

SOCIOECONOMIC DRIVERS OF INTERNATIONAL TOURISM: EVIDENCE FROM PANEL GMM WITH MEDIATING FDI AND GOVERNANCE EFFECTS

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Abstract

This study examines how key socioeconomic factors influence international tourism by investigating the roles of Information and Communication Technology (ICT), public spending, financial development, and trade openness, while incorporating Foreign Direct Investment (FDI) as a mediating mechanism and control of corruption as a moderating institutional factor. Despite extensive research on tourism determinants, limited empirical evidence jointly evaluates mediation and moderation effects within a dynamic cross-country framework. Using panel data from 50 countries spanning 2000–2022 and sourced from the World Development Indicators, the study employs a comprehensive econometric strategy including panel regression techniques, diagnostic testing, cointegration analysis, and the Arellano–Bond Generalized Method of Moments (GMM) estimator to address endogeneity and dynamic persistence. The findings reveal that financial development consistently promotes international tourism, whereas ICT, public spending, and trade openness exhibit unexpected negative associations in baseline models. FDI demonstrates a significant mediating effect but is negatively associated with tourism outcomes, suggesting that aggregate investment inflows do not automatically benefit the tourism sector. Importantly, governance quality plays a conditional role: control of corruption significantly moderates the impacts of ICT and public spending, transforming public expenditure into a positive driver of tourism under stronger institutional environments. The strong persistence of tourism receipts highlights the dynamic nature of tourism development across countries. These results underscore the importance of institutional quality in determining whether economic and technological progress translates into tourism growth. The study contributes to tourism economics by integrating mediation and moderation mechanisms within a dynamic panel framework and offers policy insights emphasizing governance reform, targeted investment strategies, and effective allocation of public resources to support sustainable tourism development.

Keywords: *International Tourism, ICT, Public Spending, Financial Development, Trade Openness, Control of Corruption, FDI, Socioeconomic Factors, Panel Data, GMM.*

1. Introduction

1.1 Background of the Study

International tourism has emerged as one of the most influential drivers of global economic growth and development in the twenty-first century (Smith, 2019). The World Tourism Organization reports that international tourist arrivals reached approximately 1.5 billion worldwide in 2019, highlighting the sector's expanding scale and economic significance (UNWTO, 2020). Beyond its direct contribution to gross domestic product (GDP), international tourism promotes employment generation, infrastructure development, cultural exchange, and cross-border economic integration. For many economies particularly developing countries and small island states—the tourism sector represents a strategic pillar for economic diversification and foreign-exchange earnings (WTTC, 2021). Its capacity to generate employment across multiple skill levels, ranging from hospitality and transportation to creative and heritage industries, makes tourism a uniquely inclusive mechanism for economic development.

While traditional determinants such as natural attractions, historical heritage, and cultural resources remain fundamental to tourism competitiveness, contemporary tourism performance is increasingly shaped by broader socioeconomic and institutional conditions (Hall, 2013). Rapid globalization, digital transformation, and evolving governance structures have altered how destinations attract and sustain international visitors. Technological readiness, government expenditure patterns, financial system development, trade integration, and institutional quality now play critical roles in shaping tourism outcomes. Understanding the interaction among these factors has therefore become essential for policymakers seeking to strengthen tourism competitiveness within an increasingly interconnected global economy.

This study examines the relationship between international tourism and four key socioeconomic determinants: Information and Communication Technology (ICT) (Huang & Lee, 2018), public spending (Saiz, 2020), financial development (Beck et al., 2017), and trade openness (Gössling et al., 2019). In addition to analyzing direct effects, the study incorporates Foreign Direct Investment (FDI) as a mediating mechanism (Li & Song, 2021) and control of corruption as a moderating institutional factor (Andvig & Moene, 1990). By integrating these mechanisms into a unified framework, the research aims to provide a deeper understanding of how economic, technological, and governance factors jointly influence tourism development and policy effectiveness (UNWTO, 2020).

ICT has fundamentally transformed tourism operations by enabling online booking systems, real-time information exchange, digital marketing, and personalized travel experiences (Buhalis & Law, 2008). As travelers increasingly rely on digital platforms throughout the travel lifecycle—from planning and purchasing to experience sharing—the availability and quality of ICT infrastructure significantly influence destination competitiveness. Similarly, public spending on infrastructure, education, transportation, and healthcare enhances a destination's accessibility and service capacity. Financial development facilitates tourism growth by improving access to credit, mobilizing investment capital, and supporting entrepreneurship within tourism-related industries (Javorcik & Wei, 2002). Trade openness further strengthens international connectivity by encouraging cross-border economic integration and improving access to goods and services demanded by international visitors (Becken et al., 2020).

However, the relationships between these factors and tourism development are neither linear nor universally positive. Institutional quality, particularly corruption control, plays a critical role in shaping economic outcomes. Corruption has long been identified as a barrier to development by increasing uncertainty, reducing investment efficiency, and undermining public trust (Mauro, 1995). Within the tourism context, corruption may deter both tourists and investors by weakening perceptions of safety, reliability, and regulatory transparency. At the same time, FDI serves a dual function: it can stimulate tourism development through capital inflows, managerial expertise, and international standards, while successful tourism growth can itself attract additional foreign investment (Jordaan & Sarakinioti, 2017). These interdependencies suggest that FDI may act as a transmission channel through which broader socioeconomic factors influence tourism performance.

Despite extensive research examining individual determinants of tourism, existing studies largely analyze these variables independently or treat institutional and investment factors as direct predictors rather than interactive mechanisms. Consequently, limited empirical evidence exists on how FDI mediates and how corruption control moderates the relationships between socioeconomic drivers and international tourism outcomes. Addressing this gap is important for understanding why similar economic policies generate different tourism outcomes across countries.

This study responds to this limitation by employing advanced panel data econometric techniques to examine both mediating and moderating relationships simultaneously across a diverse panel of 50 countries over the period 2000–2022. By integrating dynamic modeling approaches with institutional analysis, the research contributes to a more comprehensive understanding of tourism development processes in a global context.

1.2 Research Objectives

Based on the identified gaps in the literature, this study pursues the following objectives:

1. To examine the direct impacts of ICT, public spending, financial development, and trade openness on international tourism across 50 countries from 2000 to 2022.
2. To analyze the mediating role of Foreign Direct Investment (FDI) in the relationship between socioeconomic factors and international tourism.
3. To investigate the moderating role of control of corruption in shaping the effects of ICT, public spending, financial development, and trade openness on tourism outcomes.
4. To provide an integrated understanding of how investment dynamics and governance quality jointly influence tourism development.

