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Medical and Rehabilitation Tourism as a Driver of Sustainable Development in Ukraine

Abstract:

The relevance of this study is determined by the growing role of medical and rehabilitation tourism in conditions of large-scale socio-economic disruption and post-war recovery, where health restoration and social reintegration become key national priorities. The research problem lies in the insufficient theoretical and applied conceptualization of medical and rehabilitation tourism as an integrated component of sustainable development and post-conflict recovery, as well as in the fragmentation of existing institutional, infrastructural, and regulatory approaches to its development. The scientific novelty of the study consists in substantiating medical and rehabilitation tourism as a multidimensional socio-economic system embedded in healthcare, social policy, and sustainable development frameworks, and in identifying crisis-driven transformation mechanisms specific to post-war conditions. The study proposes an integrated analytical perspective that combines global trends with national specificities of Ukraine. The subject of the study is the system of socio-economic, organizational, and managerial processes that determine the development and transformation of medical and rehabilitation tourism in Ukraine. The object of the study is medical and rehabilitation tourism in Ukraine, including sanatorium and resort institutions, rehabilitation infrastructure, and service delivery models. The purpose of the study is to comprehensively analyze the development of medical and rehabilitation tourism in Ukraine, identify key constraints, and substantiate promising directions for its modernization as a factor of sustainable socio-economic recovery and human capital development. The research methods include general scientific methods of analysis, synthesis, comparison, and systematization, as well as special methods such as statistical analysis, SWOT analysis, expert evaluation, benchmarking, sociological surveys, case study analysis, and an integrated performance assessment approach grounded in sustainable development principles. The study synthesizes the works of Ukrainian and international scholars in the fields of medical tourism, rehabilitation, sustainable development, and regional studies, as well as institutional materials from international and national tourism organizations. The study examines global and national trends in medical and rehabilitation tourism, assesses the impact of military conflict on sectoral development, identifies structural, institutional, and regional limitations, and analyzes emerging opportunities for functional reorientation toward rehabilitation and social recovery. Particular attention is paid to the role of innovation, digitalization, human capital development, and inclusive access in shaping the sector's post-war transformation. The conclusions demonstrate that medical and rehabilitation tourism in Ukraine is undergoing a profound structural shift from recreational models toward rehabilitation-oriented and socially embedded systems. The study substantiates that the sustainable development of the sector requires coordinated institutional governance, infrastructural modernization, workforce development, and integration into national recovery strategies, positioning medical and rehabilitation tourism as a strategic driver of post-war reconstruction and long-term socio-economic resilience.

Keywords: medical tourism, rehabilitation tourism, human capital, development program, innovations.

Introduction

Global trends indicate a steady increase in demand for health, rehabilitation, and preventive services, driven by demographic changes, the growth of chronic diseases, post-pandemic health challenges, and rising awareness of quality-of-life issues. In response, many countries are actively modernizing healthcare and tourism infrastructure, integrating medical and rehabilitation tourism into national development strategies and positioning it as a competitive segment of the global tourism market.

The health status of the population serves as a key indicator of a country's socio-economic stability and plays a decisive role in the formation and preservation of human capital. In this context, medical and rehabilitation tourism increasingly functions not only as a tourism activity but also as an instrument of public health policy, social recovery, and sustainable development.

For Ukraine, the relevance of medical and rehabilitation tourism is significantly intensified by the consequences of prolonged military conflict. Large-scale physical injuries, psychological trauma, internal displacement, and the deterioration of public health conditions have generated an unprecedented demand for rehabilitation services among both military personnel and civilians. At the same time, traditional health resort and sanatorium systems face infrastructural damage, financial constraints, and organizational challenges, which necessitate comprehensive modernization and strategic reorientation.

The exploration of medical tourism and rehabilitation within Ukraine remains an underresearched domain both scientifically and discursively. Works from various authors provide valuable insights for this examination. These studies typically characterize medical and rehabilitation tourism as part of national tourism with a specialized focus on medical recreation and social rehabilitation. Domestic researchers have also explored foundational principles related to this sector's growth in Ukraine—an area currently experiencing notable transformations driven by military conflict as well as economic challenges.

Thus, the development of medical and rehabilitation tourism in Ukraine emerges as a critical interdisciplinary task at the intersection of tourism studies, healthcare management, social policy, and sustainable development, particularly in the context of post-war recovery and long-term national resilience.

Despite growing scholarly interest in medical tourism, rehabilitation tourism remains comparatively underexplored, especially within countries experiencing armed conflict and systemic socio-economic transformation. Existing studies primarily focus on general trends in health tourism, regional competitiveness, or inclusive tourism practices, while insufficient attention is paid to rehabilitation tourism as a structurally independent and strategically significant segment.

The novelty of this study lies in the application of contemporary analytical approaches to assess medical and rehabilitation tourism in Ukraine simultaneously from present-day and prospective perspectives, taking into account security challenges, socio-economic constraints, and post-war recovery needs. Unlike previous works, this research emphasizes the integration of global development trends with national specificities and proposes a comprehensive framework for the modernization of sanatorium and resort systems under conditions of structural transformation.

Additionally, the study contributes to the scientific discourse by conceptualizing medical and rehabilitation tourism as a driver of sustainable development, linking it explicitly to human capital restoration, innovation adoption, and institutional resilience in post-conflict contexts.

The subject of the study is the system of socio-economic, organizational, and managerial processes that determine the development, transformation, and modernization of medical and rehabilitation tourism in Ukraine under contemporary security and economic conditions.

The object of the study is medical and rehabilitation tourism in Ukraine, including sanatorium and resort institutions, rehabilitation infrastructure, service delivery models, and their interaction with national healthcare, tourism, and social protection systems.

