspects confirmed in the study by A. Alothman *et al.* (2023) is the complexity of implementing the latest technologies in project management, particularly in infrastructure projects in India. This study highlights the need to adapt management models to specific project conditions, which is also relevant to this model of the telegraphic equation in healthcare projects. Synergistic project portfolio management should take into account the specifics of the healthcare sector, where resources, technology and changes in the external environment have a significant impact on project success.

The authors G. Bilgin *et al.* (2023) in their study developed a decision support system for project portfolio management in construction companies. Although the construction industry and medical projects are different, the principles of portfolio management, such as prioritisation and resource optimisation, have common features. This demonstrates the versatility of project management models based on the telegraphic equation, which can be adapted to different industries.

Researchers E. da Costa Carvalho & S.R.B. Oliveira (2022) explore the variety of approaches to supporting software project management using Agile, which focuses on the flexibility and adaptability of the methods. Although Agile is mostly used in the IT industry, its principles are also useful for healthcare projects, where rapid adaptation to changes in the external project environment is also important. For example, in the context of pandemics or crises, when project priorities change rapidly, applying Agile approaches such as incremental updates and frequent progress reviews is useful for a synergistic healthcare project portfolio management model.

R. Ghule *et al.* (2015) discuss in detail the modelling of the telegraphic equation for system stabilisation in the

energy context, which has direct parallels with model, analysed in this research. Their approach to controlling dynamic systems through telegraphic equations shows that such methods are effective in predicting the behaviour of complex systems, including medical projects with many interconnected elements.

Another important aspect was investigated by A. Kock *et al.* (2020) and D. Silva *et al.* (2021), who studied the impact of information systems on the success of project portfolio management. Their results showed that the level of use of management processes is quite important for ensuring project efficiency. In the context of model, outlined in this paper, this means that the use of the telegraphic equation is only successful if there is a high level of use of management processes in healthcare project management.

Finally, Y. Zhang *et al.* (2020) investigated dynamic modelling of financing strategies for infrastructure projects, which is also useful in the context of healthcare projects where funding is often limited and requires careful planning. Their simulation approach confirms the importance of dynamic models for evaluating financing strategies, which is another confirmation of the effectiveness of the telegraphic equation in project portfolio management.

Thus, the results of model of synergistic management of a medical project portfolio based on the telegraphic equation are consistent with existing research and approaches to project management, which confirms its practical value for improving efficiency in the complex and dynamic conditions of a given project environment. Proposed model of synergistic management of a portfolio of medical projects based on the telegraphic equation and the developed computer programme based on it allow to effectively assess the status of each project in the portfolio, taking into account both individual characteristics and mutual influence between projects. This toolkit allows to identification of negative trends at the early stages of changes in the project environment, which makes it possible to analyse synergies arising from the interaction between projects and to substantiate recommendations for improving the efficiency of project management.

Testing of the model has shown that synergistic effects play an important role in stabilising or deteriorating the state of individual projects, which underlines the expediency of using a synergistic approach to managing portfolios of such projects. The use of the telegraphic equation provides an accurate description of project dynamics, allow to track trends in their development over time.

The average error of the computer program test results, which does not exceed 5%, confirms the adequacy and accuracy of the numerical solutions made by it, which is acceptable for use by project managers for practical purposes. Recommendations based on the model are used by project managers to improve the efficiency of project implementation, optimise resource allocation,

and reduce risks. Implementation of this model in real-world conditions will allow for more flexible and efficient management of the development of hospital districts and their medical facilities, improve the quality of medical services, and promote the rational use of limited financial and human resources within the hospital district.

Conclusions

Based on the analysis of scientific papers on the developed tools for managing medical projects, it has been found that scientists have paid considerable attention to both models and methods of managing individual medical projects and their portfolios. However, due to the lack of management tools that provide modelling of dynamic processes in systems with spatio-temporal interactions, there is a need to develop a model of synergistic management of a portfolio of medical projects using the telegraph equation.

