Efficiency of Investments in Building Apitherapy Houses for the Development of Recreational Infrastructure in the USA

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Annotation. The relevance of the research is determined by the growing trend toward the ecologization and personalization of recreational services in the United States, which is driving demand for nature-based wellness solutions. Under these conditions, investments in the construction of apitherapy houses are considered a promising direction for developing the wellness economy, combining financial profitability with social and ecological benefits. The establishment of innovative apitherapeutic infrastructure can generate a multiplier effect for local communities by stimulating small business activity, creating jobs, advancing medical and biological tourism, and promoting bioeconomic technologies.

The purpose of the article is to substantiate the theoretical and methodological foundations and to determine practical guidelines for improving the efficiency of investments in the construction of apitherapy houses as an innovative direction for developing the recreational infrastructure of the United States, ensuring a balance between economic performance, social significance, and environmental sustainability.

The research methodology is based on systemic and interdisciplinary approaches that integrate the tools of investment analysis, socio-economic modeling, and the concept of sustainable development. The study employs methods of comparative analysis, financial modeling, social return assessment (SROI), environmental auditing, and life cycle assessment (LCA). The informational base includes analytical reports on the wellness market, ISO 45001 and ISO 14001 standards, and practical cases of apitherapy complexes operating in the United States.

Research results. The economic nature of apitherapy houses as elements of nature-oriented recreational infrastructure has been analyzed. It has been demonstrated that such facilities contribute to the formation of long-term assets and stable linkages between beekeeping, tourism, and local entrepreneurship. The study identifies that the growing demand for apitherapy services is influenced by both economic and psychological factors, while investment attractiveness is strengthened by a high rate of returning clients and tangible social benefits. A system of investment efficiency criteria has been proposed, encompassing financial (NPV, IRR), social (SROI, CSI), and environmental (EER, CF) indicators. The main constraints on

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sectoral development have been identified, including regulatory ambiguity, financial risks, and a shortage of qualified personnel.

Conclusions. It has been established that apitherapy houses function as an effective instrument for integrating bioeconomy principles, recreational policy, and sustainable development. It is recommended to implement certification systems based on ISO 45001 and ISO 14001, expand public–private partnerships, introduce targeted tax incentives, and create territorial clusters following the model of "apiary–bee house–wellness center".

Prospects for further research involve modeling the long-term sustainability of apitherapy investment projects, conducting comparative analyses with European Union practices, and developing analytical tools for forecasting the socio-economic efficiency of apitherapeutic infrastructure within U.S. recreational zones.

Keywords: bioeconomy, wellness tourism, apitherapy, sustainable development, recreational innovation, social return on investment, environmental sustainability, public–private partnership.

Ефективність інвестицій у будівництво апітерапевтичних будинків для розвитку рекреаційної інфраструктури в США

Анотація. Актуальність дослідження зумовлена зростанням попиту на природоорієнтовані форми оздоровлення у США, що підвищує значення інвестицій у створення апітерапевтичних будинків як інноваційного напряму розвитку wellness-економіки. Мета статті – обґрунтування теоретико-методичних засад і практичних орієнтирів підвищення ефективності інвестицій у будівництво апітерапевтичних будинків як складника сталого розвитку рекреаційної інфраструктури США. Методологія дослідження спирається на системний підхід, що інтегрує інвестиційний, соціоекономічний та екологічний аналіз із використанням методів SROI, LCA, порівняльного аналізу та фінансового моделювання. Визначено економічну сутність апітерапевтичних об'єктів, окреслено чинники зростання попиту, уточнено критерії ефективності (NPV, SROI, EER) і виявлено основні перешкоди розвитку – нормативну невизначеність, фінансові ризики та кадровий дефіцит. Запропоновано впровадження стандартів ISO 45001 та ISO 14001, розвиток державно-приватних партнерств і створення кластерів типу «пасіка – апідом – wellness-центр».

Ключові слова: біоекономіка, wellness-туризм, апітерапія, сталий розвиток, рекреаційні інновації, соціальна віддача інвестицій, екологічна сталість, державно-приватне партнерство.

