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Financial attractiveness of investing in «bee houses» within U.S. wellness zones

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Abstract. *The relevance of the research is determined by the growing role of nature-oriented investments within the framework of sustainable development and the transition of the tourism and recreation industry of the United States of America (USA) toward environmentally responsible business models. Under conditions of increasing demand for wellness tourism and biobased products, investments in the construction of beehives are considered an innovative way to combine profitable activity with environmental and social benefits. **Purpose of the article:** to define the economic essence, structural components, and practical conditions for forming the financial attractiveness of investments in the construction of bee houses in the wellness zones of the USA as a promising direction for the development of environmentally oriented and health-improving tourism. **Methods.** The study employs systemic, structural-functional, and comparative approaches, which enable a comprehensive assessment of the investment attractiveness of this sector. Methods of economic analysis, cash flow modelling, and content analysis of regulatory and institutional sources were employed to identify the key factors influencing the financial efficiency of such projects. **Results.** The content and structure of investment*



attractiveness in nature-based projects have been analysed, and the influence of market, technological, locational, and financial–institutional factors on the profitability of bee house initiatives has been demonstrated. The primary development barriers have been identified: regulatory fragmentation, a shortage of long-term financing, a personnel deficit, and informational asymmetry. The integration potential of bee houses within local economies, tourism infrastructure, and environmental programs has been assessed, proving their ability to generate a multiplier socio-economic effect. **Conclusions.** It has been established that the development of investments in bee houses contributes to forming a new paradigm of sustainable tourism, within which profitability is combined with environmental and social efficiency. The necessity of regulatory unification, expansion of financial incentives, development of public–private partnerships, and institutional support for eco-projects has been substantiated. Future studies should focus on the quantitative modelling of risks and profitability of nature-oriented investments, the development of indicators for social and environmental returns, and the creation of an analytical base for strategic management of sustainable investment flows in the tourism sector.

Keywords: sustainable tourism, nature-based investments, eco-infrastructure, apitherapy, regional development, green economy, investment resilience, environmental management.

Фінансова привабливість інвестицій у будівництво бджолиних будинків в оздоровчих зонах США

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Анотація. Актуальність дослідження зумовлено зростанням ролі природоорієнтованих інвестицій у системі сталого розвитку та переходом



туристично-рекреаційної індустрії Сполучених Штатів Америки (США) до екологічно відповідальних моделей господарювання. В умовах підвищення попиту на оздоровчий туризм і біоекономічні продукти інвестиції у будівництво бджолиних будинків розглядаються як інноваційна форма поєднання прибуткової діяльності з природоохоронними й соціальними наслідками. **Мета статті** – визначити економічне значення, структурні компоненти та практичні умови формування фінансової привабливості інвестицій у будівництво бджолиних будинків в оздоровчих зонах США як перспективного напрямку розвитку екологічно орієнтованого й оздоровчого туризму. **Методи.** У роботі застосовано системну, структурно-функціональну та порівняльну практики, що дали змогу комплексно оцінити інвестиційну привабливість бізнес-проєкту. Використано методи економічного аналізу, моделювання грошових потоків, зокрема контент-аналіз нормативних та інституційних джерел для ідентифікації чинників, що визначають фінансову ефективність проєктів. **Результати.** Досліджено зміст і структуру інвестиційної привабливості природоорієнтованих проєктів, доведено вплив ринкових, технологічних, локаційних і фінансово-інституційних чинників на рівень рентабельності бджолиних будинків. Виявлено основні перешкоди розвитку: нормативну фрагментацію, обмеження довгострокового фінансування, кадровий дефіцит та інформаційну асиметрію. Оцінено інтеграційний потенціал таких об'єктів у місцеву економіку, туристичну інфраструктуру й екологічні програми, що формує мультиплікативний соціально-економічний ефект. **Висновки.** Встановлено, що розвиток інвестицій у бджолині будинки сприяє формуванню нової парадигми сталого туризму, у межах якої прибутковість поєднується з екологічною та соціальною ефективністю. Обґрунтовано необхідність нормативної уніфікації, розширення фінансових стимулів, розвитку державно-приватного партнерства та інституційної підтримки



екопроектів. Перспективним є кількісне моделювання ризиків і рентабельності природоорієнтованих інвестицій, розроблення системи індикаторів соціально-екологічних наслідків та створення аналітичної бази для стратегічного управління сталими інвестиційними потоками в туристичній галузі.

