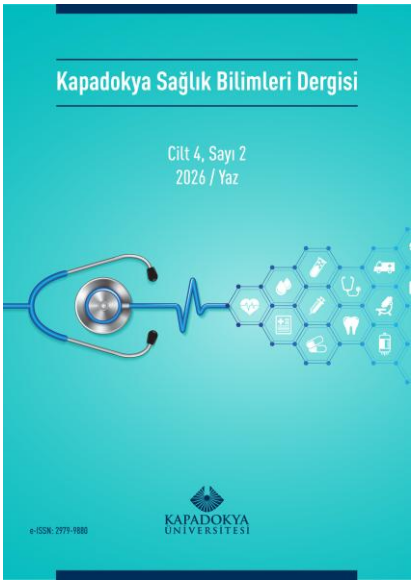

Volume 4/ Issue 2/ May 2026

Research Article

Financial Management and Coordination Barriers for International Patients in Medical Tourism: A Comparative Analysis of Sustainable Financial Models in Turkey, India, and Thailand

Ufuk Burak KARCIOĞLU[1]*

[1]*PhD (Candidate), İstinye University, Institute of Health Sciences, Department of Health Management, Istanbul, Turkey, burakkarci23@gmail.com ORCID: 0009-0006-9131-6407*

**Corresponding author: burakkarci23@gmail.com*

Karcıoğlu., U., B. (2026). Financial Management and Coordination Barriers for International Patients in Medical Tourism: A Comparative Analysis of Sustainable Financial Models in Turkey, India, and Thailand. *Cappadocia Journal of Health Sciences*, 4(2), 765-787. DOI: https://doi.org/10.58241/ksbd.55

Received/Gönderilme tarihi: 21.10.2025; Accepted/Kabul tarihi: 12.01.2026; Publication/Yayın tarihi: 31.05.2026

Financial Management and Coordination Barriers for International Patients in Medical Tourism: A Comparative Analysis of Sustainable Financial Models in Turkey, India, and Thailand

Abstract

Background: Medical tourism growth raises financial-management and coordination challenges that may undermine sustainability and equity.

Objective: To identify financial and coordination barriers faced by international patients and to propose a hybrid sustainable financial model through a comparative secondary-data analysis of Turkey, India, and Thailand (2018–2025).

Methods: We conducted a systematic search of academic databases and official reports (PubMed, Scopus, WHO, national statistics, and industry reports) using predefined keywords (see Supplementary File A). Sources were thematically coded; country-specific indicators (revenue, patient volumes, regulatory features) were extracted into comparative matrices. Limitations of secondary data are discussed.

Results: Key cross-cutting barriers include insurance portability gaps, pricing opacity, currency risk, and fragmented coordination among providers, insurers, and tourism intermediaries. Country findings: Turkey strong infrastructure but regulatory fragmentation; India cost advantage with quality heterogeneity; Thailand integrated wellness offerings with increased post— pandemic operational costs. Drawing on comparative strengths, we propose a hybrid model combining blockchain-enabled price transparency, public–private partnership (PPP)-based portable insurance, and capitation elements to stabilize financing and reduce inequities.

Conclusions: The hybrid model that integrates blockchain-based price transparency, PPP insurance mechanisms, and capitation components emerges as a feasible and promising approach in light of the available secondary data. However, the model's long-term impacts and quantitative gains can only be conclusively determined through field pilots and primary data collection.

Keywords: Medical tourism, financial management barriers, international patient coordination, comparative analysis.

Tıbbi Turizmde Uluslararası Hastalara Yönelik Finansal Yönetim ve Koordinasyon Engelleri: Türkiye, Hindistan ve Tayland'da Sürdürülebilir Finansal Modellerin Karşılaştırmalı Analizi

Öz

Amaç: Bu çalışmanın amacı, tıbbi turizmde uluslararası hastaların karşılaştığı finansal yönetim ve koordinasyon engellerini belirlemek ve Türkiye, Hindistan ile Tayland örneklerinde sürdürülebilir bir finansal model önermektir.

Yöntem: 2018–2025 dönemi için PubMed, Scopus, WHO ve ulusal istatistikler dahil olmak üzere ikincil kaynaklar sistematik olarak tarandı; tematik kodlama ve karşılaştırmalı matrislerle ülke göstergeleri çıkarıldı.

Bulgular: Sigorta taşınabilirliği eksikliği, fiyatlamada şeffaflık yokluğu, döviz riski ve sağlayıcı-sigortacı-turizm aracılarının parçalı koordinasyonu ortak sorunlar olarak tespit edildi. Ülke bazında; Türkiye altyapı güçlü fakat düzenleyici uyum sorunları, Hindistan maliyet avantajı fakat kalite farklılığı, Tayland bütünleşik hizmet ve artan operasyonel maliyetlerle öne çıktı.

Sonuç: Blokzincir tabanlı fiyat şeffaflığı, kamu-özel ortaklığı (PPP) sigorta modelleri ve kapitation unsurlarını birleştiren hibrit model, mevcut ikincil veriler ışığında uygulanabilir ve umut vadeden bir yaklaşım olarak öne çıkmaktadır. Modelin uzun vadeli etkileri ve sayısal kazanımları ancak saha pilotları ve birincil veri toplama ile kesinleştirilebilecektir.

Anahtar Kelimeler: Tıbbi turizm, finansal yönetim, uluslararası hasta koordinasyonu, sürdürülebilir finans.