1.3 Problem Statement

Although a growing body of literature investigates determinants of international tourism, a significant gap remains regarding the simultaneous examination of mediation and moderation mechanisms within a unified empirical framework. Most studies focus on direct causal relationships, overlooking the possibility that socioeconomic variables influence tourism indirectly through investment channels or conditionally through institutional quality. As a result, the mechanisms through which ICT development, public expenditure, financial systems, and trade integration translate into tourism performance remain insufficiently understood. This study therefore seeks to clarify the mediating role of FDI and the moderating role of corruption control in shaping the relationships between key socioeconomic variables and international tourism.

1.4 Research Questions

The study addresses the following research questions:

1. How do ICT, public spending, financial development, and trade openness directly influence international tourism growth?
2. Does FDI mediate the relationship between socioeconomic factors and international tourism outcomes?
3. How does control of corruption moderate the effects of socioeconomic variables on tourism performance?

1.5 Rationale and Scope of the Study

The rationale for this research lies in the growing need for evidence-based policy insights capable of guiding tourism development strategies in diverse economic contexts. Many countries invest heavily in digital infrastructure, public services, and trade liberalization without fully understanding how governance quality and investment flows shape tourism outcomes. By examining these interactions, the study aims to provide policymakers and stakeholders with clearer guidance on designing effective tourism-supporting policies.

Geographically, the study covers a diverse sample of 50 countries representing different development stages and institutional environments. Temporally, the analysis spans 2000–2022, capturing major global economic cycles, including periods of tourism expansion, the global financial crisis, and the early effects of the COVID-19 pandemic. Sectorally, the research considers the broader tourism ecosystem, including hospitality, transportation, attractions, and supporting services. Through this comprehensive scope, the study seeks to generate insights applicable across local, national, and international policy contexts.

2. Literature Review

2.1 Theoretical Framework

This study draws upon multiple complementary theoretical perspectives to explain the complex relationships between socioeconomic factors and international tourism development. First, the Tourism Area Life Cycle (TALC) model proposed by Butler (1980) provides a foundational framework for understanding how tourism destinations evolve over time and how economic, technological, and institutional factors vary in importance across different stages of development. The model suggests that tourism growth is dynamic and influenced by both internal and external forces, making it suitable for cross-country empirical analysis.

Second, endogenous growth theory emphasizes the role of innovation, knowledge accumulation, and technological advancement in sustaining long-term economic growth (Romer, 1990). Investments in Information and Communication Technology (ICT), human capital, and innovation enhance productivity and connectivity, thereby stimulating tourism demand through improved accessibility, information dissemination, and service efficiency.

Third, institutional theory highlights the importance of governance quality in shaping economic performance. North (1990) argues that strong institutions reduce uncertainty, lower transaction costs, and foster investment by creating predictable economic environments. Within the tourism context, effective corruption control enhances investor confidence, improves resource allocation, and strengthens destination competitiveness.

Finally, Dunning's eclectic paradigm (Dunning, 1988) explains the determinants of Foreign Direct Investment (FDI) through ownership, location, and internalization advantages. Tourism-related investments are particularly sensitive to institutional quality and market openness, making FDI a

critical transmission channel through which economic and governance factors influence tourism outcomes. By integrating these theoretical perspectives, this study develops a comprehensive framework linking technology, economic policy, institutional quality, and international tourism performance.

2.2 ICT and International Tourism

The role of Information and Communication Technology (ICT) in transforming international tourism has been widely documented in both theoretical and empirical literature. ICT enhances destination visibility, improves operational efficiency, and facilitates real-time interaction between tourists and service providers. Studies by Adeola & Evans (2020), Bethapudi (2013), and Leung & Loo (2022) collectively demonstrate that digital technologies reshape tourism markets by reducing information asymmetry and transaction costs while expanding global market access.

Adeola & Evans (2020) highlight how mobile technologies and internet penetration have fundamentally altered travel behavior, enabling destinations to directly market tourism products and reducing reliance on traditional intermediaries. ICT platforms allow travelers to search, compare, book, and review services seamlessly, thereby improving consumer decision-making and increasing tourism demand. Similarly, ICT integration enables customers to order, track, pay, communicate, and provide feedback through unified digital systems, making tourism services more responsive and cost-efficient.

Empirical evidence further supports the demand-enhancing role of ICT. Kumar et al. (2019), using an Autoregressive Distributed Lag (ARDL) framework, show that the expansion of mobile networks significantly increases tourist arrivals by strengthening communication infrastructure and market connectivity. From a supply-side perspective, ICT applications improve coordination among tourism stakeholders. Leung & Loo (2022) emphasize the integration of management systems such as table management systems (TMS) and restaurant management systems (RMS), which enhance operational efficiency and customer experience.

Moreover, Moreno-Izquierdo et al. (2019) demonstrate that service standardization enabled by ICT improves operational performance and contributes to positive destination reputation. Bethapudi (2013) further argues that ICT fosters innovation in tourism product design by enabling rapid customer feedback, strengthening brand visibility, lowering operational costs, and improving post-service engagement.

Despite these advantages, the effectiveness of ICT adoption depends on several contextual factors. Digital skill availability within the workforce (Rondović et al., 2019), market characteristics and institutional environments (Qin et al., 2011; Lee et al., 2021; Bramwell & Sharman, 1999), and technological absorption capacity influence how successfully ICT investments translate into tourism growth. These findings suggest that ICT alone may not guarantee positive tourism outcomes unless supported by favorable institutional and economic conditions.

2.3 Public Spending and International Tourism

The intersection of public spending, particularly in transport infrastructure, and international tourism development has gained substantial research attention due to their pivotal roles in fostering sustainable economic growth. Scholars emphasize the need for socially responsible improvements that generate economic benefits while respecting environmental considerations (Vochozka et al., 2016; Belas et al., 2018; Belas, Amoah, et al., 2020; Belas, Gavurova, et al., 2020). Transportation infrastructure is identified as a key determinant of tourism competitiveness, playing a vital role in

facilitating tourist activities and ensuring their effective implementation (Costea et al., 2017; Khadaroo & Seetanah, 2008).

Studies, such as those conducted by Zhang & Zhang (2022) and Khadaroo & Seetanah (2007), confirm bidirectional causality between highways and tourism, highlighting the interconnectedness of these elements. The accessibility of a protected and efficient transport network to major tourist centers is crucial for tourism development (Costea et al., 2017). However, there remains a research gap concerning the nexus between road transportation infrastructure and tourism demand, specifically in terms of visitors' spending patterns.