The developed model of synergistic management of a portfolio of medical projects is built based on the telegraphic equation and includes 6 stages. It is based on the construction of a system of interrelated ordinary differential equations that represent a discrete analogy of the telegraphic equation. The proposed model in the form of a system of differential equations allows for taking into account both the use of resources and their distribution between projects and synergistic effects arising from the interaction of medical projects.

Based on the developed model of synergistic management of a medical project portfolio, a computer program was created that significantly accelerates the process of making managerial decisions on the implementation of project portfolios in a changing environment. Verification of the adequacy of the program, based on the telegraphic equation, has shown that this decision support tool provides high accuracy in solving the problems of managing a portfolio of medical projects. The deviation between the numerical and analytical solutions did not exceed 5%, which is in line with the standards for such models.

Based on the initial data on the implementation of projects in the hospital district (Ukraine) for 2021, using the developed computer program that implements the model of synergistic management of a portfolio of medical projects based on the telegraphic equation, the results of the implementation of medical projects were modelled and forecasted, taking into account synergistic interactions and their impact on the overall state of the portfolio of medical projects. The obtained results made it possible to quantify the status and synergistic effects of medical projects included in the hospital district development portfolio, as well as to develop recommendations for project managers.

Further research should be conducted to adapt the model of synergistic management of a healthcare

project portfolio based on the telegraphic equation to the conditions of different hospital districts. In particular, additional factors of the project environment, such as changes in the sources and amounts of project funding, should be taken into account. Particular attention should be paid to developing methods for forecasting long-term synergies, which will improve resource management and increase the efficiency of project implementation. It is also worth integrating

more flexible algorithms for adapting to the rapidly changing components of the project environment of hospital districts.

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Conflict of Interest

None.

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Модель синергетичного управління портфелем медичних проєктів на основі телеграфного рівняння

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Анотація. Актуальність дослідження полягає у потребі підвищення ефективності управління портфелем медичних проєктів розвитку госпітальних округів. Метою статті була розробка та використання моделі синергетичного управління портфелем медичних проєктів розвитку госпітальних округів на основі телеграфного рівняння, що враховує синергетичні взаємозв'язки між проєктами та забезпечує отримання максимальної цінності від їх реалізації. У роботі використано метод критичного аналізу наукової літератури із проєктного менеджменту, інформаційних технологій, синергетичного управління та управління медичними проєктами, модель синергетичного управління портфелем медичних проєктів на основі телеграфного рівняння, чисельні методи, метод аналізу ієрархій. Було виконано аналіз наукових праць щодо наявного

інструментарію для управління медичними проєктами. Встановлено, що у 2024 році відсутній управлінський інструментарій, що забезпечує моделювання динамічних процесів в системах з просторово-часовими взаємодіями. Обґрунтована доцільність розробки моделі синергетичного управління портфелем медичних проєктів з використанням телеграфного рівняння. Запропонована модель синергетичного управління портфелем медичних проєктів на основі телеграфного рівняння. Вона передбачала виконання 6-х етапів, які базуються на формуванні системи взаємопов'язаних звичайних диференціальних рівнянь, які є дискретною аналогією телеграфного рівняння. На основі розробленої моделі було створено комп'ютерну програму, яка значно пришвидшує процес прийняття управлінських рішень щодо реалізації портфелів проєктів за зміни їх проєктного середовища. Виконана перевірка адекватності комп'ютерної програми. Встановлено, що створений інструмент для підтримки прийняття рішень дає точні результати під час вирішення завдань управління портфелем медичних проєктів. Похибка між чисельними та аналітичними рішеннями не перевищувала 5 %, що відповідає вимогам для таких моделей. На підставі проведених досліджень кількісно оцінено стан та синергетичні ефекти медичних проєктів, включених у портфель розвитку госпітального округу, а також розроблено рекомендації для проєктних менеджерів

Ключові слова: портфельне управління; синергетичний ефект; моделювання; диференціальні рівняння; частинні похідні

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