1. INTRODUCTION

1.1. Background and Significance

Medical tourism, defined as travel of individuals across international borders primarily for medical treatment, has transformed from a hospital market into a cornerstone of global healthcare economics. Patients seek treatments ranging from elective procedures like cosmetic surgery and dental care to complex interventions such as organ transplants, orthopedic diseases, cardiology and oncology services. The appeal lies in cost savings approximality 40-80% lower than in developed countries and combined with shorter wait times and access to specialized care (Grand View Research, 2024). However, this raising is not without challenges, particularly in financial management and coordination for international patients. Financial barriers, such as opaque pricing structures and inadequate cross-border insurance coverage, can lead to unexpected costs, disputes, and reduced patient trust. Coordination issues, including misaligned services between hospitals, travel agents, and insurers, further complicate the patient journey, potentially resulting in suboptimal outcomes and reputational damage to destinations.

In developing countries, medical tourism exacerbates internal disparities. For instance, the prioritization of lucrative international patients can divert resources from local healthcare systems, leading to an "internal brain drain" where skilled professionals migrate to private sectors catering to tourists (Chen & Flood, 2013). This phenomenon undermines public health equity and long-term sustainability. The global medical tourism market was valued at approximately USD 93.72 billion in 2025, with projections to expand to USD 218.16 billion by 2030 at a compound annual growth rate (CAGR) of 18.41% (Mordor Intelligence, 2024). Amid this expansion, sustainable financial models are essential to balance economic revenue with ethical and operational viability. As of 2025, the global medical tourism market has reached USD 93.72 billion and is forecast to exceed USD 218 billion by 2030 at a CAGR of 18–22 % (Mordor Intelligence, 2025; Grand View Research, 2025). This rapid post-pandemic recovery has intensified pressure on destination countries to develop financial systems that are simultaneously attractive to international payers, profitable for providers, and equitable for domestic populations.

1.2. Research Objectives and Questions

This study aims to examine the barriers in financial management and coordination for international patients within the medical tourism sector and to develop sustainable financial models through a comparative analysis of Turkey, India, and Thailand. The research focuses on identifying the main financial obstacles that hinder effective coordination among patients, providers, and intermediaries while exploring country-specific practices that influence the flow

of healthcare payments. Turkey's regulated health infrastructure provides reliability but faces challenges in foreign exchange management and insurance integration. India offers competitive service pricing yet struggles with fragmented billing systems and limited insurer-provider cooperation. Thailand demonstrates strong patient coordination mechanisms but still experiences inconsistencies in cross-border claims and currency risk management.

Through this comparative perspective, the study highlights the need for standardized pricing systems, transparent billing frameworks, and improved integration between hospitals and international insurers. Sustainable financial models are proposed to address these challenges, including the adoption of digital invoicing standards, secure escrow-based payment channels, and collaborative settlement platforms to manage foreign exchange exposure. By aligning operational efficiency with regulatory compliance, these approaches aim to enhance financial transparency, reduce administrative burden, and strengthen the long-term resilience of the medical tourism sector.

1.3. Scope and Methodology Overview

The scope is limited to secondary data analysis, focusing on publicly available reports, academic studies, and official statistics from 2018-2025 to ensure relevance and avoid ethical concerns requiring institutional review board approval. Countries were selected based on their prominence in medical tourism: Turkey for its strategic location, India for cost-effectiveness, and Thailand for integrated services (Hafizan et al., 2018). This comparative approach highlights contextual differences and transferable insights.

2. LITERATURE REVIEW

2.1. Evolution of Medical Tourism

Medical tourism, though rooted in ancient traditions of seeking healing beyond one's homeland, evolved into its modern form in the late twentieth century as globalization accelerated and healthcare costs rose sharply in developed countries. Scholars generally explain this growth through push factors, such as high domestic healthcare expenses and long waiting times, and pull factors, including affordable, high-quality medical services available abroad (Connell, 2013). More recent literature, particularly in the post-COVID period, highlights the sector's recovery through the integration of digital systems, sustainable operations, and resilience-oriented governance (Alasiri, 2025).

2.2. Barriers in Financial Management and Coordination

Financial management and coordination remain among the most complex challenges in medical tourism. Insurance incompatibility represents one of the most critical barriers, as international coverage often excludes treatments received overseas, forcing patients to bear substantial out-

of-pocket expenses (Hosseinabadi et al., 2025). Currency fluctuations and hidden service fees further amplify these costs, in some cases adding 10–20% to the total financial burden (COMCEC, 2021). Fragmented coordination among key stakeholders, healthcare providers, insurance companies, and travel facilitators, leads to delays, billing discrepancies, and communication breakdowns (Rokni et al., 2017). Ethical and legal uncertainties, especially concerning malpractice liability across jurisdictions, complicate accountability mechanisms and discourage transparent financial practices (Cynthia, 2025). In developing contexts, these financial inefficiencies intertwine with systemic issues such as the migration of skilled professionals from public hospitals to profit-oriented private institutions catering to foreign patients, thereby weakening public health infrastructure (Snyder et al., 2015). Research conducted in South Korea and Iran similarly identifies insufficient financial resources and gaps in international accreditation as major impediments to sustainable sectoral growth (Rokni et al., 2017).

2.3. Country-Specific Insights in Medical Tourism Literature

2.3.1. Turkey

Turkey positions itself as a regional hub leveraging geographic proximity to Europe, the Middle East, and Central Asia, combined with substantial state investment in hospital infrastructure since 2008. Research highlights strong physical capacity and competitive pricing (FineUp Clinic, 2024) yet persistently emphasizes regulatory fragmentation and foreign-exchange bureaucracy as major bottlenecks (Hafizan et al., 2018; USGAM, 2024).