The purpose of this study is to conduct a comprehensive analysis of developing medical and rehabilitation tourism in Ukraine, identify key constraints and challenges, and substantiate promising directions for its modernization as a factor of sustainable socio-economic recovery and human capital development.

To achieve the stated purpose, the study addresses the following objectives:

- analyze global trends in medical and rehabilitation tourism and assess their relevance for the Ukrainian context;
- identify the key socio-economic, infrastructural, and security-related factors influencing the development of medical and rehabilitation tourism in Ukraine;
- evaluate the current state and structural limitations of Ukrainian sanatorium and rehabilitation systems;
- determine priority areas and mechanisms for modernization and innovation in the sector;
- substantiate the role of medical and rehabilitation tourism in post-war recovery and sustainable development strategies.

The results of this study are intended for researchers and scholars in the fields of tourism studies, healthcare management, regional development, and sustainable development, contributing to the academic understanding of rehabilitation tourism in post-conflict environments. In addition, the findings may be of practical relevance to policymakers, public authorities, healthcare administrators, tourism managers, and investment planners involved in the reconstruction and modernization of health resort infrastructure, as well as to international organizations and development agencies supporting Ukraine's post-war recovery initiatives.

Materials and Methods

The research is based on a combination of empirical, statistical, analytical, and conceptual materials related to the development of medical and rehabilitation tourism. The empirical basis of the study includes statistical data reflecting the dynamics of medical and rehabilitation tourism, expert assessments of service quality and institutional performance, results of sociological surveys targeting tourists, staff members, and local communities, as well as analytical materials derived from case studies of specific sanatorium and rehabilitation facilities. In addition, international standards, best practices, and comparative benchmarks were used to contextualize the Ukrainian experience within global development trends.

From a methodological perspective, the study relies on a set of general scientific methods that ensure the systematic and comprehensive nature of the analysis. Analytical and synthetic methods were applied to examine the structural characteristics of medical and rehabilitation tourism and to integrate heterogeneous indicators into a coherent analytical framework. Comparative analysis was used to assess the positioning of Ukrainian medical and rehabilitation tourism in relation to leading international resorts and recognized global standards. Generalization and abstraction supported the formulation of broader conclusions regarding sectoral development patterns and strategic priorities. The research is grounded in a systems approach, which allows medical and rehabilitation tourism to be examined as a complex socio-

economic phenomenon shaped by interactions between healthcare, tourism, social policy, and sustainable development factors.

Special and applied research methods were employed to address the empirical and strategic objectives of the study. Statistical methods, including index calculations, assessments of dynamic change, and average indicator determination, were used to identify quantitative trends and structural shifts within the sector. SWOT analysis was applied to evaluate the strengths, weaknesses, opportunities, and threats affecting the development of medical and rehabilitation tourism under current socio-economic and security conditions.

Expert evaluation played a particularly important role in assessing the impact of service quality on health outcomes and institutional effectiveness, especially in areas where quantitative measurement is limited. Benchmarking methods enabled comparative assessments of Ukrainian facilities against leading international practices and standards, providing a basis for identifying gaps and potential directions for modernization. Sociological survey methods were used to capture perceptions, expectations, and experiences of key stakeholder groups, including patients, medical personnel, tourism staff, and local communities. Case study analysis of selected facilities was applied to illustrate both successful practices and existing challenges, allowing for a more nuanced understanding of operational and organizational factors.

An integrated performance assessment approach was used to synthesize multiple economic, social, and environmental criteria into a summary indicator reflecting the multifaceted nature of medical and rehabilitation tourism. In line with the principles of sustainable development, the effectiveness of sectoral development was evaluated not only through financial and economic metrics but also by considering environmental sustainability and social health outcomes. This methodological framework provides a reliable basis for strategic planning and managerial decision-making aimed at the modernization and sustainable development of medical and rehabilitation tourism in Ukraine.

Literature Review

The scientific discourse on medical and health-related tourism has developed at the intersection of tourism studies, healthcare economics, regional development, and social policy. International research traditionally focuses on medical tourism as a competitive service industry oriented toward cross-border patient mobility, wellness consumption, and institutional quality standards, as reflected in the conceptual frameworks promoted by professional organizations such as the International Spa Association (ISPA). These approaches provide a general reference point for understanding global standards, classifications, and best practices in wellness and medical tourism, which are used in this study as a comparative and contextual benchmark.

The historical evolution of medical tourism has been explored internationally; however, rehabilitation tourism remains relatively unexplored despite being a priority area that requires active development in Ukraine. Research conducted by Bezugla et al. (2022) emphasizes the promotion of rehabilitation tourism as an integration strategy for individuals with disabilities.

Along with colleagues, Ostryanin (2024) also examines inclusive economic policies related to veterans' reintegration while underscoring the impact of cross-sector collaboration. Bieloborodova's work (2024) assesses how developing health-related tourist offerings can bolster Ukraine's competitiveness on an international scale.

Kalinichenko et al. (2024) state that regions endowed with unique therapeutic resources must widen their array of high-quality healthcare services by establishing modern complexes aligned with cutting-edge medical advancements, aimed at fulfilling lifestyle desires centered around wellness as well as entertainment options.

Pankiv et al. (2023) indicated that overcoming economic constraints is paramount for advancing the effective evolution of Ukraine's medical tourism market—a direction that promises competitive positioning on a global stage. The research of Saichuk et al. (2023) identifies essential sectors poised for significant growth amidst restorative efforts in de-occupied territories, evaluating their potential development even amid emergencies.

One of the key theoretical sources for understanding the long-term evolution of health resort systems in Ukraine is the textbook by Zavarika (2015), which systematizes the principles of resort business organization, sanatorium infrastructure, and institutional management within post-Soviet and transitional economies. This work provides a historical and structural framework for interpreting the persistence of inherited organizational models and infrastructural constraints in Ukrainian sanatorium systems. In the present study, Zavarika's conceptualization is used as a baseline for assessing the depth of required modernization and the scale of institutional transformation needed in the post-war period.