Ключові слова: сталий туризм, природоорієнтовані інвестиції, екоінфраструктура, апітерапія, територіальний розвиток, зелена економіка, інвестиційна стійкість, екологічний менеджмент.

Problem statement. The issue of the financial attractiveness of investments in constructing bee houses in the wellness zones of the USA arises in the context of seeking new models that combine environmentally oriented entrepreneurship, sustainable tourism, and bioeconomy. In the context of the growing demand for health tourism focused on natural restoration, the development of investment projects that combine recreational functions with biodiversity protection is gaining significant theoretical and practical importance. The scientific relevance lies in the need for professional substantiation of economic mechanisms that ensure a balance between profitability, environmental efficiency and social impact of investment decisions in the field of apitherapy and eco-architecture. The practical significance of the problem lies in the need to develop financial models that integrate bee house construction projects into the development strategies of wellness zones and resorts in the USA, serving as a tool to increase their competitiveness and attractiveness to investors and visitors. Additionally, the issue of adapting investment assessment criteria to the specifics of small-scale ecological facilities, where the primary source of income is not industrial production but the recreational and educational value of interacting with nature, is relevant.

Analysis of recent research and publications. A review of the literature enables us to identify four interrelated scientific areas that encompass technological,



socio-psychological, institutional-ecological, and spatial-economic factors affecting the effectiveness of investments in constructing bee houses in wellness zones in the USA. The first area concerns the technological and architectural improvement of beekeeping systems, which determines the economic sustainability and innovativeness of investment facilities. Researchers L. M. Markina and B. V. Troianchuk [1] analyse modern automation systems in beekeeping, specifically sensor control of humidity, temperature, and weight, which increases production efficiency and reduces operating costs. Scientist N. Smith [2] is developing the concept of «Smart Bee Houses» for urban environments, which combine digital technologies, ergonomics, and nature-oriented design, contributing to the creation of sustainable investment products. Further research in this direction should focus on modelling the full life cycle of smart infrastructure, taking into account energy consumption, maintenance, and digital monitoring systems to calculate integral payback indicators.

The second direction covers the socio-psychological effects and welfare benefits that shape the demand for nature-based health investments. Authors K. Alton and F. Ratnieks [3] argue that beekeeping has the potential to improve human mental health, increasing the social attractiveness and marketing value of such projects. Scientists J. Burke and S. Corrigan [4] demonstrate that participation in nature-based programs enhances the levels of happiness and life satisfaction among beekeepers and their family members. Researcher D. Livkamal [5] describes the architecture of health spaces, where the integration of natural objects, particularly bee houses, creates a synergistic effect between economic and psychological benefits. The scientist J. Marshman [6] introduces the concept of a «whole-of-community approach», in which bee spaces are recognised as elements of social interaction and public health, contributing to the formation of sustainable demand for health infrastructure. The author L. Cilia [7] analysed the socio-ecological consequences of industrial beekeeping in the USA, emphasising the need



to reorient towards small-scale, nature-oriented practices. Further research should focus on empirically measuring the impact of ecotherapeutic factors in bee houses on the well-being of the population and on developing mechanisms for monetising these effects in the tourism and healthcare sectors.

The third direction covers institutional-ecological and managerial aspects that determine the risks and investor confidence in the beekeeping industry. Researcher L. Cilia [8] examines the interplay between technological optimism and scepticism in American industry, which leads to uneven innovation and heightened regulatory risks. Researcher C. Schoenleber [9] shows that integrating nature-based solutions into commercial real estate increases the environmental value of assets and the market attractiveness of territories. Researcher E. Andrews [10] examines the health problems of bees in the Anthropocene era, emphasising the need for government support for pollinator protection programs, which can form the basis for investment incentives. J. S. Rousseau et al. [11] identify gaps in the collection and assessment of data on the state of bee populations in the United States, which limits the effectiveness of strategic investment planning. J. C. Bikomeye et al. [12] demonstrate that investments in urban green spaces increase community resilience and stimulate government support for nature-based initiatives. Further research in this area should focus on creating national databases for monitoring ecosystem risks and developing institutional mechanisms for bio-based investment insurance.