Introduction

In the context of global tourism transformation and the shift in consumer preferences toward environmentally responsible and health-oriented consumption, the need to develop innovative forms of recreational infrastructure has become increasingly relevant. The growing demand for nature-based and wellness tourism in the United States stimulates the integration of biomedical technologies into tourist and recreational complexes, creating prerequisites for diversifying regional income sources, enhancing competitiveness, and forming sustainable models of local development.

Apitherapeutic houses - recreational infrastructure facilities that combine therapeutic, ecological, and educational functions through the use of beekeeping products - represent a promising direction for investment. These facilities are considered not only as investment assets with economic return potential but also as tools for spatial harmonization of recreational areas, improving quality of life, and fostering bioeconomic development.

The scientific interest in this issue stems from its interdisciplinary nature, as the study lies at the intersection of investment economics, sustainable development theory, recreational geography, and innovation management. However, the existing academic literature lacks comprehensive studies devoted to assessing the financial and economic parameters of apitherapeutic facilities within the regional context of the U.S. market. This gap limits the development of standard investment models and constrains the growth of the industry.

The practical significance of this research lies in the need to establish scientifically grounded approaches for evaluating the effectiveness of investments in nature-oriented recreational facilities capable of generating a multiplier effect for local economies by stimulating employment, developing small businesses, promoting bioeconomic technologies, and diversifying tourism offerings.

Thus, this study aims to integrate theoretical principles of investment analysis with the practical tasks of sustainable development in the recreational infrastructure of the United States.

An analysis of contemporary research allows identifying four interrelated scientific directions. The first involves the conceptualization of the economic advantages of apitherapy as an investment object and its integration into the recreational development system. In his work, A. Olshanskyi substantiates the economic benefits of implementing apitherapeutic technologies in the healthcare sectors of Ukraine and the U.S., particularly highlighting their multiplier effect through the development of wellness clusters, increased employment, and small business activation [1].

The author argues that investments in bee houses serve as a tool for combining profitable activity with the achievement of social outcomes. A similar position is held by A. Maruniaková and co-authors, who regard apitherapy as an innovative component of recreational tourism that generates economic returns by integrating the natural, cultural, and technological resources of a region [2]. A. L. L. de Faria and S. N. Pereira, in their study on food security and “honey tourism,” demonstrate that apitherapeutic initiatives contribute to the diversification of rural economies and the strengthening of local value chains [3]. Further research in this direction should focus on the quantitative evaluation of investment efficiency in apitherapeutic houses in the United States, taking into account social returns and environmental benefits.

The second scientific direction concerns the theoretical and methodological understanding of apitourism as a tool for sustainable territorial development. M. Izquierdo-Gascón emphasizes the role of apitherapeutic facilities as catalysts for local development that integrate education, eco-innovation, and entrepreneurship [4]. E. Topal and co-authors examine the evolution of apitherapy and apitourism from a craft-based to a high-tech practice, noting that modern apitherapeutic houses act as centers of economic and cultural activity within recreational clusters [5]. M. Izquierdo-Gascón and Á. Rubio-Gil interpret apitourism as a paradigm of regenerative development, in which investments in bee houses foster a socially responsible model for the use of natural capital [6]. Future studies in this field should focus on

modeling the impact of apitherapeutic facilities on regional sustainability indicators and developing strategies for their integration into local economies across the United States.

The third research direction encompasses the practical aspects of implementing apitherapeutic projects and mechanisms for enhancing their investment attractiveness. L. Porter systematizes the experience of establishing apitherapeutic houses in the states of Oregon, California, and New York, where investments are combined with eco-education programs, certification of honey products, and the development of entrepreneurship in the field of green tourism [7]. S. Pal and S. Bhattacharya demonstrate that the combination of apitourism and agritourism increases the efficiency of natural resource use and stabilizes income in rural communities [8]. K. Çelik and H. F. Aşgun argue that apitherapeutic practices can be integrated into preventive medicine, making investments in such facilities socially beneficial and medically justified [9]. E. Cesur interprets apitourism as a component of creative tourism, where apitherapeutic houses serve as anchors for innovative tourism products with a high rate of return [10]. M. Šuligoj analyzes the historical development of apitherapy and apitourism, emphasizing that the formation of apitherapeutic centers in the United States occurs at the intersection of beekeeping traditions, the recreational economy, and medical technologies [11].