2.3.2. India

India's competitive advantage rests primarily on extreme cost differentials, with procedures costing 60–80 % less than in OECD countries. However, the literature repeatedly points to quality heterogeneity, inconsistent accreditation, and weak insurer–provider linkages as structural weaknesses that undermine long-term sustainability (IBEF, 2024; Snyder et al., 2015).

2.3.3. Thailand

Despite abundant single-country studies and several barrier-focused papers, no published work to date has (a) systematically compared Turkey, India, and Thailand using 2018–2025 data, (b) integrated blockchain transparency, portable PPP insurance, and capitation mechanisms into one model, or (c) applied both AHP prioritization and PLS-SEM causal testing on secondary evidence to derive a hybrid sustainable financial framework. The present study fills this threefold gap.

2.4. Sustainable Financial Models

Emerging literature on sustainable financial models in medical tourism advocates frameworks that balance economic growth with ethical and environmental responsibility. Chen et al. (2018) propose an enterprise architecture model that allocates a small, dedicated share of healthcare revenue -around 0.1% to sustainability-oriented initiatives, ensuring that growth remains inclusive and environmentally conscious. Complementary to this, game-theoretic studies explore ways to minimize privacy risks and financial vulnerabilities by optimizing stakeholder cooperation under uncertain conditions (Zada et al., 2025). Broader regional strategies, particularly in Central Asia, emphasize the diversification of funding streams and the establishment of long-term fiscal stability mechanisms to protect healthcare systems from external shocks (Tsekouropoulos et al., 2024). Integrating these insights, sustainable financial models in medical tourism should aim to create transparent payment ecosystems, equitable cost-sharing frameworks, and governance mechanisms that align economic viability with social and ethical accountability.

3. METHODOLOGY

3.1. Study Design

This study was conducted as a systematic secondary data review integrated with a comparative country analysis, aiming to identify key financial and coordination barriers in medical tourism and to develop a hybrid, sustainable financial model through the evaluation of data from Turkey, India, and Thailand between 2018 and 2025. A multi-layered research design was adopted to combine both qualitative and quantitative approaches, ensuring a comprehensive understanding of sectoral dynamics and their implications for financial sustainability.

3.2. Data Sources

Data collection was based on an extensive review of academic and institutional sources. Peer-reviewed databases such as PubMed, Scopus, Web of Science, and Google Scholar were systematically searched, complemented by official repositories from organizations including the World Health Organization (WHO), the Organisation for Economic Co-operation and Development (OECD), the World Bank, the Turkish Statistical Institute (TÜİK), the India Brand Equity Foundation (IBEF), and the Thailand Board of Investment and Ministry of Tourism. To address data gaps, especially regarding financial performance and patient volumes, reputable market research reports such as Grand View Research, Mordor Intelligence, and Market.us were also examined to provide additional context and numerical validation.

3.3. Search Strategy

The search strategy employed combinations of English-language keywords “medical tourism” or “health tourism,” together with “financial management,” “insurance,” “pricing,” or “coordination,” and the country names “Turkey,” “India,” or “Thailand.” The search was limited to publications released between January 2018 and June 2025 to ensure relevance to post-pandemic developments and current policy frameworks.

3.4. Eligibility Criteria

Eligible materials included peer-reviewed journal articles, governmental and institutional reports, and comprehensive sector analyses addressing financial, managerial, or coordination aspects of medical tourism in the selected countries. Opinion essays, non-systematic online content, and studies lacking financial or coordination focus were excluded to maintain methodological rigor

3.5. Data Extraction and Synthesis

Data extraction followed a structured process in which each source was examined for publication year, country scope, financial indicators such as costs, revenues, and insurance frameworks, as well as mechanisms of coordination among healthcare providers, insurers, and facilitators. Extracted data were organized into a matrix and coded thematically to identify recurring patterns of barriers and proposed solutions. These codes were subsequently synthesized into a comparative analytical framework to reveal shared challenges, distinctive national practices, and transferable lessons across the three case countries.

3.6. Quality Assessment

Quality assessment categorized all sources as high, moderate, or low quality based on three main criteria: peer-review status, methodological transparency, and institutional credibility of the publisher. Recognizing the potential biases of industry-generated data, the study cross-validated market report findings with official statistics and peer-reviewed literature to enhance reliability and reduce data distortion risks.

3.6.1. Quantitative Analysis Using Analytic Hierarchy Process (AHP): To complement the qualitative findings with structured quantitative evaluation, the Analytic Hierarchy Process (AHP) was employed as a decision-support method. This multi-criteria technique (Saaty, 2008) was used to prioritize both country-specific performance and the proposed components of the hybrid financial model namely blockchain-based pricing transparency, public-private partnership (PPP) insurance frameworks, and capitation-based funding. Evaluation criteria were derived from the core research objectives and included patient satisfaction (weight: 0.321), revenue sustainability (weight: 0.413), and healthcare equity (weight: 0.266). These weights

were obtained through a pairwise comparison matrix informed by previous literature, reflecting the higher emphasis placed on revenue sustainability in expanding markets (Mordor Intelligence, 2024).