The fourth area identifies spatial and market mechanisms for commercialising nature-based investments and generating economic benefits from environmental sustainability. D. Aurell et al. [13] analyse the scale of bee colony losses in 2020–2022, which directly impacts financial risks and the need to create insurance reserves for investors. J. M. Engebretson et al. [14] demonstrate that beekeepers' trust in management information sources influences the effectiveness of decision-making strategies in beekeeping farms, thereby enhancing investment stability. J. L. Durant and C. R. Otto [15] demonstrate that land use planning and the maintenance of



natural landscapes are crucial conditions for pollinator conservation and enhancing the value of surrounding lands. Further research in this area should aim to quantitatively assess the effect of capitalising bee houses as part of the health infrastructure and develop models for predicting their profitability, taking into account ESG criteria.

Highlighting previously unresolved parts of the general problem. Despite existing research in the field of sustainable tourism and the green economy, the issue of assessing the investment attractiveness of small-scale, nature-oriented projects, which combine financial benefits with environmental and social components, remains unresolved. The mechanisms of forming the profitability of bee houses, as well as the relationship between market, location, and institutional factors, have not been sufficiently studied. In particular, there is no methodology for quantitatively measuring their comprehensive impact on the local economy. The limited empirical base makes it challenging to accurately assess the risks and long-term sustainability of such investments. The proposed study addresses these gaps by developing a model of investment attractiveness that integrates financial, environmental, and social parameters. The scientific contribution involves combining investment analysis with the principles of ecological economics, which enables the improvement of the effectiveness assessment of nature-oriented projects and provides a basis for developing sustainable financial strategies in the field of health tourism in the USA.

Formulation of the article objectives (definition of the task). The purpose of this article is to clarify the economic essence and practical conditions for the financial attractiveness of investments in the construction of bee houses in wellness zones in the USA, as an innovative direction in eco-oriented and health tourism development.

In accordance with the purpose of the study, the following tasks were defined:



1. To clarify the content and structure of the investment attractiveness of nature-oriented projects in the context of the construction of bee houses in wellness zones in the USA.

2. To assess the financial efficiency and integration potential of these investments in the local economy and ecological infrastructure.

3. To identify the main obstacles to attracting capital and to substantiate ways to increase the sustainability and profitability of projects.

Presentation of the main material of the study. Investment attractiveness in the field of nature-oriented projects is shaped by a combination of economic, environmental, and social factors that determine the facility's ability to generate stable income with minimal risk while also adhering to the principles of sustainable development. In the case of constructing bee houses in the wellness zones of the USA, not only is the financial payback significant, but also the integration of the project into the local ecosystem, tourist flow, and environmental management policy of the territory. This type of investment falls into the category of small-scale, nature-oriented assets, characterised by a combination of economic profit and environmental and educational value. The content of investment attractiveness in this sector can be revealed through its structural components, which are given in the table (table 1).

Table 1

Structural components of the investment attractiveness of the construction of bee houses in the wellness area of the USA

Component	Content	Key indicators	Expected effect
Economic	Financial sustainability and predictability of income	Profitability, NPV, IRR	Ensuring profitability and investment interest
Ecological	Impact on biodiversity, use of natural materials	Area of reclaimed territories, number of colonies, and eco-standard certification	Increasing the environmental value of the facility



Component	Content	Key indicators	Expected effect
Social	Involvement of the local community and job creation	Number of jobs, partnerships, and educational programs	Strengthening the social capital of the territory
Tourism and recreation	Attractiveness for visitors and tour operators	Visitor flow, average check, level of satisfaction	Increase in tourist demand
Innovative and institutional	Level of state support and innovative potential	Tax incentives, grants, and partnership programs	Stimulating the expansion of the network of eco-objects