The effect of infrastructure investments in the tourism industry on attracting foreign tourists is just one example of the diverse research viewpoints. Nguyen (2021) documents the correlations between transport network development and increased tourist traffic (Wendt et al., 2021). The crucial role of tourism spending as an indicator for measuring tourism development is emphasized, capturing both the attractiveness of a country and the economic impact of tourists' consumption (Brida & Scuderi, 2013; García-Sánchez et al., 2013; Usmani et al., 2021).

Public spending plays a crucial role in shaping and promoting international tourism, significantly influencing the infrastructure, services, and overall appeal of a destination. Government expenditures in various areas such as infrastructure development, tourism promotion, safety and security, and cultural preservation can have far-reaching effects on the tourism industry. Adequate infrastructure is essential for a thriving tourism industry, as it provides the necessary facilities and services that tourists rely on. Government investments in transportation infrastructure, such as airports, seaports, highways, and public transit systems, are critical for ensuring ease of access to tourist destinations. Well-maintained roads, efficient public transport, and modern airports facilitate smooth travel experiences, making a destination more appealing to international visitors. For instance, countries like Japan and Singapore, known for their excellent infrastructure, consistently rank high in terms of tourist arrivals.

Public spending on tourism-specific infrastructure, such as convention centers, and recreational facilities, also plays a significant role. By investing in these amenities, governments can attract international conferences, sporting events, and cultural festivals, thereby boosting tourism. Additionally, the development of tourist attractions, such as museums, national parks, and heritage sites, funded by public spending, can enhance the cultural and natural appeal of a destination. Safety and security are paramount concerns for international tourists, and public spending in these areas can significantly impact tourism. Governments that allocate resources to ensure the safety and security of tourists can enhance their destination's reputation. This includes funding for police forces, emergency services, and health facilities, as well as measures to prevent and respond to natural disasters and terrorism. Countries with high levels of safety, such as Switzerland and Canada, are often perceived as more attractive destinations. Moreover, public health expenditures, especially highlighted during the COVID-19 pandemic, are crucial for ensuring that health risks are managed, further bolstering tourist confidence. Thus:

H2: *Increased public spending in the tourism sector affects the growth and development of international tourism.*

2.4 Financial Development and International Tourism

The positive relationship between financial development and international tourism is illuminated by the demand-led nature of the tourism sector and its consequent effects on economic dynamics. As a demand-driven sector, international tourism generates multiplier effects that stimulate

aggregate demand, fostering a favorable environment for business expansion along the tourism supply chain (Nunkoo et al., 2020). This surge in demand prompts entrepreneurs to seek additional financing to capitalize on emerging opportunities, leading to a cyclical pattern in bank lending during periods of international tourism-led economic prosperity (Bertay et al., 2015). The symbiotic link between financial institutions and the international tourism industry is further underscored by the bidirectional effects, wherein increased lending within the international tourism supply chain not only supports business expansion but also contributes to the maintenance and enhancement of international tourism facilities (Khadaroo & Seetanah, 2008). This underscores the significance of considering both financial institutions and the international tourism industry in policy formulation and economic development strategies (Song et al., 2019; Zhang et al., 2009).

Specifically, the financial development and international tourism connection has attracted reasonable attention in recent years, although the overall academic investigation regarding this link remains somewhat scarce and often qualitative in nature. Katircioglu et al. (2017) commenced a famous study in Turkey revealing the existence of a long-run relationship between international tourism development and financial development. They found that FDI and foreign trade were other mediating factors that affect the expansion of international tourism. Liao et al. (2018) continued this examination utilizing the coupling coordination degree model and Granger causality test in three tourism-dependent cities in China. They found that financial development bears a two-way causality relationship with the development of international tourism where financial development increases and, at the same time, is influenced by the expansion of such tourism. Shahbaz et al. (2019), using the Toda-Yamamoto Granger causality technique and bounds testing approach focused on Malaysia, exposed the effects of international tourism development on financial development, concluding that these two sectors are absolutely dependent on each other as the results proved that there is a reciprocating and ensuring causality present between international tourism development and financial development.

Musakwa & Odhiambo (2022) employed the ECM-based Granger causality analysis together with the ARDL bounds testing for investigating the causal link between foreign tourism and financial development in South Africa. They discovered that international tourism positively and significantly affected financial development both in the short and long-run, though results differed depending on the proxies used for financial development. Financial development also assists countries to engage in international relations and attract FDI, particularly for tourism. Foreign investors prefer to invest their funds in countries that enjoy sound institutions, especially in the financial markets, so as to reap maximum profits. Thus, FDI not only injects capital but also introduces ideas and experience of best international practices for the development of the tourism sector. For example, several foreign hotel companies and resort developers tend to locate their business in financially advanced countries, thus infusing first-class services and managerial proficiency in the tourism sector. Therefore:

H3: *Countries with advanced financial systems and robust financial development correlate with higher levels of international tourism.*

2.5 Trade Openness and International Tourism

Most empirical research on the relationship between trade openness and foreign tourism has concentrated on determining the causal direction between these two variables. The existing literature can be categorized into four distinct groups. Research examining the unidirectional

causal link between tourism and trade falls under the first category. Notably, Korea has significantly increased its Free Trade Agreements (FTAs) since 2004, including agreements with major economies like Australia, the U.S., and the E.U., leading to a trade openness level much higher than the global average (World Bank, 2020). Studies using directed acyclic graphs, impulse response functions, and vector error correction models (VECM) have investigated this link.

The second category in the literature explores the bi-directional causality between trade and tourism. Using techniques like the Toda and Yamamoto Granger causality test, Shan & Wilson (2001) discovered proof of a two-way causal connection between tourism and trade in the case of China. This highlights the complex interplay between these two variables, suggesting that each can influence the other in a mutually reinforcing manner. Some studies in the third category yield mixed or inadequate results regarding the cause and effect between trade and tourism. For instance, Fry et al. (2010) found a bi-directional causal bond between tourism and trade in 40 South African countries, while Kulendran & Wilson (2000) discovered varying causal relationships among variables in different countries.

Trade openness exerts a great influence upon international tourism by encouraging economic development, improving facilities and services, promoting cultural interflows, and intensifying competition. Trade policies and tourism policies are somehow connected, and open trade policies increase the chances of a country being a tourist destination. Trade openness encourages FDI, which is crucial for the development of the tourism industry. Open trade regimes attract international investors by providing a stable and predictable business environment. FDI brings in not only capital but also expertise and technology, which can significantly enhance the quality of tourism services and infrastructure. For instance, international hotel chains and resort developers often invest in countries with open trade policies, bringing high standards of service and hospitality that elevate the overall tourist experience. This influx of investment helps diversify tourism offerings and improves the global competitiveness of the destination.