Complementing this perspective, Aliyeva (2020) develops a theoretical model of sustainable development for the tourism and recreation sector based on inclusive growth. Her work emphasizes the integration of social, economic, and environmental dimensions in tourism policy and highlights the importance of accessibility and social inclusion. This framework informs the present study's methodological emphasis on evaluating medical and rehabilitation tourism not solely through economic indicators, but also through social health outcomes and sustainability criteria, particularly relevant in post-conflict recovery contexts.

The institutional structure of medical tourism is examined in detail by Gnedyk (2018), who analyzes the legal status, economic functions, and regulatory challenges of medical tourism actors in Ukraine. This study identifies gaps in legislative coherence, licensing procedures, and institutional coordination that constrain sectoral development. In the present research, Gnedyk's findings are used to contextualize governance-related barriers and to substantiate the argument for regulatory modernization as a prerequisite for effective integration of medical and rehabilitation tourism into national development strategies.

Regional heterogeneity represents a significant factor in the development of medical and rehabilitation tourism. Molodetskyi and Ostra (2020) provide a comparative analysis of health tourism in the Ukrainian Carpathians and the Black Sea region, focusing on natural therapeutic resources, infrastructure availability, and market dynamics. Their work offers empirical evidence of spatial disparities that inform this study's assessment of post-war regional reorientation and the growing importance of relatively secure western territories.

Similarly, Gladkyi et al. (2022) examine the development of medical tourism in the western regions of Ukraine, highlighting regional specialization, infrastructural constraints, and cross-border cooperation potential. These findings are directly applied in the present research to support the identification of priority regions for rehabilitation tourism development in conditions of security asymmetry and uneven recovery.

Early analytical contributions by Didenko and Zhuchenkov (2016) represent some of the first systematic attempts to assess the state and prospects of medical tourism in Ukraine. Their work outlines structural weaknesses, including insufficient investment, outdated infrastructure, and limited international integration. These observations serve as a longitudinal reference point in the present study, enabling a comparison between pre-war challenges and current crisis-induced transformations.

In a similar vein, Dubinsky and Orlova (2017) focus on identifying key factors that influence the development of medical and health tourism, such as resource availability, institutional capacity, and market demand. Their factor-based approach informs the analytical framework

used in this study to categorize constraints and drivers affecting medical and rehabilitation tourism under contemporary conditions.

The role of innovation in enhancing the competitiveness of medical tourism markets is addressed by Vakhovich et al. (2018), who analyze the adoption of innovative technologies at the regional level. Their research emphasizes digital solutions, medical technologies, and service innovation as critical factors for improving competitiveness. In the present study, this perspective underpins the analysis of digitalization, tele-rehabilitation, and technological upgrading as core components of sectoral modernization.

Issues of accessibility and state intervention are examined by Vivosiannyk and Sazonets (2024), who analyze the formation of barrier-free environments in sanatorium and resort facilities through public policy mechanisms. Their findings highlight the importance of inclusive design, regulatory support, and state-led initiatives in ensuring equal access to rehabilitation services. This work directly informs the present study's discussion of accessibility and social inclusion as essential dimensions of sustainable rehabilitation tourism.

The transformation of medical and rehabilitation services under wartime conditions is explored in the works of Sazonets and Khanina (2024a; 2024b), which focus on medical volunteering and state regulation of volunteer activity during martial law. These studies reveal the growing role of volunteer networks in compensating for institutional deficits and supporting rehabilitation needs. In the present research, these insights are used to contextualize workforce shortages, institutional adaptability, and the expansion of non-market mechanisms within the rehabilitation ecosystem.

Institutional sources such as materials from the International Spa Association (ISPA) (*About ISPA, n.d.*) provide internationally recognized classifications and quality benchmarks for spa and wellness services. These standards are employed in the present study as comparative reference points for benchmarking Ukrainian facilities. Data from the State Agency for Tourism Development of Ukraine and national statistics from Ukrstat serve as empirical foundations for quantitative analysis, trend identification, and validation of sectoral dynamics.

Finally, the conference study by Yavorska et al. (2020) addresses practical problems and development prospects of medical and health tourism in Ukraine, offering applied insights that bridge academic research and policy-oriented analysis. This source is used in the present study to supplement peer-reviewed literature with practice-oriented observations relevant to strategic planning and regional development.

Despite the breadth of existing research, the literature reveals a persistent gap in comprehensive, system-oriented analyses of medical and rehabilitation tourism in Ukraine that simultaneously integrate security challenges, post-war recovery needs, sustainable development principles, and innovation-driven modernization. In particular, rehabilitation tourism remains insufficiently conceptualized as a strategic driver of sustainable development and human capital restoration. This gap defines the scientific relevance and positioning of the present study.

Taken together, these additional sources significantly enrich the analytical foundation of the study by providing theoretical depth, institutional context, regional differentiation, and innovation-oriented perspectives. Their integration highlights a persistent research gap: the lack of comprehensive, system-based analyses that position medical and rehabilitation tourism as a strategic instrument of post-war recovery, sustainable development, and human capital restoration. Addressing this gap constitutes the central contribution of the study.

Results

General Information

The extensive warfare impacting Ukrainian healthcare systems has catalyzed a range of complex effects, shaping operational scales alongside structural transformations within the sector itself; military threats now dictate consumer behavior patterns, significantly altering market dynamics, including reduced mobility resulting from persistent missile risks, compounded by airspace restrictions that limit outbound travel avenues to wellness destinations previously accessible before wartime escalation.