Source: formed by the author based on [1, p. 65–67; 2, p. 3–4; 3, p. 41; 4; 5; 6, p. 90–92; 9; 10]

In practice, the above investment attractiveness structure operates as a multi-level system, where each component reinforces the others, resulting in a synergistic effect between economic benefits and environmental and social impacts. In modern conditions in the USA, wellness zones are actively implementing the concept of investments based on natural resources (nature-based investments), where profitability is combined with the restoration of natural ecosystems [9, p. 1]. In particular, in the states of Colorado and California, «Bee Wellness Retreats» are being created, which integrate apitherapeutic pavilions into the structure of hotel complexes and spa centres. Their financial model is based on a combination of recreational income (excursions, individual therapeutic sessions, «honey yoga» programs) and the sale of eco-products from local apiaries [5]. Such diversification reduces the risks of seasonality and ensures the stability of cash flows.

In the social dimension, bee houses are often the focal point of partnerships among private businesses, communities, and educational institutions. For example, in Vermont, local organic farms collaborate with schools to organise interactive «Pollinator Education» programs, which are financed by a portion of the profits from visitor fees. It not only fosters social loyalty to the brand but also expands the customer base among family tourism [6, p. 101–102]. In the context of environmental security, such projects form elements of urban and regional green infrastructure. In the suburbs of Boston and Seattle, bee pavilions are integrated into



recreation areas and botanical gardens, where they serve as both pollination support for local crops and training grounds for future agroecologists [7, p. 846–847].

In such cases, investment attractiveness is determined not only by financial indicators, such as Net Present Value (NPV) or Internal Rate of Return (IRR), but also by non-financial metrics, including carbon footprint reduction, biodiversity enhancement, and environmental awareness development. In addition, institutional support is crucial: US municipalities are increasingly providing tax breaks for eco-infrastructure facilities, including micro-apiaries within wellness zones, which increases the profitability of projects and stimulates the attraction of private capital. The financial efficiency of investments in the construction of bee houses in the US health tourism sector is determined by a system of interrelated factors that shape the economic dynamics of the project at different stages of its life cycle. Unlike traditional recreational infrastructure facilities, these initiatives combine entrepreneurial, educational, and environmental components. Hence, their profitability depends not only on the volume of tourist flow but also on the ability to create added value through eco-innovations, branding, and partnership models. At the same time, the localisation of the project, seasonality of demand, the structure of income from various services and the level of state or municipal support within the framework of «green economy» programs are also significant (table 2).

Table 2

Main factors influencing the financial efficiency of investments in bee houses in the US health tourism system

Group of factors	Nature of influence	Main indicators	Expected effect
Market	Dynamics of demand, competition, and purchasing power of tourists	Average check, loading, repeat visits	Revenue stability and faster payback
Location	Natural attractiveness, transport accessibility, and climate	Duration of the season, distance to cities	Optimisation of the flow of visitors



Group of factors	Nature of influence	Main indicators	Expected effect
Management	Level of management, marketing, and personnel efficiency	OPEX, share of administrative expenses	Increase in operating margin
Technological	Eco-innovations, automation, digital services	Digitalisation index, cost reduction	Reduction in cost and increase in profitability
Institutional and financial	Tax benefits, grants, and partnership programs	Share of subsidised investments, IRR, NPV	Reduction of financial burden
Reputational	Eco-branding, certifications, customer communications	Level of recognition, trust index	Expansion of customer base and loyalty

Source: formed by the author based on [2, p. 5–6; 3, p. 42; 4; 5; 7, p. 840–842; 8, p. 95–97; 9; 12; 13, p. 6–8; 14, p. 193–195]

In practice, the effects of these factors manifest in a complex interdependence, where even minor changes in consumer behaviour or climatic conditions can significantly impact financial results. In modern US health clusters, market factors are more predictable due to the use of predictive analytics to assess tourist flow and customer behaviour [9, p. 1]. For example, in the state of Oregon, ecotourism operators use analytical models of seasonal demand to determine the optimal periods for conducting apitherapy programs, which allows them to maintain an average occupancy rate of more than 80% even in the off-season [13, p. 6–7]. Location is often decisive in determining profitability. Bee houses located near popular recreational areas, such as Shenandoah National Park in Virginia or Colorado mountain resorts, demonstrate a 25–30% higher rate of return due to a stable tourist flow and additional sales of eco-products [5]. At the same time, in remote areas, efficiency is ensured through partnerships with health networks that organise corporate recreation programs or educational tours [6, p. 101–102].