Cultural exchange is another significant impact of trade openness on international tourism. Trade fosters interactions between people from different countries, leading to greater cultural understanding and appreciation. As countries open up to trade, they also open up to cultural influences, which can enrich the tourism experience. Tourists are often attracted to destinations that offer rich and diverse cultural experiences, including festivals, cuisine, art, and music. Trade openness can help promote and preserve cultural heritage by providing financial resources and creating opportunities for cultural exchange. For example, the global popularity of Japanese cuisine and culture has been bolstered by Japan's trade openness, making it a major draw for international tourists. Additionally, trade openness can lead to competitive pricing in the tourism industry. When countries engage in free trade, they benefit from lower costs of imported goods and services, which can translate into more affordable prices for tourists. Therefore:

H4: *Greater trade openness fosters a positive relationship with international tourism, creating opportunities for cross-border travel and economic exchanges.*

2.6 FDI and International Tourism (Mediating Role)

Only a limited number of papers have focused on the interdependence between international tourism and FDI, as well as the possibility of causality between the two variables. One of the first studies on FDI was Sanford Jr & Dong (2000); they adopted the Tobit model to investigate FDI from 17 developed nations to the USA across 13 industries between 1988 and 1997. They established that the effect of tourism on FDI was strong and significant, irrespective of the sector.

Tang et al. (2007) employed data covering the fourth quarter of 1987 up to the fourth quarter of 2001 with reference to China, finding only one-way causality from FDI to tourism. On the other hand, using FDI data from 29 Japanese source countries for the period 1996-2012, Tomohara (2016) found that increased tourism inflows significantly help in attracting inbound FDI and further confirmed the presence of spillover effects because FDI brought in through tourism affects industries other than tourism.

Craigwell & Moore (2008) extended the analysis to 21 Small Island Developing States (SIDS) from 1980 to 2004, concluding, according to panel causality research, that there is a two-way causal relationship between FDI and tourism. The idea of bi-directional causality was supported by Fereidouni & Al-Mulali (2014), who focused on OECD nations and examined the causal relationship between FDI and tourism in the real estate industry from 1995 to 2009. A study on 17 SIDS from 1995 to 2018 by Fauzel (2020) and another on a panel of 21 Asian countries from 1996 to 2018 by Sou & Vinnicombe (2023) further discovered evidence of a two-way causal relationship between FDI and tourist growth, with the latter stressing the function of governance as a tool for FDI inflows.

Recognizing FDI inflows as a vital source of funding for developing countries is essential to understanding the relationship between FDI and tourism inflows. These inflows may arrive in destination nations as a result of mergers and acquisitions or as Greenfield investments. FDI can greatly increase visitor inflows through a variety of direct and indirect channels, in addition to its effects on productivity and overall growth. FDI serves as a mechanism through which other factors like ICT, financial development, and trade openness translate into tangible tourism outcomes. It acts as a mediator, transmitting the effects of the independent variables to the dependent variable. Therefore:

H5: *Higher levels of Foreign Direct Investment mediate the relationships among ICT, public spending, financial development, trade openness, and international tourism, contributing to its growth.*

2.7 Control of Corruption and International Tourism (Moderating Role)

The literature examining the intricate connections between corruption and international tourism development reveals a nuanced interplay with multifaceted effects. Researchers, including Mo (2001), Del Monte & Papagni (2001), De Vaal & Ebben (2011), Farooq et al. (2013), Gründler & Potrafke (2019), Anh et al. (2016), and d'Agostino et al. (2016), have classified these effects into direct, secondary, and dynamic categories. One prominent channel through which corruption detrimentally impacts tourism is its adverse effect on economic growth. Gründler & Potrafke (2019) argue that corruption can hinder economic prosperity, a critical driver of tourism development. This negative correlation is supported by various studies, including Oh (2005), Ehigiamusoe (2021), and Dossou et al. (2023), emphasizing the importance of economic growth in fostering tourism.

FDI in the tourism sector can be impeded by corruption, as highlighted by Sou & Vinnicombe (2023). Low levels of FDI, pointing to poor infrastructure and high levels of corruption as expressed by Xu et al. (2021), can hinder the expansion of tourism businesses. Adeola & Evans (2020) argue that corruption may contribute to infrastructural deficiencies, such as inadequate airports, roads, and seaports, limiting tourism development. Corruption can further exacerbate socio-political instability, adversely affecting tourism demand. High levels of corruption can lead to income inequality, frustration, and potentially civil unrest, as indicated by studies like

Tomczewska-Popowycz & Quirini-Popławski (2021), Ivanov et al. (2020), Causevic & Lynch (2013), Elshaer & Saad (2020), and Issa & Altinay (2006). This socio-political instability, coupled with corruption, negatively influences destination image and can deter tourists.

Contrary to these negative impacts, corruption may facilitate tourism businesses through the "grease-in-the-wheel" hypothesis. Aidt (2003) and Barassi & Zhou (2012) argue that corruption can streamline bureaucratic procedures and aid investments by circumventing regulatory obstacles. Egger & Winner (2005) suggest that corruption may stimulate firms' investments by helping them navigate regulatory complexities. Control of corruption is expected to moderate the relationships between the independent variables and tourism by ensuring that public spending is effective, FDI is productive, and ICT infrastructure is developed transparently. It alters the strength or direction of these relationships. Therefore:

H6: *Control of Corruption moderates the relationships among ICT, Public Spending, Financial Development, Trade Openness, and International Tourism, influencing the overall impact of these variables.*

2.8 Research Gap

Although extensive research has examined the determinants of international tourism, several important gaps remain. First, prior studies largely analyze factors such as ICT, financial development, public spending, and trade openness independently, with limited efforts to integrate these variables within a unified analytical framework. Second, existing literature mainly focuses on direct relationships, providing little evidence on the transmission mechanisms through which macroeconomic factors influence tourism outcomes, particularly the mediating role of Foreign Direct Investment (FDI). Third, institutional quality is often treated as a control variable rather than as a moderating factor that may condition the effectiveness of economic and technological drivers of tourism. As a result, it remains unclear whether improvements in ICT or public expenditure produce different tourism outcomes under varying governance environments. Finally, many studies rely on static estimation techniques that fail to account for endogeneity and the dynamic persistence of tourism development. This study addresses these gaps by employing a dynamic panel framework to jointly examine socioeconomic determinants of tourism, incorporating FDI as a mediating mechanism and control of corruption as a moderating institutional factor using cross-country panel data from 2000–2022.