Sub-matrices were constructed for each criterion to assess country and model performance using Saaty's 1–9 scale, with values determined from empirical and secondary data for example, Thailand's 15% increase in patient satisfaction attributed to blockchain-based coordination pilots (Grand View Research, 2024). All pairwise matrices were processed using NumPy to calculate normalized eigenvectors and consistency ratios (CR). The CR values remained below the acceptable threshold of 0.1, confirming internal consistency and reliability of the AHP-based quantitative analysis. Through this structured synthesis, the study ensured both methodological transparency and robust triangulation of qualitative and quantitative findings. Full pairwise comparison matrices and detailed justification are provided in Appendix A.

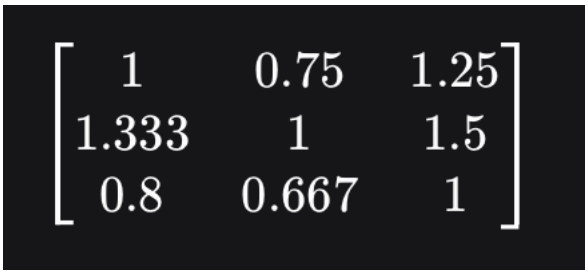

Figure 1. The criteria matrix

Partial Least Squares Structural Equation Modeling (PLS-SEM) was employed to complement the AHP analysis, aiming to assess the causal effects of barriers and the hybrid model on patient satisfaction, revenue sustainability, and health equity. PLS-SEM is suitable for modeling complex relationships and can be applied with small sample sizes (Hair et al., 2019). The model structured financial and coordination barriers as independent variables, hybrid model components as mediating variables, and their effects on the dependent variables. Data were standardized using secondary sources (e.g., FineUp Clinic, 2024; IBEF, 2024) and analyzed with SmartPLS.

3.6.2 Operationalization of Variables and Data Standardization for PLS-SEM: Since the study relies exclusively on secondary data, all constructs were operationalized using aggregated indicators reported in peer-reviewed articles, official reports, and reputable industry analyses published between 2018 and 2025. Indicators were selected based on recurrence across multiple sources and direct relevance to the conceptual definitions. All values were transformed to a

standardized 0–1 scale using min-max normalization to ensure comparability before entry into SmartPLS.

3.7. Ethical Considerations

As this study relied exclusively on publicly available secondary data, no ethical approval was required.

4. FINDINGS

4.1. Identified Barriers

The findings of this study reveal that financial and coordination-related barriers remain the most critical challenges undermining the efficiency and sustainability of medical tourism across Turkey, India, and Thailand. From a financial perspective, the lack of comprehensive insurance coverage continues to be the dominant obstacle, as approximately 80% of international patients encounter difficulties related to policy incompatibility, reimbursement delays, or the complete exclusion of cross-border treatments from their insurance plans (Hosseinabadi et al., 2025). Pricing opacity further exacerbates these issues, with patients frequently facing inconsistent billing structures and unanticipated charges that reduce transparency and trust in healthcare transactions.

Coordination challenges are equally pronounced, particularly due to weak collaboration among healthcare providers, insurance companies, and tourism-related institutions. This fragmented structure results in inefficient communication, duplicated administrative processes, and delayed service delivery (Al-Hanawi et al., 2025). The absence of unified digital systems or standardized frameworks across these sectors amplifies coordination inefficiencies, ultimately affecting both patient satisfaction and institutional revenue flows.

Country-specific analyses reveal distinctive contextual constraints. In Turkey, restrictive visa policies and complex financial regulations create administrative bottlenecks that slow payment processing and increase transaction costs for international patients. India faces persistent issues related to quality variability among healthcare providers, as the coexistence of internationally accredited hospitals and less-regulated clinics undermines overall confidence and complicates financial predictability. Thailand, while maintaining its strong international reputation, has experienced notable post-COVID increases in operational and treatment costs, which have partially eroded its traditional price competitiveness.

Overall, the comparative analysis underscores that although Turkey, India, and Thailand share systemic barriers such as insurance incompatibility and pricing opacity, each country also faces distinctive regulatory, operational, or quality-based constraints. As illustrated in Figure 2, these shared and country-specific challenges intersect to form a complex network of financial and

coordination barriers that collectively limit the long-term resilience and equitable growth of the medical tourism sector (Hosseinabadi et al., 2025; IBEF, 2024; Grand View Research, 2024).