Consequently, sharp declines are noted in comparison with past tourist traffic figures, demonstrating notable shifts toward shorter travel arrangements that prioritize proximity over long-distance excursions, predominantly favoring safe zones during ongoing hostilities. Sustained conflicts have inflicted heavy losses on existing infrastructure, encompassing individual sanatoria as well as auxiliary support systems, including transport and utilities, thereby undermining overall operational viability and further exacerbating challenges—especially given the reliance on specialized resources essential to their functioning (e.g., water/electricity/therapeutic equipment).

Cultural heritage assaults that undermine traditional resort attractions contribute detrimentally to diminishing the overall appeal for prospective visitors, while prolonged instability fosters severe socio-economic ramifications that cripple commercial healthcare demand. This situation prompts urgent adjustments across service delivery paradigms, particularly in response to the growing demand for mental health recovery initiatives necessitated directly by the psychosocial toll inflicted through nationwide armed conflict.

Emerging demand profiles are increasingly focused on providing psychological rehabilitation tailored specifically to veterans' needs, while also complementing civilian recovery trajectories. This shift necessitates the restructuring of programs, fundamentally transitioning conventional preventive recreational modalities toward specialized, recovery-oriented interventions perceived as more suitable within flexible frameworks that accommodate internally displaced populations seeking refuge (*Aliyeva, 2020*).

Economic downturns have triggered energy crises compounded by related infrastructural damage, thereby amplifying operational burdens faced across the industry; surges in spiraling energy costs, coupled with power disruptions and procurement challenges, have emerged as critical factors driving profitability constraints. As a result, investments in modernization are stifled, ultimately placing strain on facility capacities to achieve optimal performance levels that would otherwise have been anticipated in pre-conflict periods.

Demographic fluxes have subsequently affected customer bases, leading to labor shortages and complicating the implementation of efficient rehabilitation regimens, particularly due to shortages of practitioners skilled in relevant disciplines. These conditions generate heightened difficulties in sustaining programmatic initiatives, thereby necessitating collaboration between private institutions and state agencies to tailor treatment protocols accordingly (*Vinsiannyk et al., 2024*).

Safety considerations now dominate destination selection processes, influencing relocations and fostering new spatial models of service provision. Client demand has predominantly shifted westward toward more stable areas, including the Carpathian region, Lviv, and Prykarpattia, whereas eastern and southern resorts struggle to reach their full potential. These challenges are further compounded by reconstruction costs estimated at hundreds of billions of U.S. dollars, posing serious implications for future investment, as resources must compete with defense,

housing, and broader economic recovery priorities. Consequently, engagement with foreign partnerships and grant-based funding models becomes essential within strategic reallocation frameworks, including state-supported planning initiatives aimed at facilitating revitalized recovery pathways (Molodetskyi et al., 2020).

Emerging trends indicative of adaptive strategies are evident, whereby establishments capable of realigning their focus toward specialized rehabilitation engage in robust cooperation networks that integrate physical therapy and psychological support mechanisms, incorporate tele-rehabilitation modalities, and respond to rising domestic visitor demand. The expansion of short-term programs further reflects evolving preferences within this sector (Bezugla et al., 2022).

Investments are increasingly directed toward enhancing energy efficiency, upgrading digital management systems, and strengthening industry-wide resilience capacities, thereby emphasizing the need for adaptive responses to navigate ongoing uncertainty.

Consequently, emerging interplays between military and socio-economic dimensions are reshaping the structural landscape of Ukraine's healthcare and tourism sectors, prompting a shift away from conventional recreational formats toward medically oriented solutions that address broader demographic welfare objectives. These transformations underpin development trajectories envisioned for post-war reconstruction phases, while simultaneously expanding opportunities and enhancing accessibility throughout successive stages of national recovery.

Key Challenges

Current developments surrounding Ukraine's medical and healthcare landscape face systemic constraints, notably intensified by ongoing adversities characterized primarily by disruptions to the security apparatus. These disruptions fuel uncertainties that affect the viability of long-distance travel, erode traditional patronage patterns, and alienate large demographic groups, shifting attention predominantly toward relatively safer western regions. This process culminates in imbalanced occupancy rates that curtail development prospects, further exacerbated by widespread infrastructural deficiencies across numerous localities.

Significant problems also existed prior to the conflict, including aging facilities constructed decades earlier that required timely modernization. These challenges have been worsened by wartime damage, creating stark contrasts with prevailing standards and rendering many facilities unable to operate competitively amid escalating demands in global markets. Extensive destruction incurred during hostilities has further complicated pathways toward revitalization efforts initiated thereafter.

Long-standing financial constraints continue to plague operators reliant on subsistence-based models, who struggle to maintain profitability margins amid rising inflationary pressures, increasing labor costs, and declining effective consumer demand. These factors contribute to industry stagnation in the absence of sufficient investment streams allocated to progressive enhancements necessary to regain lost ground nationwide. At the same time, regulatory and legal frameworks governing the sector remain misaligned and outdated, failing to meet evolving demands dictated by contemporary realities. This results in a lack of cohesive strategic direction that impedes modernization efforts and severely undermines competitiveness, particularly the ability to access international markets that rely on substantial funding sources constrained by competing national priorities.

Staff shortages markedly diminish service quality outcomes, as acute deficits of trained physiotherapists, massage therapists, and rehabilitation specialists impede the effective implementation of sound therapeutic programs. Managing heightened pressures arising from demand that exceeds existing capacities necessitates coordination between private and public

entities to ensure an adequate workforce capable of meeting the growing needs of veteran populations experiencing trauma-related conditions. These challenges are further compounded by legislative and regulatory requirements related to labor protection and professional compliance, which require reassessment if meaningful transformation is to be achieved at the desired pace. As a result, many institutions remain unprepared to navigate the complexities of securing appropriate qualifications, licensure, and accreditation, thereby inhibiting adaptability and the realization of long-term development objectives.