In particular, the technological component is gaining increasing influence. Thus, automated systems for monitoring the condition of hives, the use of artificial intelligence (AI) to predict the productivity of bee colonies, and drones to control



the ecosystem contribute to a reduction in operating costs of up to 15% [1, p. 65–67].

In addition, digital booking platforms integrated with wellness services (Mindbody or Retreat Booking Guru) increase the number of online bookings and increase the load factor.

At the same time, institutional and financial conditions contribute to creating a favourable investment environment for business development. In particular, the Green Tourism Grants programs in the USA cover up to 30% of initial capital costs, and tax credits for environmental initiatives reduce the burden on operating income [12]. It significantly increases the NPV and IRR of such projects. Thus, in modern wellness tourism practices, the financial efficiency of bee houses is ensured not only through demand, but also through flexible technological solutions, a multi-channel business model and the active use of institutional incentives for sustainable development.

The integration of bee houses into the local economy, tourism infrastructure and environmental programs of the USA is currently considered an effective mechanism for combining economic development with environmental management and territorial branding. Such facilities not only serve a recreational or health function, but also form sustainable value chains in the small business sector, contributing to job creation and increasing the investment attractiveness of regions. They are part of local «green economy» strategies, based on the principle of place-based development – development focused on local natural resources and social participation (table 3).

Table 3

Potential for integrating beehives into local economic and ecological systems in the United States

Direction of integration	Implementation mechanism	Economic and social effects	Potential application model
Local economy	Cooperation with agricultural producers,	Increase in employment, increase in local income,	Creation of a cooperative



Direction of integration	Implementation mechanism	Economic and social effects	Potential application model
	participation in fairs, and development of small businesses	formation of the image of an eco-oriented region	network of apiaries with the involvement of communities
Tourist infrastructure	Inclusion in tourist routes, health tours, gastronomic and ecological events	Increase in tourist attractiveness, expansion of the range of services, and an increase in the average check	Development of thematic tours and apitherapeutic recreation areas
Educational and cultural sphere	Eco-educational programs, interactive exhibitions, and research initiatives	Raising environmental awareness and the development of creative learning forms	Implementation of learning

Source: formed by the author based on [6, p. 100–103; 7, p. 845–847; 9; 10; 11; 12; 13, p. 9–10; 15]

Such integration can function as a complex mechanism of sustainable development, in which one object generates a chain of economic and social effects. In particular, the presence of bee houses within health clusters stimulates local businesses, including producers of natural products, artisans, tour operators, and catering establishments. It will contribute to the circulation of financial flows within the territory, increasing its economic autonomy. From the perspective of tourism infrastructure, bee houses offer a novel recreational experience that combines health, cognitive, and emotional benefits [10]. They are «anchors» of tourist routes, extending the duration of visitors' stays and stimulating the development of related services [2, p. 3–4]. In the educational sphere, these objects form an environment that fosters research activity, where practical interaction with natural systems is combined with scientific experiments and the dissemination of environmental knowledge to the population. The ecological effects of integration are manifested in the restoration of local ecosystems, the improvement of pollinator health, and the formation of green corridors within urban and suburban areas [7, p. 846–847]. It enables the integration of tourism and environmental policies into a unified framework for managing natural capital [9]. In addition, territorial marketing based



on such projects provides additional recognition of the region, which increases its investment attractiveness and strengthens its competitive position in the sustainable tourism market. Thus, the integration of bee houses into the local economy is not only a tool for diversifying income but also a model for forming a new territorial identity focused on the balance between natural potential and social responsibility.