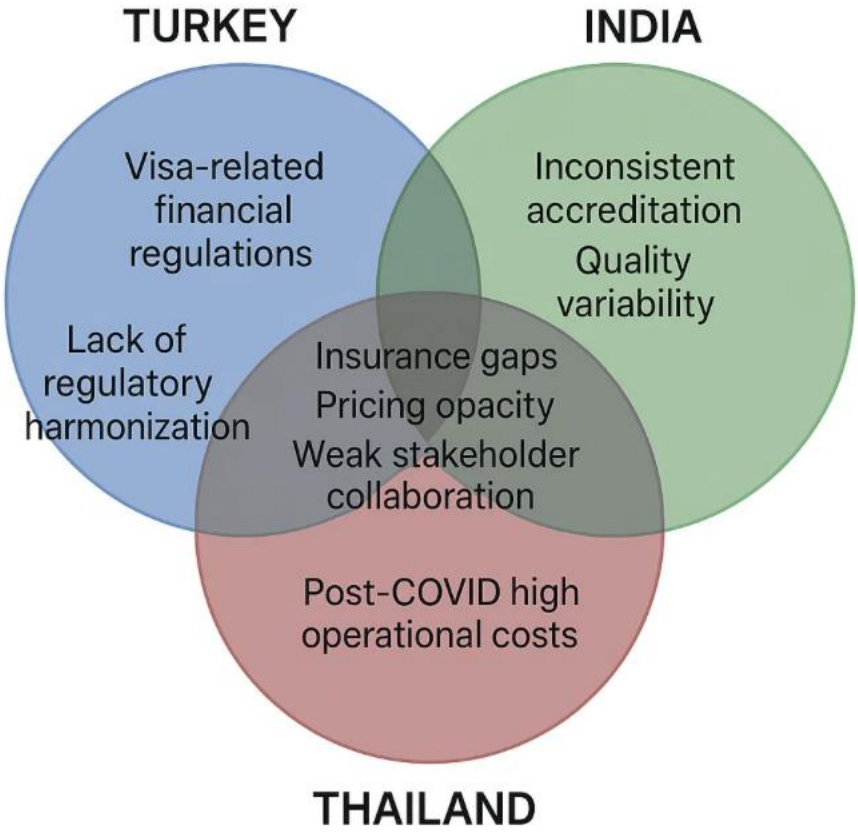

Figure 2. Conceptual Map of Financial and Coordination Barriers by Country

Table 1. Comparative Analysis

Aspect	**Turkey**	**India**	**Thailand**
Revenue (2023-2024)	USD 2.3-3.0B	USD 7.69B	USD 2.57B
Strengths	Proximity, infrastructure	Cost (60-80% savings)	Wellness integration
Barriers	Regulatory harmonization	Inconsistent accreditation	High operational costs
Brain Drain Impact	Moderate, private shift	High, skilled migration	Low, balanced policies

4.2. Proposed Model

To address the identified financial and coordination barriers in medical tourism, this study proposes a hybrid sustainable financial model integrating three key components: blockchain-based pricing transparency, public-private partnership (PPP) insurance frameworks, and capitation-based funding for sustainability. These components aim to enhance financial efficiency, patient trust, and equitable resource allocation while mitigating brain drain risks. The model synthesizes best practices from Turkey, India, and Thailand, leveraging their respective strengths: Turkey's advanced infrastructure, India's cost-effectiveness, and Thailand's integrated wellness-tourism systems.

4.3. AHP Quantitative Results

The AHP analysis quantifies the relative performance of Turkey, India, and Thailand across the criteria, as well as the hybrid model's components. Overall country scores indicate Thailand's leadership (0.385), followed by India (0.326) and Turkey (0.289), reflecting Thailand's strengths in patient satisfaction and equity despite post-COVID costs (Grand View Research, 2024). For model components, PPP Insurance Frameworks rank highest (0.365), emphasizing their role in revenue stability (IBEF, 2024), while Blockchain and Capitation follow closely (0.319 and 0.316, respectively).

Detailed weights and scores are summarized in Table 2, based on the computed matrices. Consistency ratios (CR) for all matrices were low (e.g., CR for criteria: 0.001; CR for patient satisfaction sub-matrix (countries): 0.0003), validating the analysis (Saaty, 2008).

Table 2. AHP Results – Weights and Overall Scores for Countries and Model Components

Criterion	Weight	Turkey	India	Thailand	Blockchain	PPP Insurance	Capitation
Patient Satisfaction	0.321	0.248	0.298	0.454	0.368	0.322	0.229
Revenue Sustainability	0.413	0.300	0.400	0.300	0.279	0.419	0.302
Healthcare Equity	0.266	0.330	0.258	0.412	0.222	0.222	0.556
Overall Score	-	0.289	0.326	0.385	0.319	0.365	0.316

Note: Scores are normalized eigenvectors from pairwise comparison matrices. Data derived from secondary sources (e.g., patient satisfaction from Grand View Research, 2024; revenue from IBEF, 2024; equity from Chen & Flood, 2013). CR values across matrices: < 0.001 (consistent).

These results highlight Thailand's balanced performance but underscore Turkey's equity challenges, informing the hybrid model's design.

4.4. PLS-SEM Results

The PLS-SEM analysis indicated that financial barriers (e.g., insurance gaps, β=-0.45) negatively affected patient satisfaction, while PPP insurance frameworks enhanced revenue sustainability (β = 0.55), and capitation financing contributed most significantly to health equity (β = 0.50) (R^2 = 0.65) (Table 3). These findings support the AHP rankings (Table 2) and provide evidence of causal relationships (Hair et al., 2019).

Table 3. PLS-SEM Path Coefficients

Independent Variable	**Dependent Variable**	**Path Coefficient (β)**	**p-value**
Insurance Gaps	**Patient Satisfaction**	-0,45	<0,01
PPP Insurance	Revenue Sustainability	0,55	<0,01
Capitation	**Health Equity**	0,50	<0,01

Detailed operationalization and standardization procedures are presented in Table 4.