Challenges also persist in maintaining international credibility and reputation, as perceptions shaped by ongoing conflict make it difficult to attract foreign clientele, thereby jeopardizing revenue generation in anticipated post-war recovery scenarios. The sector's projected resurgence, particularly its reliance on foreign currency inflows, depends on the timely implementation of measures addressing the aforementioned issues while simultaneously strengthening institutional frameworks. These efforts aim to reinforce and mediate collective contributions, yielding tangible improvements in infrastructure capacity and overall quality assurance, and fostering collaborative relationships among governance bodies aligned around shared priorities and common strategic visions (*Chetyrbuk et al., 2024*).

Ultimately, resolution requires coordinated and concerted approaches that leverage collective resources to modernize infrastructure, integrate digital innovations, enhance workforce competencies, and develop effective marketing strategies. Strengthening cooperative linkages and facilitating diversified funding mechanisms through incentivized partnerships are essential for building a supportive ecosystem capable of overcoming existing barriers. Such an approach will redefine sectoral prospects under current conditions and guide future development trajectories, enabling the sustainable revitalization of opportunities through effective and actionable interventions, supported by continuous monitoring, regular evaluation, and adaptive program management in response to evolving societal needs in subsequent post-conflict transition phases.

Innovations Trends

Contemporary phenomena surrounding global health-related travel encompass the convergence of disciplines, melding medicine, technology, psychology, ecology, and hospitality sectors, and revealing innovative responses tailored to meet emerging societal expectations derived from anxiety, chronic illness trends, and pandemic-induced fatigue. These shifts in cultural norms foster the pursuit of harmonious living environments, balance, and fulfillment, requiring adaptation grounded in holistic perspectives that inform the development of care delivery frameworks (*Figure 1*).

Digitalization emerges as a central innovation trend observed in the wellness sector, heralding personalized applications designed to support dietary habits, sleep routines, and yoga and meditation practices. These tools operate in synergy with resort-based amenities, offering virtual consultations with physicians and nutritionists that augment premium experiences. Patrons increasingly focus on restoring mental well-being, often through so-called “digital detox” retreats, which encourage temporary disconnection from electronic devices to restore equilibrium amid the pressures of constant connectivity in today's world.

Personalization represents a key objective, achieved through individualized programming that utilizes genetic testing, biomarkers, and microbiome assessments to craft bespoke nutritional, exercise, and sleep plans. These approaches are increasingly incorporated into resorts pursuing functional medicine and biohacking concepts designed to enhance individual experiences and support longevity and adherence to healthy lifestyles (*Vakbovich et al., 2018*).

Clinique La Prairie and the SHA Wellness Clinic in Spain are pioneering advances in this field, exploring the application of nutrigenomics in dietetics while acknowledging patient-specific genetic variations. Biohacking addresses the enhancement of physiological functioning through scientific interventions such as infrared therapy, hyperbaric oxygenation, cryotherapy, and real-time monitoring of vital signs using smart devices, sensors, and wearable technologies. These practices are complemented by mental health care components, including silent retreats, mindfulness initiatives, art therapy offerings, supportive psychotherapeutic services, and neurotechnological applications aimed at mitigating anxiety levels.

Environmental consciousness increasingly shapes traveler preferences toward green lifestyles, as eco-resorts that utilize sustainable materials, minimize ecological footprints, source organic produce, provide filtered water and locally sourced ingredients, and offer forest therapy, naturopathy, and agotherapy programs continue to gain popularity (*Pankiv et al., 2023*).

Evolving wellness formats are also gaining traction as corporate entities invest in employee well-being through wellness trips, retreat-based anti-stress programs, and hybrid approaches that merge physical recuperation with online follow-ups, professional conferences, knowledge sharing, and motivational activities, thereby cultivating healthy lifestyle choices.

Innovations have spurred significant transitions within the field, shifting from static sanatorium paradigms toward dynamic, personalized, and technology-driven experiences that transcend purely therapeutic objectives. These models aim to improve quality of life, enhance preventive awareness, and establish new benchmarks, as enterprises offering tailor-made, eco-friendly, and psychologically satisfying products are anticipated to shape future interactions with both guests and local communities (*Yavorska et al., 2023*).

Modernizing Ukrainian sanatorium and resort complexes represents an imperative component of post-war rebuilding efforts. Sustainable competitiveness in the post-war era, shaped by challenges inherent in widespread destruction, requires a strategic reconceptualization of institutional roles that contribute positively to reparative development frameworks. This approach emphasizes technical upgrades, comprehensive restructuring, adherence to high-quality standards, and the digitization of management models, thereby strengthening entry into global markets (*Table 1*).

The establishment of regional clusters connecting medical facilities, diagnostic centers, telemedicine services, and natural assets aligns national development with global practices. Such clusters aim to provide comprehensive treatment services, improve logistical accessibility, and serve diverse patient groups, including military personnel and civilians affected by the consequences of armed conflict. The Carpathian and Transcarpathian regions hold particularly strong potential due to their relatively secure environments (*Ostryanin et al., 2024*).

Meticulous attention must be directed toward restoring material infrastructure, rehabilitating damaged facilities, adopting energy-efficient technologies, upgrading equipment, and adhering to clinical guidelines. These measures are integral to fostering institutional resilience, reducing operating costs, optimizing long-term sustainability, and reinforcing environmentally friendly practices whose relevance is expected to persist beyond wartime exigencies.

This approach further entails fostering credibility, building trust, restoring confidence among domestic and international clients, aligning professional qualifications with EU-accredited certifications, promoting the use of insurance schemes, attracting foreign patients, and stimulating export capacity, thereby positioning Ukraine favorably within the global medical and rehabilitation tourism market.