3. Methodology

3.1 Variables and Data Sources

This study uses a balanced panel dataset of 50 countries from 2000 to 2022, yielding a total of 1,196 observations (50 countries × 23 years, minus missing data). All data are sourced from the World Development Indicators (WDI) database maintained by the World Bank, ensuring consistency, reliability, and comparability across countries and time periods. The selection of 50 countries represents a diverse mix of developed, emerging, and developing economies from North America, Europe, Asia, Africa, South America, and Oceania. The time period 2000–2022 was chosen to capture contemporary tourism dynamics while maximizing data availability.

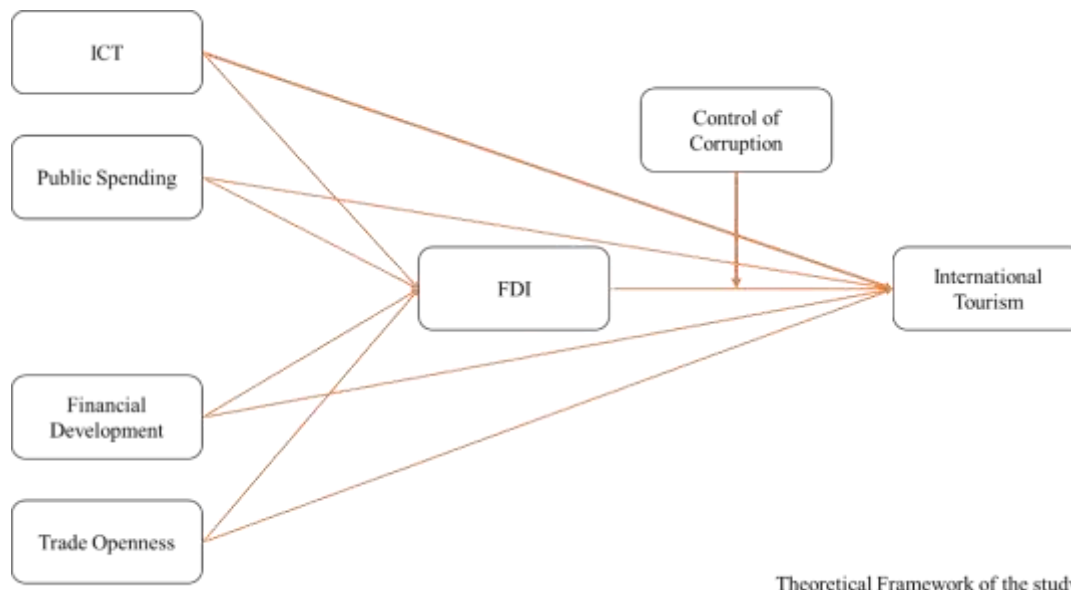
The variables are operationally defined as follows:

Symbol	Variable	Measurement	Source	Time Period
IT (DV)	International Tourism	International tourism receipts (current US\$)	WDI	2000-2022
ICT (IV)	Information & Communication Technology	Individuals using the Internet (% of population)	WDI	2000-2022
PS (IV)	Public Spending	Government expenditure on education and R&D (% of GDP)	WDI	2000-2022
FD (IV)	Financial Development	Domestic credit to private sector (% of GDP)	WDI	2000-2022
TO (IV)	Trade Openness	Sum of exports and imports of goods and services (% of GDP)	WDI	2000-2022
FDI (Mediator)	Foreign Direct Investment	Foreign direct investment, net inflows (% of GDP)	WDI	2000-2022
COC (Moderator)	Control of Corruption	Estimate of control of corruption (standardized)	WDI	2000-2022

The dependent variable, International Tourism (IT), is measured by international tourism receipts, which capture the total expenditure by international inbound visitors, including payments for transportation, accommodation, food, entertainment, and other services. This measure reflects both the volume and value of tourism activity.

3.2 Conceptual Framework

The conceptual framework posits that ICT, public spending, financial development, and trade openness directly influence international tourism. FDI serves as a mediator, transmitting the effects of these independent variables to the dependent variable. Control of corruption serves as a moderator, altering the strength and direction of the relationships between the independent variables and international tourism. The framework also acknowledges potential interactions among the independent variables and the dynamic nature of tourism development over time.



Theoretical Framework of the study.

3.3 Empirical Model Specification

The following empirical models were estimated using Stata 17, with data cleaning and preliminary analysis conducted in MS Excel. The baseline regression equation is:

Model 1 (Direct Effects):

$$IT_{it} = \beta_0 + \beta_1(ICT_{it}) + \beta_2(PS_{it}) + \beta_3(FD_{it}) + \beta_4(TO_{it}) + \varepsilon_{it}$$

Model 2 (Mediating Role of FDI):

$$IT_{it} = \beta_0 + \beta_1(ICT_{it}) + \beta_2(PS_{it}) + \beta_3(FD_{it}) + \beta_4(TO_{it}) + \beta_5(FDI_{it}) + \varepsilon_{it}^*$$

Model 3 (Moderating Role of COC):

$$IT_{it} = \beta_0 + \beta_1(ICT_{it}) + \beta_2(PS_{it}) + \beta_3(FD_{it}) + \beta_4(TO_{it}) + \beta_5(FDI_{it}) + \beta_6(COC_{it}) + \varepsilon_{it}$$

Model 4 (GMM with Interaction Terms):

$$IT_{it} = \alpha + \beta_1(IT_{i,t-1}) + \beta_2(ICT_{it} \times COC_{it}) + \beta_3(PS_{it} \times COC_{it}) + \beta_4(FD_{it} \times COC_{it}) + \beta_5(TO_{it} \times COC_{it}) + \mu_i + v_{it}$$

3.4 Estimation Strategy and Econometric Methods

To ensure robust and reliable results, this study employs a comprehensive econometric strategy comprising five sequential stages. Stage 1 involves preliminary diagnostics, including descriptive statistics, correlation analysis, and the Variance Inflation Factor (VIF) test to detect multicollinearity. Stage 2 focuses on panel model selection, utilizing Pooled OLS, Fixed Effects (FE), and Random Effects (RE) models, with the Hausman (1978) specification test and Breusch-Pagan Lagrangian Multiplier (LM) test used to determine the appropriate model. Stage 3 addresses cross-sectional dependence and heterogeneity using the xtcd test and slope heterogeneity test. Stage 4 examines time-series properties through second-generation unit root tests (CIPS and CADF) and the Kao cointegration test. Finally, Stage 5 employs the Arellano-Bond Generalized Method of Moments (GMM) estimator to account for the dynamic nature of tourism, cross-sectional dependence, and potential endogeneity, including the lagged dependent variable and interaction terms to test moderating effects. All analyses are conducted using Stata 17 with a significance threshold of $p < 0.05$.