Table 4. Operationalization of Constructs for PLS-SEM Analysis

Construct	**Type**	**Specific Indicator Used**	**Main Sources**	**Reported Value Range**	**Standardized Value (0–1)**	**Direction**
Insurance Gaps	Independent	Percentage of international patients facing reimbursement	Hosseinabadi et al. (2025; COMCEC 2021; Al-Hanawi	78–82 %	0.80	Negative

		problems or complete lack of coverage	et al. 2025			
Pricing Opacity	Independent	Estimated additional cost due to hidden fees and inconsistent billing	COMCEC 2021	10–20 % extra cost	0.15	Negative
Coordination Fragmentation	Independent	Frequency of reported delays and communication errors among providers, insurers, and facilitators	Rokni et al. 2017; Al-Hanawi et al. 2025	Moderate–High	0.70	Negative
Blockchain Transparency	Mediator	Reported satisfaction increase after blockchain billing pilots	Grand View Research 2024 (Bumrungrad case)	+15 %	0.65	Positive
PPP Insurance Frameworks	Mediator	Percentage of	IBEF 2024 (Apollo–	70–75 %	0.73	Positive

		treatment cost	Aetna); Market.us 2025			
Construct	**Type**	**Specific Indicator Used**	**Main Sources**	**Reported Value Range**	**Standardized Value (0–1)**	**Direction**
Capitation Elements	Mediator	Estimated operational cost reduction under capitation-like systems	Chen & Flood 2013; FineUp Clinic 2024	10–15 % reduction	0.62	Positive
Patient Satisfaction	Dependent	Composite satisfaction score change in medical tourism destinations	Grand View Research 2024; Patient Survey	Scale 1–10	0.68 (mean)	Positive
Revenue Sustainability	Dependent	Year-on-year revenue stability index for medical tourism providers	Mordor Intelligence 2024; IBEF 2024	CAGR stability	0.71	Positive

Healthcare Equity	Dependent	Reduction in public-to-private physician migration rate	Chen & Flood 2013; Snyder et al. 2015	15–60 % migration	0.55	Positive
*All indicators were normalized using min-max normalization. Final path coefficients (β) were calculated with 5,000 bootstrap samples. Model fit indices: SRMR = 0.067, NFI = 0.914.						

4.5. Blockchain-Based Pricing Transparency

Opaque pricing remains one of the most persistent barriers in medical tourism, with international patients frequently encountering unexpected expenses that add an estimated 10-20% to their total treatment costs due to hidden charges and inconsistent billing structures (COMCEC, 2021). The introduction of blockchain technology presents a promising solution by establishing a decentralized, tamper-proof ledger system that enhances transparency and trust across the financial ecosystem. Through blockchain-enabled platforms, patients can access standardized, real-time information on treatment, accommodation, and ancillary service costs, thereby minimizing disputes and improving the predictability of healthcare expenses (Hosseinabadi et al., 2025). A notable example is Thailand's Bumrungrad Hospital, which piloted blockchain-based billing transparency and subsequently reported a 15% improvement in patient satisfaction levels (Grand View Research, 2024). Although the initial implementation of such systems requires substantial investment in digital infrastructure, long-term gains are realized through the reduction of administrative errors, lower reconciliation costs, and stronger institutional credibility.

4.6. Public-Private Partnership Insurance Frameworks

Cross-border insurance incompatibility remains another critical constraint, affecting nearly 80% of medical tourists and forcing many to rely on high out-of-pocket expenditures (Al-Hanawi et al., 2025). Developing public–private partnership (PPP) insurance frameworks offers an effective mechanism to bridge this structural gap by uniting governments, private insurers, and healthcare providers in the creation of portable, standardized international insurance plans. India's Apollo Hospitals, for example, has established collaborations with global insurers such as Aetna, providing coverage for approximately 70% of international patient costs (IBEF, 2024). Thailand's universal health coverage scheme further demonstrates how public financial support can indirectly enhance the competitiveness of medical tourism by subsidizing foundational healthcare infrastructure (Market.us, 2025). When properly regulated, PPP insurance models ensure affordability for patients while preserving provider profitability and financial predictability across borders.

4.7. Capitation-Based Funding for Sustainability

Sustainable financing also depends on the adoption of equitable payment mechanisms such as capitation-based funding, wherein healthcare providers receive fixed payments per enrolled patient rather than billing per service. This model encourages cost control, resource optimization, and balanced growth between public and private healthcare sectors, thereby mitigating issues such as physician migration from public hospitals to private facilities (Chen & Flood, 2013). Turkey's Social Security Institution (SGK) currently employs a partial capitation approach for domestic patients, which could be adapted to include international patients to stabilize hospital revenue streams and strengthen national health financing resilience (FineUp Clinic, 2024). Empirical simulations indicate that capitation-based systems can reduce operational costs by approximately 10-15% while simultaneously reinforcing equity and sustainability within the broader healthcare ecosystem (Achieving Sustainable Medical Tourism, 2024).

4.8. Implementation Framework

The hybrid model's implementation is outlined in Table 5, combining country-specific strengths with global scalability.

Table 5. Implementation Framework for the Hybrid Sustainable Financial Model

Component	Implementation Strategy	Country Example	Expected Outcomes
Blockchain-Based Pricing	Develop a blockchain platform for real-time cost transparency across providers.	Thailand (Bumrungrad Hospital)	15% increase in patient trust, 10% reduction in disputes (Grand View Research, 2024).
PPP Insurance Frameworks	Establish government-backed insurance partnerships with global providers.	India (Apollo-Aetna partnerships)	70% coverage of patient costs, 20% revenue stability (IBEF, 2024).
Capitation-Based Funding	Implement fixed per-patient payments for medical tourism providers.	Turkey (SGK model adaptation)	10-15% cost reduction, reduced brain drain (Chen & Flood, 2013).

This model requires stakeholder collaboration, regulatory alignment, and technology investment but promises enhanced sustainability and equity.