Digital integration transforms operational processes by automating registration systems, creating electronic medical records, and streamlining monitoring procedures, which enhances continuity of care and reinforces safety and convenience. Workforce reskilling and re-employment are paramount, requiring the establishment of specialized training centers to cultivate competencies among physiotherapists, occupational therapists, mental health professionals, and managers through multidisciplinary training programs. These initiatives support human capital development, ensure professional competence, and maintain institutional reputations, while the pharmaceutical sector likewise plays a critical role in ensuring the effective application of emerging technologies and updated treatment protocols.

Strategic development of marketing communications strengthens positions in both local and global markets by enhancing brand recognition, promoting Ukraine as a safe and reliable destination, and cultivating a positive image of national recovery. These efforts contribute to increasing international visitor flows and supporting broader economic revitalization (*Onyschuk, 2019*).

Regional clusters that integrate diverse functional elements foster collaborative exchanges, enhance management efficiency, generate employment, and stimulate regional growth. Community-based enterprises that combine well-being and tourism initiatives further strengthen social cohesion, reinforce local development foundations, and contribute to the creation of sustainable, long-term socio-economic legacies.

The final component involves forging partnerships and financial mechanisms that harmonize public–private cooperation, integrate grant schemes, preferential lending, and investment instruments, and create a streamlined governance system. Such arrangements enhance stakeholder coordination, enable the realization of ambitious projects, attract substantial investment, and generate long-lasting benefits for society as a whole.

In conclusion, comprehensive agendas centered on development strategies rooted in systematic planning and interdisciplinary collaboration can drive sectoral recovery, rebuild revitalized industries that integrate into global platforms, and establish a strong and resilient international reputation. These efforts lay the foundation for sustained excellence, support long-term growth trajectories, and contribute to the realization of shared aspirations for a stable and prosperous future.

Discussion

The results obtained in this study are of particular relevance in the current stage of Ukraine's socio-economic and humanitarian transformation, as they reflect not only sectoral dynamics within medical and rehabilitation tourism but also broader structural shifts associated with wartime disruption and post-war recovery. Unlike pre-conflict analyses that predominantly examined competitiveness, resource availability, or market positioning, the present findings highlight the systemic role of rehabilitation tourism as an integral component of national recovery, public health stabilization, and social reintegration. In this sense, the relevance of the results lies in their ability to reframe medical and rehabilitation tourism from a narrowly defined tourism product into a multifunctional socio-economic mechanism operating at the intersection of healthcare, social policy, and regional development.

A key interpretative outcome of the Results is the identification of a dual transformation trajectory within the sector. On the one hand, empirical evidence demonstrates the contraction of traditional tourism flows, infrastructural degradation, and heightened financial vulnerability of sanatorium and resort facilities. On the other hand, the same conditions have generated a qualitatively new and stable demand for rehabilitation services, driven by large-scale physical and

psychological trauma among military personnel and civilians. This duality confirms that crisis conditions do not simply suppress sectoral development but reconfigure its functional priorities, shifting emphasis from recreational and preventive models toward rehabilitation-oriented and socially embedded service provision.

The relevance of these results is further reinforced when viewed through the lens of sustainable development. The study demonstrates that medical and rehabilitation tourism increasingly fulfills functions associated with social sustainability, particularly in terms of restoring human capital, reducing long-term healthcare burdens, and supporting vulnerable populations. This finding aligns with contemporary sustainability frameworks but extends them by embedding rehabilitation tourism within post-conflict recovery paradigms. As a result, the sector emerges not as a supplementary economic activity but as a strategic domain with long-term implications for demographic stability, labor market recovery, and social cohesion.

Despite these positive transformations, the results also reveal a complex set of interrelated problems that continue to constrain the development of medical and rehabilitation tourism in Ukraine. One of the most significant challenges is the persistent imbalance between growing demand for rehabilitation services and the limited capacity of existing infrastructure to meet this demand. Wartime damage to facilities, combined with decades of underinvestment prior to the conflict, has resulted in structural obsolescence that cannot be resolved through incremental adjustments alone. This problem is not merely technical but systemic, as it reflects entrenched patterns of deferred modernization and fragmented investment strategies.

Another critical problem identified in the study concerns institutional and regulatory misalignment. The Results indicate that existing legal and administrative frameworks governing medical tourism, healthcare provision, and resort operations remain poorly synchronized with contemporary realities. This misalignment manifests in regulatory rigidity, insufficient incentives for innovation, and limited mechanisms for public-private cooperation. In the context of rehabilitation tourism, such institutional inertia undermines the sector's ability to adapt rapidly to changing needs, particularly those associated with veteran reintegration, accessibility requirements, and interdisciplinary service provision.

Human resource constraints represent an additional and particularly acute problem. The findings demonstrate that shortages of qualified medical, rehabilitation, and support personnel significantly limit the effectiveness of service delivery. These shortages are exacerbated by labor migration, wartime displacement, and the absence of comprehensive professional retraining systems tailored to rehabilitation tourism. Importantly, this issue extends beyond quantitative deficits and includes qualitative challenges related to interdisciplinary competence, digital literacy, and familiarity with modern rehabilitation protocols. As a result, workforce limitations emerge as a central bottleneck in the sector's transformation.

The study also highlights spatial and regional disparities as a persistent structural problem. While relatively secure western regions have experienced increased demand and investment interest, eastern and southern territories face prolonged recovery horizons due to extensive destruction and elevated security risks. This uneven spatial development risks reinforcing regional inequalities and creating a fragmented rehabilitation landscape. From an analytical perspective, these findings underscore the need to conceptualize rehabilitation tourism within a territorial resilience framework rather than treating it as a uniformly distributed national system.

Based on the Results, several directions for the further development of medical and rehabilitation tourism can be proposed. First, modernization strategies must prioritize functional reorientation rather than cosmetic infrastructure renewal. This entails redesigning facilities and service models to support long-term rehabilitation, psychological recovery, and inclusive access,

rather than replicating pre-war recreational formats. Such reorientation should be grounded in evidence-based rehabilitation standards and integrated care pathways that link tourism infrastructure with healthcare systems.