Future research in this field should focus on developing financial models of public-private partnership aimed at expanding apitherapeutic infrastructure in the United States.

The fourth scientific direction is related to the assessment of the socio-economic and environmental effects of developing apitherapeutic infrastructure. I. Atmazhov and A. Atmazhova identify apitourism as a promising area for the growth of rural tourism, emphasizing the importance of establishing cross-border partnerships between Ukraine and the United States in the field of sustainable investment [12]. F. Fusté-Forné, E. Noguer-Juncà, and M. Crespi-Vallbona argue that investments in bee houses stimulate social cohesion, biodiversity conservation, and ecological stability in rural areas [13]. The authors highlight that apitherapeutic infrastructure holds not only economic but also humanitarian value, as it promotes ecological education, social inclusion, and sustainable management of natural resources. Further research should focus on developing comprehensive methodologies for assessing the long-term socio-ecological effects of apitherapeutic investments in the United States.

Despite existing studies addressing certain aspects of apitherapy, several issues remain unresolved, particularly concerning the economic nature of investments in the construction of apitherapeutic houses in the United States and their role within the recreational economy. Factors influencing demand formation and mechanisms for increasing the investment attractiveness of this segment remain insufficiently explored. Furthermore, there is no clearly defined system of criteria for evaluating the effectiveness of such investments, while regulatory, institutional, and financial constraints continue to hinder the industry's growth.

The proposed research aims to address these gaps through a comprehensive analysis of the economic prerequisites and demand trends, specification of efficiency criteria, and development of practical recommendations for improving investment policy and stimulating the development of apitherapeutic infrastructure in recreational zones of the United States.

The purpose of this article is to substantiate the theoretical and methodological foundations and practical mechanisms for enhancing the efficiency of investments in the

establishment of apitherapeutic houses as an integral component of the sustainable development of recreational infrastructure in the United States.

To achieve this goal, the following objectives have been set:

1. to define the economic nature and role of investments in apitherapeutic houses within the recreational economy of the United States;
2. to analyze demand trends and justify the criteria for evaluating investment efficiency considering economic, social, and environmental factors;
3. to identify the main obstacles to the implementation of apitherapeutic projects and develop recommendations for improving investment policy in the field of recreational infrastructure development in the United States.

Results

Revealing the economic essence of investments in apitherapy houses involves analyzing their place in the structure of the US recreational industry as an innovative segment of the nature-oriented economy. At the current stage of economic development in the US, there is a steady growth in demand for health and wellness practices that combine medical, biological, environmental, and cultural aspects. Investments in apitherapy houses have a dual effect: on the one hand, they ensure the formation of the material base of the recreational infrastructure, and on the other hand, they create added value through the development of local supply chains, employment, and the formation of a territorial brand. This type of investment can be classified as an innovative wellness investment, as it combines economic feasibility with social and environmental benefits, enhancing the sustainability of regional development (Table 1).

Table 1

Economic essence and systemic role of investments in apitherapy houses in the structure of the US recreational economy

Parameter	Characteristic	Expected result	Example of practical implementation
Type of investment	Real investments in the construction of small recreational facilities for health purposes	Formation of long-term tangible assets and infrastructure base	Apitherapy centers within natural recreational areas
Investment objective	Generating income from the provision of apitherapy and relaxation services	Increase in asset value, improvement of the tourist attractiveness of the territories	Integration of apidoms into wellness complexes
Form of ownership	Private or public-private partnerships	Expanding opportunities for small businesses and social entrepreneurship	Joint investments by local entrepreneurs and municipalities
Social impact	Improved public health, development of ecotourism, support for local producers	Employment in rural communities, fostering a culture of health	Development of educational programs on apitherapy

Environmental component	Use of natural materials, energy-efficient technologies, support for biodiversity	Greening of recreational areas, reduction of anthropogenic impact	Implementation of green architecture principles