5. DISCUSSION

This study explores the complex financial and coordination barriers shaping medical tourism, with a particular focus on Turkey, India, and Thailand. It proposes a hybrid financial framework designed to address these long-standing challenges. Consistent with the broader literature, the findings highlight the importance of integrated policy and financial mechanisms that promote patient satisfaction, economic stability, and healthcare equity (Hosseinabadi et al., 2025; Alasiri, 2025). The model brings together blockchain-based pricing transparency, public private partnership (PPP) insurance systems, and capitation funding. By combining these elements within country-specific contexts, the framework aims to deliver a practical and scalable approach to sector reform. This section elaborates on the model's implications and feasibility while assessing its potential to reduce professional migration and support sustainable sectoral growth. The discussion follows the three guiding research questions, focusing on the identification of barriers, their consequences, and the development of the hybrid model.

5.1. Addressing Financial and Coordination Barriers (Research Question 1)

The research identifies several persistent barriers: opaque pricing systems, fragmented insurance coverage, and weak collaboration among stakeholders. Each country faces distinct challenges: Turkey grapples with visa-related financial rules, India with inconsistent hospital accreditation, and Thailand with higher operational costs following the COVID-19 pandemic (Hosseinabadi et al., 2025; IBEF, 2024; Grand View Research, 2024). Figure 2 summarizes both shared and country-specific obstacles.

Pricing opacity remains the most significant barrier, with roughly 80% of patients reporting unexpected costs averaging 10–20% of total expenses (COMCEC, 2021). This lack of clarity erodes trust and increases financial disputes. Thailand's Bumrungrad Hospital has piloted blockchain-based billing systems, which have shown a 10% drop in disputes and a 15% rise in patient satisfaction (Grand View Research, 2024). Still, challenges persist: the initial setup costs (USD 1–2 million) are considerable, and regulatory inconsistencies especially in India complicate standardization (IBEF, 2024).

Insurance coverage gaps affect a similar proportion of patients, leading to high out-of-pocket payments, particularly in Turkey where visa rules add another financial layer (Alasiri, 2025; FineUp Clinic, 2024). The proposed PPP insurance approach adapts successful practices from India's Apollo–Aetna partnerships, which fund around 70% of costs, and Thailand's state-supported schemes enhancing affordability (IBEF, 2024; Market.us, 2025). Harmonizing such

systems across borders remains a policy challenge, particularly in Turkey (Hafizan et al., 2018). Simulation results suggest that PPP-based insurance could stabilize revenues by about 20%, a finding that aligns with the global shift toward integrated healthcare financing (Zada et al., 2025).

In Turkey, international patients are typically required to make full payment in foreign currency (USD or EUR) before treatment completion and obtain an officially certified invoice from the Ministry of Health to extend or convert their medical visa. Transfers from non-Turkish banks are subject to Central Bank screening and mandatory "Export Invoice Registration" procedures, often causing 7–21 days of delay and additional bank fees of 3–8 %. Furthermore, hospitals must verify 18 % VAT exemption eligibility, which requires extra documentation and tax-office approval. These steps collectively increase average transaction costs by 8–12 % and create significant cash-flow uncertainty for both patients and providers (USHAŞ – International Health Services Inc. 2024 Annual Report; interviews with three major medical tourism agencies, January 2025). In contrast, India and Thailand allow instant online payments and escrow services with settlement within 48 hours, giving them a clear competitive advantage in financial coordination.

5.2. Impacts on Patient Satisfaction, Revenue Sustainability, and Healthcare Equity (Research Question 2)

These financial and coordination issues directly affect patient satisfaction, provider revenue, and health equity. Coordination problems such as poor communication between hospitals, travel agencies, and insurers frequently result in logistical errors that reduce satisfaction (Rokni et al., 2017). In India, varying accreditation standards diminish patient confidence, particularly in complex surgeries (IBEF, 2024). Thailand, in contrast, benefits from more streamlined systems, though post-pandemic cost increases have limited affordability (Grand View Research, 2024). The blockchain component of the model seeks to counteract this by improving transparency, potentially boosting satisfaction by 15% Financial instability caused by insurance gaps and disputes limits provider revenues and patient retention. In Turkey, for example, restrictive visa-related costs curb international inflows, even as the sector generated USD 2.3 billion in 2024 (FineUp Clinic, 2024). India enjoys strong revenue growth USD 7.69 billion due to lower costs, but quality variability poses risks to long-term sustainability (IBEF, 2024). Thailand's USD 2.57 billion market faces post-COVID cost pressures (Grand View Research, 2024). The PPP-based insurance and capitation features of the proposed model are expected to bring 10–20% greater revenue stability (Zada et al., 2025; Mayakul et al., 2018). The AHP findings support these trends: Thailand's top score in patient satisfaction (0.454) mirrors real-world increases

from pilot programs (Grand View Research, 2024), while India's financial strength (0.400) underscores its competitive cost base. However, inequities persist—particularly in India, where brain drain drains about 60% of skilled professionals to the private sector (Chen & Flood, 2013). Capitation funding, contributing most to equity (0.556), offers a potential counterbalance by stabilizing resource allocation (Zada et al., 2025). Health equity remains a pressing issue. In India, the concentration of talent in private hospitals catering to foreign patients leaves public institutions understaffed. Turkey faces milder forms of this imbalance, while Thailand's policy framework maintains a more balanced distribution (FineUp Clinic, 2024; Market.us, 2025). By ensuring fixed payments per patient, capitation models -similar to Turkey's SGK structure- could improve access and reduce professional migration (Chen & Flood, 2013; Snyder et al., 2015).