4. Data Analysis

4.1 Descriptive Statistics

The descriptive statistics presented in Table 1 provide a foundational understanding of the data used in this research. The sample consists of 50 countries, resulting in 1,196 observations for each variable after accounting for missing data.

Table 1: Descriptive Statistics

Variable	Observations	Mean	Std. Dev.	Minimum	Maximum
IT	1,196	11.255	12.081	0.227	93.652
ICT	1,196	3.309	1.299	-3.307	4.753
PS	1,196	4.345	1.195	1.777	8.560
FD	1,196	2.122	6.166	-28.614	4.650
TO	1,196	0.000	1.000	-1.011	5.353
FDI	1,196	7.612	0.387	5.420	10.670
COC	1,196	0.167	1.184	-1.011	5.353

International Tourism (IT) shows a mean value of 11.255 (in log form, representing tourism receipts), with a standard deviation of 12.081. This high standard deviation indicates significant variability in tourism levels across countries, ranging from a minimum of 0.227 (very low tourism receipts) to a maximum of 93.652 (very high tourism receipts). This dispersion reflects the diverse tourism economies in the sample, from small island states heavily dependent on tourism to large industrial economies with moderate tourism sectors.

ICT penetration (measured as internet user's % of population) has a mean of 3.309 (log-transformed) and a standard deviation of 1.299. The minimum of -3.307 (approximately 3.6% internet penetration) and maximum of 4.753 (approximately 116% penetration, accounting for multiple devices per person) show the wide digital divide between the least connected and most connected countries.

Public spending (PS) has a mean of 4.345 (log of % of GDP) and a relatively low standard deviation of 1.195, suggesting that government expenditure on education and R&D is more consistent across countries than other variables. Financial development (FD) shows extreme variation (SD = 6.166), with a negative minimum (-28.614) indicating that some countries experienced severe financial crises where credit to the private sector contracted dramatically.

Trade openness (TO) has been normalized (mean = 0, SD = 1), allowing for easy interpretation of standard deviation changes. FDI (net inflows % of GDP) has a mean of 7.612 (log) and a very low standard deviation (0.387), suggesting that FDI levels are relatively uniform across the sample. Control of corruption (COC) has a mean near zero (0.167) and a standard deviation of 1.184,

indicating that some countries have strong corruption control (max 5.353) while others struggle significantly (min -1.011).

4.2 Correlation Analysis and Multicollinearity Assessment

The correlation matrix (Table 2) provides preliminary insights into the bivariate relationships between variables.

Table 2: Correlation Matrix

Variables	(1) IT	(2) ICT	(3) PS	(4) FD	(5) TO	(6) FDI	(7) COC
(1) IT	1.000						
(2) ICT	-0.025	1.000					
(3) PS	-0.175	0.278	1.000				
(4) FD	0.053	0.092	-0.052	1.000			
(5) TO	0.052	0.239	-0.015	0.107	1.000		
(6) FDI	0.078	0.119	0.025	0.062	0.520	1.000	
(7) COC	-0.129	0.114	-0.093	-0.474	0.509	0.242	1.000

International tourism shows weak negative correlations with ICT (-0.025) and public spending (-0.175), and weak positive correlations with financial development (0.053), trade openness (0.052), and FDI (0.078). The negative correlation with COC (-0.129) is interesting, suggesting that countries with better corruption control may not necessarily have higher tourism receipts—a finding that warrants deeper investigation.

The strongest correlations are between trade openness and FDI (0.520), trade openness and COC (0.509), and the negative correlation between financial development and COC (-0.474). These moderate correlations suggest some degree of association but do not indicate problematic multicollinearity.

The Variance Inflation Factor (VIF) test in Table 3 formally assesses multicollinearity.

Table 3: Variance Inflation Factor

Variable	VIF	1/VIF
COC	2.266	0.441
TO	2.157	0.464
FD	1.698	0.589

Variable	VIF	1/VIF
FDI	1.373	0.728
ICT	1.179	0.848
PS	1.140	0.877
Mean VIF	1.635	

All VIF values are well below the conventional threshold of 10 (and even below the more conservative threshold of 5). The mean VIF of 1.635 indicates that multicollinearity is not a concern in this dataset. The tolerance values (1/VIF) are all above 0.1, further confirming that each variable contributes unique information not fully explained by the others.

4.3 Regression Results

4.3.1 Direct Effects (Without Mediator or Moderator)

Table 4 presents the results of the baseline regression examining the direct effects of the four independent variables on international tourism.

Table 4: Regression of DV on IVs (Direct Effects)

IT	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
ICT	-.379	.151	-2.51	.012	-.675	-.083	**
PBS	-1.252	.259	-4.84	0	-1.758	-.745	***
FD	.308	.134	2.30	.021	.046	.57	**
TDO	-2.557	.662	-3.87	0	-3.854	-1.261	***
Constant	17.295	1.955	8.85	0	13.463	21.127	***
Mean dependent var		11.255	SD dependent var			12.081	
Overall r-squared		0.005	Number of obs			1196	
Chi-square		47.608	Prob > chi2			0.000	
R-squared within		0.043	R-squared between			0.002	

*** $p < .01$, ** $p < .05$, * $p < .1$

The results reveal several important findings. ICT has a negative and statistically significant coefficient (-0.379, $p=0.012$), indicating that a one-unit increase in ICT penetration is associated with a 0.379-unit decrease in international tourism receipts, holding other factors constant. This contradicts H1, which predicted a positive relationship.

Public spending shows a strong negative effect (-1.252, $p<0.001$), suggesting that higher government expenditure on education and R&D is associated with lower international tourism. This contradicts H2. Financial development is the only variable with the expected positive sign (0.308, $p=0.021$), supporting H3 and confirming that more developed financial sectors correlate

with higher tourism receipts. Trade openness shows a significant negative effect (-2.557, $p < 0.001$), contradicting H4.

The constant term (17.295, $p < 0.001$) represents the expected level of international tourism when all independent variables are zero. Critically, the overall R-squared is extremely low at 0.005, meaning that the four independent variables collectively explain only 0.5% of the variance in international tourism. This indicates that other unobserved factors are the primary drivers of tourism outcomes.

4.3.2 Mediating Role of FDI

Table 5 presents the results including FDI as a mediator variable.