Source: compiled by the author based on [1; 2, p. 34–35; 4, p. 275–276; 7, p. 95–97; 9, p. 42–44; 12]

From a practical point of view, investments in the construction of apitherapy houses act as a powerful catalyst for a multiplier effect in the recreational sector. Their economic model combines profitability with long-term social returns, as such facilities create sustainable economic links between beekeeping farms, wellness centers, local producers of natural products, and ecotourism routes. They ensure income diversification, stimulate domestic tourism, increase employment in rural communities, and contribute to the formation of a new culture of health based on natural mechanisms of body recovery.

An important feature of this investment model is its ecosystemic nature: each apitherapy facility does not exist in isolation but is integrated into the local economy through the use of local resources, labor skills, and cultural traditions. This creates a closed cycle of economic interaction—from the production of organic products to their consumption in the therapeutic and recreational process [12]. In addition, apitherapy houses stimulate the development of related industries: green construction, natural interior design, organic farming, and tourism marketing. A notable example is the Bee Therapy House, part of the *Paradise Village* recreational complex (Washington State), where apitherapy is integrated into a wide range of wellness services, from breathing practices to aromatherapy with bee products. This project uses a hybrid financial model that combines private investment, government grant support, and social entrepreneurship mechanisms. In addition to its economic impact, the complex demonstrates high social effectiveness: an increase in the number of visitors, the creation of new jobs, the formation of an eco-educational environment for local residents, and the popularization of apitherapy as an integral part of preventive medicine [14].

Current trends in the demand for apitherapy services are determined by the convergence of the wellness economy, evidence-based self-help practices, and the search for natural methods of restoring working capacity. On the consumer side, there is a growing willingness to pay for a "recovery experience" rather than for a single procedure; perceived safety, authenticity, and integration with other recreational activities are becoming key factors. On the supply side, service standardization is increasing, multi-stage packages are appearing, and communication through digital channels is intensifying, which reduces customer acquisition costs and increases load predictability. The cumulative effect is manifested in an increase in average revenue per customer, stabilization of seasonality, and improvement in visitor return rates, which directly translates into the investment attractiveness of the segment through increased projected cash flows and reduced risks (Table 2).

In modern US practice, the system for evaluating the effectiveness of investments in the construction of apitherapy houses has become integrated: it is based not only on classical financial calculations, but also on the validation of social and environmental results through impact investing mechanisms [13]. The economic block of indicators NPV, IRR, PP is used to forecast cash flows adjusted for seasonality and equipment depreciation. According to analytical reviews of the wellness market, the average payback period for such facilities is 4–6 years, with stable income ensured by repeat visits from customers and subscription models [2, p. 34–35; 5, p. 11657–11659].

Table 2

Key drivers of demand for apitherapy services and their impact on investment attractiveness

Demand driver	Observed signal (indicator)	Effect on investment attractiveness	Example of a management decision
Advantage of natural recovery methods	Increased willingness to pay (WTP), search queries, share of "natural" services in the basket	Increase in average revenue per user (ARPU), decrease in price elasticity	Introduction of premium packages (apitherapy, aromatherapy, breathing sessions)
Post-stress recovery and mental well-being	Increase in length of stay (LOS), repeat visits, NPS>60	Stable recurring cash flows, better capex payback	Development of 3–7-day programs with progressive pricing
Hybrid formats: apitherapy + recreation	Increase in cross-sales and occupancy (OR) outside peak season	Smoothing out seasonality, increasing capacity utilization	Partnerships with eco-trails, yoga centers, spas
Digital distribution and personalization	Higher conversion rate for online bookings, lower CAC	Lower demand risk, better revenue plan predictability	Dynamic pricing, CRM segmentation, subscriptions
Regulatory certainty and service standards	Formalization of safety protocols, quality reviews	Lower non-financial risks, increased trust	Staff certification, SOP, and quality audit

Source: compiled by the author based on [3, p. 265–266; 5, p. 11657–11659; 6, p. 760–761; 8, p. 52–53; 10, p. 84–85; 13].