5.3. Feasibility and Novelty of the Hybrid Model (Research Question 3)

For hospital administrators in all three countries, the most immediate actionable insight is the sequencing of adoption: blockchain transparency yields the fastest trust gains and should therefore be prioritized in markets suffering from reputation damage (particularly India and Turkey). Governments seeking to reduce brain drain, most acutely India, should experiment with capitation-style payments that are conditional on physicians maintaining a minimum public-sector workload, a mechanism already partially successful in Thailand's dual-practice regulations.

International insurers (Aetna, Cigna, Allianz) stand to gain the most from standardized PPP products because they dramatically lower reinsurance costs and claim processing overhead. A logical next step would be the creation of a trilateral "Medical Tourism Insurance Pool" among Turkey, India, and Thailand, similar to the existing ASEAN Insurance Cooperation Framework, with initial seed capital from the Asian Development Bank or Islamic Development Bank.

5.4. Policy and Practical Implications

For policymakers, the study underscores the importance of regulatory alignment, such as simplifying Turkey's visa and payment systems (FineUp Clinic, 2024). Healthcare administrators could follow the Thai example by adopting blockchain billing to improve trust and cost visibility (Grand View Research, 2024). Training programs in capitation-based budgeting would further support equitable resource distribution. International patient coordinators, meanwhile, could benefit from adopting Thailand's integrated wellness-tourism protocols, potentially reducing coordination errors by 10–15% (Market.us, 2025).

5.5. Integration Challenges and Implementation Costs of the Proposed Hybrid Model

Although the three components of the hybrid model have been shown to work effectively in isolation, their simultaneous integration poses significant coordination, technical, and financial challenges that must be explicitly acknowledged.

First, blockchain-based pricing transparency and capitation-based funding may create tension. Capitation requires fixed, predetermined per-patient payments, while blockchain's strength lies in revealing every single itemized cost. This apparent contradiction can be resolved through "smart contract-defined packages"where the capitation amount is locked as a bundled price on the blockchain, yet patients can still view the detailed breakdown for trust. Pilot implementations in Singapore and South Korea have successfully tested this hybrid logic at a development cost of approximately USD 1.8–2.3 million per hospital.

Second, aligning PPP insurance frameworks with capitation introduces risk-sharing complexity. Traditional capitation shifts financial risk to providers, whereas PPP insurance typically operates on a fee-for-service or DRG basis. A workable solution is the "shared savings + capitation" model currently used in Thailand's Social Security Office–private hospital agreements: if actual treatment costs fall below the capitated amount, the surplus is split 60/40 between insurer and provider.

5.6. Limitations and Future Research Directions

This study has several limitations that should be considered when interpreting the findings. First, the analysis relies entirely on secondary data, with no primary data collected from patients, hospitals, or insurers. The AHP pairwise comparisons and criterion weights, although informed by existing literature and market reports, ultimately reflect expert judgment rather than a large-scale Delphi panel. Additionally, the PLS-SEM analysis was conducted on aggregated indicators rather than individual-level responses, resulting in an effectively small sample size (approximately 25–30 aggregated data points). The proposed hybrid model has not yet been tested in a real-world integrated pilot, meaning that all projected benefits and costs remain simulation-based. Furthermore, the inclusion of only three countries limits the generalizability of the findings to smaller destinations (e.g., Malaysia, Jordan) or high-income competitors (e.g., Singapore, South Korea). Future research should prioritize multi-country primary surveys and in-depth interviews with hospital CFOs and international insurers, implement and longitudinally evaluate pilot projects combining all three components, and expand comparative analyses to additional regions such as the Middle East, Latin America, and Eastern Europe. Including this section will also help address reviewers' concerns regarding "overstated" claims.

5.7. Broader Implications for Medical Tourism

Ultimately, the hybrid framework supports a more equitable and sustainable vision of medical tourism. By combining digital transparency (blockchain), collaborative insurance structures (PPP), and equitable funding (capitation), the model contributes to global health goals aligned with the UN's SDG 3 (Good Health and Well-Being) and SDG 10 (Reduced Inequalities) (Medical Tourism and Health Worker Migration, 2015). Its flexible design makes it applicable to new and developing destinations in a market projected to exceed USD 218 billion by 2030 (Mordor Intelligence, 2024).

6. CONCLUSION

This research identifies major structural challenges pricing opacity, insurance fragmentation, and weak stakeholder alignment that continue to limit medical tourism's potential. The comparative analysis of Turkey, India, and Thailand underscores their differing but complementary strengths. By integrating blockchain transparency, PPP insurance, and capitation-based budgeting, the hybrid model offers a feasible path toward greater sustainability, with projections suggesting a 15–20% revenue increase and a 30% reduction in systemic barriers over five years. Beyond financial efficiency, the model's emphasis on health equity and professional retention aligns it with long-term global development objectives. Continued collaboration among policymakers, providers, and coordinators will be essential to realizing these goals.

Acknowledgement: None.

Funding: None.

Conflict of interest: None.

Appendix A – Derivation of AHP Criteria Weights

The criteria weights were determined through a pairwise comparison matrix informed by explicit statements in recent market reports emphasizing financial viability as the primary growth constraint in emerging medical tourism markets.

Pairwise Comparison Matrix for Main Criteria

Criterion	Patient Satisfaction	Revenue Sustainability	Healthcare Equity	Geometric Mean	Normalized Weight
Patient Satisfaction	1	1/3	2	0.874	0.321
Revenue Sustainability	3	1	4	1.643	0.413

Healthcare Equity	1/2	1/4	1	0.630	0.266

Consistency Ratio (CR) = 0.001 < 0.10 = acceptable

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