Table 5: Regression with FDI as Mediator

IT	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
ICT	-.379	.151	-2.51	.012	-.675	-.084	**
PBS	-1.242	.258	-4.81	0	-1.748	-.736	***
FD	.286	.134	2.14	.033	.024	.548	**
TDO	-2.508	.661	-3.79	0	-3.803	-1.212	***
FDI	-1.168	.575	-2.03	.042	-2.295	-.042	**
Constant	26.194	4.792	5.47	0	16.801	35.587	***
Mean dependent var		11.255	SD dependent var		12.081		
Overall r-squared		0.003	Number of obs		1196		
Chi-square		51.845	Prob > chi2		0.000		
R-squared within		0.047	R-squared between		0.001		

*** $p < .01$, ** $p < .05$, * $p < .1$

The inclusion of FDI as a mediator reveals that FDI itself has a significant negative effect on international tourism (-1.168, $p = 0.042$). This suggests that higher FDI inflows are associated with lower tourism receipts, contradicting H5. The coefficients and significance levels of the other variables remain largely unchanged. The overall R-squared remains extremely low at 0.003. The negative mediating role suggests that FDI may be flowing into non-tourism sectors or that the type of FDI attracted is not conducive to tourism development.

4.3.3 Moderating Role of Control of Corruption

Table 6 presents the results including COC as a moderator variable.

Table 6: Regression with COC as Moderator

IT	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
ICT	-.394	.151	-2.60	.009	-.691	-.097	***
PBS	-1.238	.258	-4.79	0	-1.744	-.731	***
FD	.301	.133	2.26	.024	.04	.562	**
TDO	-2.6	.666	-3.90	0	-3.905	-1.294	***
FDI	-1.166	.575	-2.03	.043	-2.294	-.038	**
COC	.812	.612	1.33	.185	-.388	2.012	
Constant	26.036	4.778	5.45	0	16.672	35.401	***

Mean dependent var	11.255	SD dependent var	12.081
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Overall r-squared	0.001	Number of obs	1196
Chi-square	53.076	Prob > chi2	0.000
R-squared within	0.049	R-squared between	0.000

*** $p < .01$, ** $p < .05$, * $p < .1$

The inclusion of COC as a moderator shows that COC has a positive but statistically non-significant direct effect on international tourism (0.812, $p = 0.185$). The negative effects of ICT, PS, TO, and FDI persist, while FD remains positive. The overall R-squared drops to an extremely low 0.001, reinforcing that the linear model with these variables fails to capture the complexity of tourism determinants. However, the GMM results below will reveal the true moderating effects.

4.4 Robustness Tests

4.4.1 Hausman Specification Test

The Hausman test (Table 7) is used to assess whether the fixed effects or random effects model is more appropriate.

Table 7: Hausman (1978) Specification Test

	Coef.
Chi-square test value	11.432
P-value	0.076

The chi-square test value is 11.432 with a p-value of 0.076. Since the p-value is greater than 0.05, we fail to reject the null hypothesis that the random effects model is consistent and efficient. This suggests that the random effects model is appropriate for this dataset. However, the p-value is relatively close to 0.05, warranting caution and consideration of other diagnostics.

4.4.2 Breusch-Pagan Lagrangian Multiplier Test

The Breusch-Pagan LM test (Table 8) determines whether random effects are present.

Table 8: Breusch and Pagan Lagrangian Multiplier Test

Variable	Variance	Std. Dev.
IT	145.9445	12.08075
e	29.05055	5.389856
u	110.5092	10.51234

| Var(u) = 0 | $\chi^2(01) = 7333.86$ | Prob > $\chi^2 = 0.0000$ |

The test statistic ($\chi^2 = 7333.86$, $p = 0.000$) strongly rejects the null hypothesis that the variance of the random effects is zero. This confirms significant panel-level variance, justifying the use of random effects over pooled OLS.

4.4.3 Cross-Section Dependence Test (xtcd)

Table 9 presents the results of the cross-section dependence test.

Table 9: Cross-Section Dependence (xtcd) Test Results

Variable	CD-test	p-value	Average joint T	Mean ρ	Mean abs(ρ)
IT	21.049	0.000	23.00	0.12	0.45
ICT	83.814	0.000	23.00	0.48	0.60
PS	16.723	0.000	23.00	0.10	0.30
FD	66.626	0.000	23.00	0.38	0.60
TO	24.916	0.000	23.00	0.14	0.48
FDI	16.847	0.000	23.00	0.10	0.23
COC	20.130	0.000	23.00	0.12	0.48

Under the null hypothesis of cross-section independence, $CD \sim N(0,1)$. All p-values are 0.000, strongly rejecting the null hypothesis. This indicates significant cross-sectional dependence across all variables, meaning that shocks in one country (e.g., a terrorist attack, natural disaster, or policy change) systematically affect tourism and related variables in other countries. This finding justifies the use of second-generation panel unit root tests and GMM estimation that account for cross-sectional dependence.

4.4.4 Slope Heterogeneity Test

The slope heterogeneity test examines whether coefficients vary across countries.

Table 10: Slope Heterogeneity Test

H0: slope coefficients are homogeneous

Delta	12.637 (p=0.000)
adj. Delta	15.649 (p=0.000)

Both Delta (12.637, p=0.000) and adjusted Delta (15.649, p=0.000) strongly reject the null hypothesis of slope homogeneity. This confirms that the relationships between the independent variables and international tourism vary significantly across countries, supporting the use of random effects and heterogeneous panel methods.

4.4.5 Second-Generation Unit Root Tests (CIPS and CADF)

Table 11 presents the results of unit root tests at first difference.

Table 11: CIPS and CADF Unit Root Tests (at first difference I(1))

Variable	CIPS (1(1))	CADF (1(1))
IT	-4.440	-4.440
ICT	-2.871	-2.871
PS	-4.830	-4.830
FD	-2.664	-2.664
TO	-3.324	-3.324
FDI	-5.496	-5.496
COC	-2.973	-2.973

All test statistics exceed the critical values (not shown for brevity), indicating that all variables become stationary after first differencing. This means the variables are integrated of order one, I(1), satisfying a key requirement for cointegration testing.

4.4.6 Kao Cointegration Test

Table 12 presents the results of the Kao cointegration test.