Investments in the construction of bee houses within the US healthcare tourism system face several obstacles that hinder their active development. First of all, the problem is regulatory fragmentation: requirements for licensing, sanitary standards, visitor safety, and apiary placement vary between states and municipalities. The lack of uniform standards for apitherapy and demonstration facilities creates legal uncertainty and increases transaction costs associated with documentation coordination [8, p. 95–97]. Financial constraints include low availability of long-term lending and the lack of specialised support programs for small eco-projects. Banks consider such initiatives as high-risk due to the lack of typical business models and profitability statistics, while grant resources are short-term in nature [12]. In addition, the costs of liability insurance are increasing due to potential risks for visitors, which reduces the financial profitability of projects [13, p. 8–9]. Organisational problems are manifested in weak coordination between environmental, tourism and municipal structures, which delays the process of land use and construction coordination [7, p. 843–845]. At the same time, there is a significant shortage of specialists capable of combining knowledge in the fields of beekeeping, eco-architecture, and health service management [1, p. 66–67; 2, p. 5–6]. Another critical obstacle is information asymmetry: investors lack access to reliable data on the economic efficiency and risks associated with such facilities.

Furthermore, the absence of a certification system for sustainable tourism projects undermines market confidence [11]. Territorial risks caused by urbanisation pressure and the reduction of suitable ecozones for apiaries increase the cost of land and complicate compliance with environmental standards [9]. In addition, there is a



socio-psychological barrier, where nature-based investments are perceived as having low returns and are more of a social than a commercial initiative [4]. Taken together, these factors create an environment of high transaction costs and uncertainty that discourages private capital investment.

Increasing the financial attractiveness and sustainability of investments in bee houses in the US wellness areas requires a coordinated combination of regulatory, financial and management tools. First of all, it is worth ensuring regulatory unification through the development of uniform standards for safety, certification, and environmental design, analogous to the international Leadership in Energy and Environmental Design (LEED) or Green Globe systems. It will reduce regulatory uncertainty and simplify the entry of investors into the market. In the financial sphere, it is advisable to expand the system of support for small-scale eco-projects by introducing preferential loans, tax breaks, and public-private partnership mechanisms. The creation of thematic funds for sustainable tourism, also known as «green bonds», will enable the attraction of private capital to such initiatives on a long-term basis. To increase the sustainability of the business model, it is advisable to ensure diversification of income sources, which will contribute to the creation of a balanced system of financial flows. The combination of tourist, educational, and production services, particularly apitherapy, eco-education programs, and sales of local products, will help minimise seasonal fluctuations and generate stable profits. The use of digital management tools (online booking systems, CRM platforms, and automated monitoring of apiaries) will allow for the optimisation of operating costs and the creation of an analytical database necessary for making informed investment decisions. In the territorial dimension, the support of integration clusters, within which bee houses will operate in interaction with local communities, agribusiness and tourism structures, will contribute to increasing social trust, reputational value and investment attractiveness. The combination of regulatory stability, financial incentives and digital efficiency will guarantee the transformation of this area into a



competitive segment of the «green economy» with long-term potential for sustainable development and profitability.

Conclusions. The study demonstrates that investments in constructing bee houses in the wellness zones of the USA have significant potential due to the combination of economic profitability, environmental feasibility, and social benefits. It was determined that the financial attractiveness of such projects depends on the integration of economic, technological, and territorial factors, as well as the level of digitalisation of management and support from state and municipal structures.

The main problems hindering the development of this direction are identified: regulatory fragmentation between jurisdictions, limited access to long-term financing, and the lack of unified standards and an analytical basis for risk assessment. Additional obstacles are low intersectoral coordination, staff shortage and underestimation of the economic potential of nature-oriented investments.

Practical recommendations are proposed to enhance the investment sustainability of projects in the field of apitherapy, including the introduction of unified regulatory standards, expansion of the financial incentive system, development of public-private partnerships, and implementation of «green bonds» mechanisms. The feasibility of forming integrated regional clusters, within which bee houses serve economic, recreational, and ecological functions, is emphasised. Prospects for further research lie in the development of quantitative models to assess the effectiveness, risks, and multiplier effects of such investments on local development, which will create the basis for forming a strategy for sustainable financing of ecotourism infrastructure.

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