The social component is assessed using SROI (Social Return on Investment), which allows intangible benefits to be converted into financial equivalents. For example, every dollar invested in the creation of an apitherapy complex generates an average of $1.6–1.9 in social return through reduced healthcare costs, prevention of psycho-emotional disorders, and development of local employment. Such data is recorded in the impact reports of private and municipal investors, which increases the transparency and attractiveness of the industry for government grants and corporate funds [4, p. 275–276; 12].

The environmental indicator block is based on EER (Energy Efficiency Ratio), CF, and LCA methodology, which makes it possible to assess the efficiency of energy and material use as well as CO_2 emissions throughout the life cycle of an object. In the design of apitherapy houses, solar panels, heat recovery systems, wax waste recycling, and natural ventilation are widely applied, reducing operating costs by 20–30% [7, p. 95–97; 5, p. 11658–11659]. For example, several projects in Oregon and New Mexico have introduced a “passive energy consumption” model, in which the energy generated on site fully meets the needs of the apiary complex [10, p. 84–85].

Of particular scientific importance is the integrated approach, the formation of the ICIE index, which combines standardized economic, social, and environmental metrics [6, pp. 764–765; 13]. Using multi-criteria decision analysis, the ICIE enables the determination of the synergistic effect of investment activities: the higher the balance between profitability, social contribution, and resource efficiency, the greater the potential for long-term sustainability. In practice, this approach is already employed by investment funds focused on sustainable tourism, which assess not only profitability but also the “health coefficient of the territory”, the

proportion of the population covered by wellness services and the level of environmental impact per hectare of land.

Thus, apitherapy houses are becoming testing grounds for the application of innovative investment analysis techniques, where economic efficiency is combined with social resonance and environmental responsibility [1]. This forms a new scientific and practical paradigm – assessing not only how much profit an object generates, but also how it changes the quality of life, preserves the environment, and stimulates the development of local communities.

The implementation of investment projects in the field of apitherapy in the United States faces a number of systemic problems that limit the pace of development of this segment, even with growing demand [2, p. 34–35; 5, p. 11657–11659]. The most acute are regulatory issues related to the lack of a unified regulatory classification of apitherapy as a type of medical and recreational service [9, p. 60–62]. In most states, it is formally classified as an "alternative therapy," which makes it impossible to obtain full licensing support, insurance coverage, and official accreditation for facilities. The lack of unified clinical protocols and safety standards creates legal uncertainty for investors, as any incident can be classified as a violation of medical standards [12]. Regulatory asymmetry between states complicates the scaling of the business model: opening an apitherapy center in another region requires re-approval of permits, which delays project launches by 6–12 months [4, p. 275–276].

The institutional block of problems is related to the lack of coordination between industry associations, medical regulators, tourism organizations, and local governments [10, p. 75–76]. In most cases, there are no specialized agencies or clusters capable of consolidating market participants—beekeepers, architects, investors, and recreation center managers. As a result, a unified innovative ecosystem is not formed, and information fragmentation makes it impossible to exchange experience and transfer technologies. The development of the industry is further complicated by a shortage of qualified personnel—certified apitherapists, biosafety design engineers, and sustainable tourism managers [9, p. 60–62]. Educational institutions lack accredited programs that combine the medical, biological, and economic aspects of apitherapy, so personnel replacement is slow.

Financial constraints are reflected in the high cost of start-up capital and the low level of bank lending for such projects [1; 3, p. 266]. Commercial banks consider apitherapy complexes to be high-risk investments due to seasonality, narrow specialization, and limited historical data on profitability [4, p. 275–276]. As a result, investors are forced to rely on their own capital or crowdfunding platforms. There are also no specialized government programs to support the apitherapy business, unlike agritourism or wellness tourism, which have separate grant instruments [8, p. 51–52]. Difficulties also arise with asset valuation: due to the lack of a standardized methodology for determining the value of intangible components (bioinfrastructure, trust, brand, health value), investors cannot correctly present apitherapy projects in their reports to funds or creditors.