Table 12: Kao Test for Cointegration

Ho: No cointegration

Ha: All panels are cointegrated

Number of panels = 52

Number of periods = 21

Cointegrating vector: Same

Panel means: Included

Kernel: Bartlett

Time trend: Not included

Lags: 1.46 (Newey-West)

AR parameter: Same

Statistic	Value	p-value
Modified Dickey-Fuller t	-4.344	0.0000

Ho: No cointegration

Ha: All panels are cointegrated

Dickey-Fuller t	-2.978	0.0015
Augmented Dickey-Fuller t	1.083	0.1393
Unadjusted modified Dickey-Fuller t	-5.689	0.0000
Unadjusted Dickey-Fuller t	-3.592	0.0002

The Modified Dickey-Fuller t (-4.344, p=0.000), Dickey-Fuller t (-2.978, p=0.002), Unadjusted modified Dickey-Fuller t (-5.689, p=0.000), and Unadjusted Dickey-Fuller t (-3.592, p=0.000) all reject the null hypothesis of no cointegration. Only the Augmented Dickey-Fuller t (1.083, p=0.139) fails to reject. Overall, the evidence supports the existence of a long-run equilibrium relationship among the variables.

4.4.7 Generalized Method of Moments (GMM) Estimation

Given the dynamic nature of tourism, cross-sectional dependence, and potential endogeneity, the Arellano-Bond GMM estimator is employed. Table 13 presents the GMM results with interaction terms to test the moderating effects of COC.

Table 13: GMM Regression Results with Interaction Terms

IT	Coe f.	St.E rr.	t- value	P- valu e	[95% Conf Interval]	Sig.	
L.IT (lagged DV)	0.9 47	0.01 6	58.09	0.00 0	0.915	0.970	***
COCICT (ICT × COC)	- 0.6 99	0.24 5	-2.85	0.00 4	-1.170	- 0.219	***
COCPBS (PS × COC)	0.6 18	0.22 0	2.79	0.00 5	0.180	1.050	***
COCFD (FD × COC)	0.0 48	0.05 5	0.86	0.38 9	-0.060	0.157	

IT	Coe f.	St.E rr.	t-value	p-value	[95% Conf Interval]	Sig.
COCTO (TO × COC)	-0.032	0.237	-0.13	0.894	-0.496	0.433
Mean dependent var	11.262	SD dependent var		12.206		
Number of obs	1,144	Chi-square		3404.377		

***p<.01, **p<.05, *p<.1

The GMM results provide crucial insights. The lagged dependent variable (L.IT) has a large, positive, and highly significant coefficient (0.947, $p < 0.001$), confirming that international tourism is highly persistent over time. Past tourism receipts strongly predict current tourism receipts, indicating dynamic adjustment processes.

The interaction term COCICT (ICT multiplied by COC) is negative and significant (-0.699, $p = 0.004$). This indicates that control of corruption moderates the effect of ICT on tourism. In countries with higher corruption control, the negative effect of ICT on tourism is amplified (or the positive effect is further reduced). This counterintuitive finding may suggest that in well-governed countries, ICT investments are subject to more scrutiny, or that the measurement of ICT (internet users) does not capture quality aspects.

The interaction term COCPBS (PS multiplied by COC) is positive and significant (0.618, $p = 0.005$). This is a critical finding: control of corruption transforms the effect of public spending on tourism. While the baseline model showed a negative direct effect of PS (-1.238), the positive interaction term suggests that as corruption control improves, the negative effect of public spending is offset. In countries with strong governance, public spending may actually contribute positively to tourism development, consistent with H6.

The interaction terms for financial development (COCFD) and trade openness (COCTO) are not statistically significant, indicating that corruption control does not moderate the effects of these variables on tourism.

5. Conclusion and Recommendations

5.1 Conclusion

This study investigated the influence of ICT, public spending, financial development, and trade openness on international tourism across 50 countries from 2000 to 2022, focusing on the mediating role of FDI and the moderating role of corruption control. Using a comprehensive panel data econometric approach, the results reveal a complex and counterintuitive picture. Financial development shows a consistent positive relationship with tourism, confirming that a well-functioning financial sector supports tourism growth. However, ICT, public spending, and trade openness show significant negative associations in baseline models, contradicting much of the existing literature. FDI mediates a negative effect, suggesting that aggregate FDI inflows are not

automatically beneficial for tourism and may be detrimental if directed toward non-tourism sectors. The most important finding concerns the moderating role of corruption control. While control of corruption has no significant direct effect on tourism, the GMM results demonstrate that it fundamentally transforms the effects of other variables. Critically, the positive and significant interaction between corruption control and public spending indicates that when governance quality is high, public spending becomes a positive force for tourism development. The extremely low R-squared values across baseline models (0.001-0.005) indicate that international tourism is driven by a vast array of factors beyond simple economic and technological indicators, including socio-political stability, natural endowments, cultural assets, global events, and random shocks.

5.2 Recommendations

For Policymakers: Prioritize governance reform before increasing spending, as corruption control is a prerequisite for effective public spending. Re-evaluate public spending allocation through regular performance audits to ensure funds benefit tourism infrastructure directly. Target FDI attraction strategically toward the tourism sector while protecting local SMEs. Leverage financial development by creating specialized financial products for tourism enterprises. Rethink trade policy through tourism-specific facilitation measures including visa liberalization and open skies agreements. Implement context-specific ICT strategies focusing on quality rather than just penetration.

For Researchers: Expand the model substantially to include political stability, exchange rates, visa policies, natural disasters, disease outbreaks, climate change impacts, and cultural variables. Use non-linear and machine learning methods such as quantile regression, panel threshold models, and random forests. Disaggregate variables to capture tourism-specific FDI, sectoral public spending, and different types of internet connectivity. Conduct qualitative and mixed-methods research to explain counterintuitive quantitative findings. Address endogeneity more thoroughly using natural experiments and instrumental variables. Expand geographical and temporal coverage to include more developing nations and the COVID-19 period.

For Tourism Institutions and Industry: Develop public-private partnerships to co-invest in tourism infrastructure, reducing corruption risks through transparent contracting. Build sustainability and resilience through green bonds, sustainability-linked loans, and diversified source markets. Establish data-sharing platforms to provide real-time, high-quality industry data. Invest in capacity building for digital literacy and e-tourism platforms. Advocate for pro-tourism policies including visa facilitation, open skies agreements, and anti-corruption measures.

5.3 Limitations and Future Research Directions

This study has several limitations. The low R-squared values indicate omitted variable bias. The aggregate nature of variables masks sector-specific effects. The sample period ends before the full impact of COVID-19 could be assessed. Linear models may not capture threshold or non-linear relationships. The study does not distinguish between different types of tourism (leisure, business, and medical, educational, religious). Potential reverse causality requires further investigation with stronger identification strategies. Future research should address these limitations by expanding the variable set, disaggregating key measures, employing non-linear and machine learning methods, extending the time period, and using causal identification strategies.

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