Second, the development of rehabilitation tourism requires a coordinated institutional approach that bridges healthcare policy, tourism governance, and social protection mechanisms. The Results suggest that isolated sectoral reforms are insufficient; instead, integrated governance models are needed to ensure regulatory coherence, sustainable financing, and accountability. Public–private partnerships, targeted state support, and international donor engagement should be aligned within a unified strategic framework that recognizes rehabilitation tourism as a public interest domain.

Third, investment in human capital must be treated as a strategic priority rather than a secondary consideration. The findings indicate that expanding educational and retraining programs for rehabilitation professionals, managers, and support staff is essential for sustaining sectoral growth. Such programs should emphasize interdisciplinary competencies, digital tools, and trauma-informed care, thereby enhancing both service quality and institutional adaptability.

Fourth, digital transformation emerges from the Results as a critical enabling factor. Tele-rehabilitation, digital patient monitoring, and integrated information systems offer practical solutions for overcoming spatial constraints, optimizing resource allocation, and improving continuity of care. The development of digital platforms can also enhance data collection and performance evaluation, supporting evidence-based decision-making and long-term planning within the sector.

Finally, the Results point toward the necessity of embedding rehabilitation tourism within broader post-war development strategies. Rather than treating it as a standalone industry, rehabilitation tourism is worth conceptualizing as part of a national recovery ecosystem that includes healthcare reform, social reintegration, regional revitalization, and sustainable development objectives. This perspective opens avenues for further research, particularly comparative studies of post-conflict rehabilitation systems, evaluations of policy effectiveness, and assessments of long-term socio-economic impacts.

In summary, the Discussion demonstrates that medical and rehabilitation tourism in Ukraine is undergoing a profound transformation shaped by crisis-driven demand, structural constraints, and emerging opportunities for systemic renewal. The interpretation of the Results reveals both the sector's vulnerabilities and its strategic potential, highlighting the need for integrated, evidence-based, and future-oriented approaches to its development. These insights provide a conceptual bridge between empirical findings and practical implications, setting the stage for the concluding synthesis of the study.

Conclusion

This study has examined the development of medical and rehabilitation tourism in Ukraine within the context of profound socio-economic disruption, security challenges, and post-war recovery imperatives. The research was guided by the premise that medical and rehabilitation tourism should be understood not merely as a specialized segment of the tourism industry, but as a multidimensional system embedded in healthcare provision, social protection mechanisms, and sustainable development strategies. The conclusions presented below synthesize the key findings, articulate the scientific contribution of the study, and evaluate the extent to which the stated research goal and objectives have been achieved.

At the conceptual level, the research confirms that medical and rehabilitation tourism in Ukraine is undergoing a structural transformation driven by crisis-induced demand and systemic

constraints. Unlike pre-war development models that emphasized recreational and preventive functions, the current trajectory is increasingly oriented toward rehabilitation, long-term recovery, and social reintegration. This shift reflects broader changes in societal needs and highlights the growing interdependence between tourism infrastructure, healthcare systems, and public welfare policies. As demonstrated in the Results and interpreted in the Discussion, this transformation positions rehabilitation tourism as a strategic component of national recovery rather than a peripheral economic activity.

The study makes a substantive scientific contribution by integrating medical and rehabilitation tourism into the framework of sustainable development and post-conflict recovery. By combining economic, social, environmental, and institutional dimensions, the research advances a holistic perspective that extends existing tourism and healthcare literature. In doing so, it addresses a notable gap in prior studies, which often examined these domains in isolation or focused predominantly on market competitiveness without sufficient attention to rehabilitation needs arising from large-scale societal trauma.

From a practical standpoint, the conclusions underscore that the future viability of medical and rehabilitation tourism in Ukraine depends on coordinated, systemic interventions rather than fragmented reforms. The analysis demonstrates that infrastructural modernization, human capital development, institutional alignment, and digital transformation must be pursued concurrently to ensure sustainable outcomes. This integrated perspective enhances the applied relevance of the study for policymakers, healthcare administrators, tourism managers, and international partners involved in post-war reconstruction and development planning.

A critical element of this Conclusion is the explicit assessment of how the research goal has been achieved. The stated purpose of the study was to conduct a comprehensive analysis of medical and rehabilitation tourism in Ukraine, identify key constraints to its development, and substantiate promising directions for modernization as a factor of sustainable socio-economic recovery and human capital development. This goal has been achieved through a multi-level analytical approach that combined empirical data, comparative assessment, and conceptual synthesis. The research not only identified structural, institutional, and spatial limitations but also articulated a coherent vision for sectoral transformation aligned with post-war recovery priorities.

The first research objective—to analyze global trends in medical and rehabilitation tourism and assess their relevance for the Ukrainian context—was addressed through a comparative examination of international practices, innovation trends, and sustainability frameworks. The study demonstrated that global shifts toward personalization, digitalization, integrated care, and inclusive access are directly applicable to Ukraine's rehabilitation needs, albeit requiring contextual adaptation. This objective was fulfilled by situating Ukraine within broader global developments while acknowledging the unique constraints imposed by security risks and post-conflict conditions.

The second objective—to identify key socio-economic, infrastructural, and security-related factors influencing the development of medical and rehabilitation tourism in Ukraine—was achieved through an integrated assessment of wartime impacts, economic instability, institutional fragmentation, and regional disparities. The research confirmed that military conflict has acted as both a disruptive force and a catalyst for functional reorientation, intensifying demand for rehabilitation services while simultaneously undermining traditional tourism flows. This duality represents a central analytical finding that deepens understanding of crisis-driven sectoral transformation.