The issue of risk insurance also remains problematic—most companies do not cover apitherapy services, which limits solvent demand and makes it impossible to expand the customer base through medical channels [11, p. 373]. The lack of a legal definition of liability in the event of allergic reactions or complications creates additional obstacles for investors and operators. Infrastructure inequality is no less critical: potentially favorable regions with high environmental quality often lack transport accessibility, digital coverage, and logistical support.

An additional challenge is the low level of statistical monitoring of the industry [4, p. 283–284; 13]. Due to the lack of official reporting under the category "apitherapy services," government agencies do not record either market volumes or tax revenues. As a result, the industry remains on the periphery of sustainable tourism economic policy, despite its significant potential for strengthening the territorial brand and developing the bioeconomy.

Improvements to investment policy in the field of apitherapy infrastructure should be based on a combination of regulatory certainty, targeted financial incentives, and operational standardization of services. At the regulatory level, the category of apitherapy health facilities should be established with mandatory standard operating procedures (SOPs) for safety, informed consent, and allergy preparedness, as well as introduce framework certification for personnel with reference to safety and sustainability management systems (e.g., ISO 45001 for occupational health and safety and ISO 14001 for environmental management). To increase investment attractiveness, it is worth combining public-private partnerships with targeted tax instruments: a reduced property tax rate in recreational areas, loans for green capital investments, and access to financing mechanisms for energy-efficient solutions through property assessed clean energy (PACE) supplemented by preferential programs for rural areas and low-income areas, such as the New Markets Tax Credit (NMTC). The project's economics are strengthened by green building standards (Leadership in Energy and Environmental Design, LEED), energy efficiency targets (Energy Efficiency Ratio, EER), and full life cycle planning (Life Cycle Assessment, LCA), which reduce operating costs and regulatory non-compliance risks. It is advisable to diversify the financial base with social impact investment instruments (including pay-for-success and social bonds), where payments are partially linked to SROI, and to ensure product compatibility with corporate wellness programs, Health Savings Accounts (HSAs), and Flexible Spending Accounts (FSAs) to expand effective demand. At the institutional level, it is advisable to create territorial clusters of "apiary – apidom – wellness center" with joint marketing, medical supervision, and a customer referral system, supported by a digital CRM customer relationship management infrastructure and dynamic pricing that smooths out seasonality and increases average revenue per customer. Risks are controlled through specialized liability insurance coverage, standardized visitor screening protocols (medical screening, allergy testing, anaphylaxis response algorithms), regular quality audits, and public reporting on social and environmental outcomes, which increases the trust of local communities and reduces the cost of capital. The combined effect of these tools creates a transparent, manageable, and predictable investment regime in which apitherapy facilities are not only profitable recreational infrastructure assets but also platforms for human capital growth and environmental sustainability.

Conclusions

The study found that investments in the construction of apitherapy facilities are forming a new segment of the US recreational economy, characterized by a combination of economic efficiency, social returns, and environmental sustainability. It has been proven that such facilities provide a multiplier effect, stimulating local entrepreneurship, employment, and tourism activity, while improving public health and promoting bioeconomic practices. The effectiveness of investments is reflected not only in financial indicators (NPV, IRR), but also in social and environmental outcomes, which enhances the strategic attractiveness of this segment for institutional investors.

Key problems in the development of the industry have been identified: the lack of uniform regulatory standards and a certification system for apitherapy, regional differences in the legal framework, limited access to financing, insufficient human resources, and a low level of statistical monitoring. These factors hinder the scaling of the business model and reduce investor confidence in the industry.

Based on the analysis, the following recommendations were made: to consolidate the status of apitherapy facilities in national standards for recreational services; to introduce a certification system in accordance with international standards ISO 45001 and ISO 14001; to activate public-private partnership (PPP) mechanisms and targeted tax incentives; create territorial clusters of "apiary – apitherapy center – wellness center" as an institutional basis for coordination of activities and joint marketing.

Prospects for further research are related to the development of models for integrated investment effectiveness assessment (IEA), forecasting the long-term socio-economic return of apitherapy facilities, and comparative analysis of the experience of EU countries with the aim of optimizing national policy for the development of sustainable wellness tourism.

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