The third objective—to evaluate the current state and structural limitations of Ukrainian sanatorium and rehabilitation systems—was met through the analysis of infrastructural conditions, workforce availability, regulatory frameworks, and service capacity. The study revealed that many facilities remain constrained by outdated physical infrastructure, limited technological integration, and shortages of qualified personnel. These limitations are compounded by insufficient coordination between healthcare and tourism governance structures, reinforcing the need for systemic modernization rather than incremental improvements.

The fourth objective—to determine priority areas and mechanisms for modernization and innovation—was fulfilled by identifying functional reorientation, digital transformation, human capital investment, and institutional integration as core development directions. The Results demonstrated that tele-rehabilitation, digital patient management systems, energy-efficient infrastructure, and interdisciplinary training programs represent practical and scalable solutions. These mechanisms were further interpreted in the Discussion as enabling factors that can enhance resilience, accessibility, and service quality in the medium and long term.

The fifth objective—to substantiate the role of medical and rehabilitation tourism in post-war recovery and sustainable development strategies—was addressed by embedding the sector within a broader recovery ecosystem. The research established that rehabilitation tourism contributes not only to individual health outcomes but also to labor market recovery, regional revitalization, and social cohesion. This finding reinforces the argument that rehabilitation tourism should be incorporated into national development strategies alongside healthcare reform, social policy, and regional planning initiatives.

In synthesizing these results, the study demonstrates that the research objectives were addressed in a coherent and cumulative manner, each contributing to the realization of the overall research goal. The alignment between objectives, methods, results, and interpretations strengthens the internal consistency of the study and enhances its scientific credibility.

The conclusions also highlight several implications for future research. First, comparative studies examining post-conflict rehabilitation tourism models across different national contexts would deepen understanding of effective recovery strategies. Second, longitudinal analyses are needed to assess the long-term socio-economic and health impacts of rehabilitation tourism investments. Third, further research should explore the role of international cooperation, donor funding, and cross-border knowledge transfer in supporting sectoral modernization. These directions extend the analytical scope of the present study and open pathways for continued scholarly inquiry.

In closing, this research confirms that medical and rehabilitation tourism in Ukraine occupies a pivotal position at the intersection of health, social recovery, and sustainable development. By providing a comprehensive, system-oriented analysis and articulating clear modernization pathways, the study contributes both to academic discourse and to practical decision-making. The findings underscore that the successful transformation of rehabilitation tourism requires strategic vision, institutional coherence, and sustained investment in human and infrastructural capital. Under these conditions, medical and rehabilitation tourism can evolve into a resilient and socially significant sector, supporting Ukraine's post-war recovery and long-term development trajectory.

Conflict of Interest

The author declares that there is no conflict of interest.

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Appendix

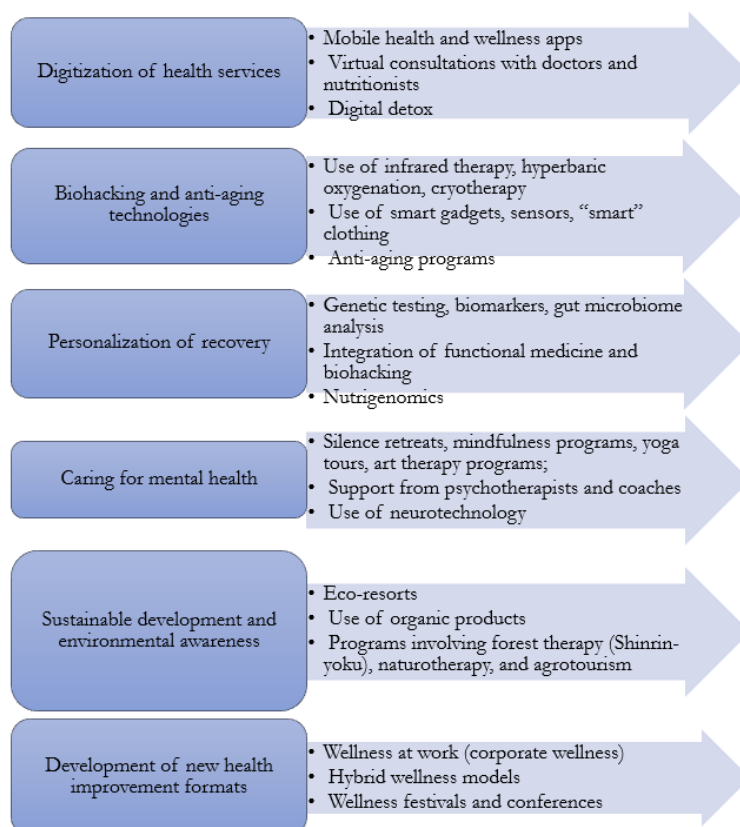


Figure 1. Innovations and trends in global medical and rehabilitation tourism

Source: compiled by the author

Table 1. Key modernization strategies and tools for their implementation (Source: compiled by the author)

No.	Strategy	Implementation tools	Expected effect
1	Regional health and rehabilitation clusters	Creation of cluster associations; medical partnerships; interregional rehabilitation routes	Comprehensive services, improved quality; international appeal
2	Infrastructure modernization	Building renovation; equipment upgrades; energy efficiency and renewable energy sources	Uninterrupted operation, increased comfort, reduced costs
3	Digitalization and tele-health	Electronic registration; telemedicine consultations; mobile applications	Time savings, continuity of rehabilitation, accessibility
4	International standards and accreditation	JCI-like protocols; ICF methodologies; quality control	Trust of foreign patients; possibility of insurance contracts
5	Human resources policy	Training centers; international training courses; personnel reserves	Improving the quality of rehabilitation and service
6	Marketing and promotion	Branding; participation in international exhibitions; diaspora campaigns	Shaping the country’s image as a rehabilitation hub
7	Public-private partnership	Co-financing; investment agreements; donor projects	Rapid modernization without excessive budgetary burden