A STUDY ON THE EFFECT OF TOURISM ON THE ECONOMIES OF DEVELOPED AND DEVELOPING NATIONS

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By

NAIK SUJAL LAXMIDAS

Goa Business School, Goa University

Goa

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DECLARATION

I, Naik Sujal Laxmidas hereby declare that this Thesis represents work which has been carried out by me and that it has not been submitted, either in part or full, to any other University or Institution for the award of any research degree.

Place: Taleigao Plateau.
Date :

Naik Sujal Laxmidas

CERTIFICATE

I hereby certify that the above Declaration of the candidate, Naik Sujal Laxmidas is true and the work was carried out under my supervision.

Prof. K.G. Sankaranarayanan
(Guide)
Goa business School
Goa University

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Dedicated to my Parents
Laxmidas Gangadhar Naik
Sunita Laxmidas Naik

Table of Contents

List of Figures

List of Tables

List of Abbreviations

Abbreviation	Full Form
ANS	Adjusted Net Savings
CO_2	Carbon Dioxide
DLT	Development-Led Tourism
GDP	Gross Domestic Product
GNI	Gross National Income
HDI	Human Development Index
IMF	International Monetary Fund
SDGs	Sustainable Development Goals
TLD	Tourism-Led Development
TLGH	Tourism-Led Growth Hypothesis
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNWTO	United Nations World Tourism Organization
WDI	World Development Indicators
WGI	Worldwide Governance Indicators
WTTC	World Travel & Tourism Council
ANOVA	Analysis of Variance
ARDL	Autoregressive Distributed Lag Model
BP	Breusch–Pagan Test (for heteroskedasticity)
CE	Common Effects (Model)
D-H	Dumitrescu–Hurlin (Panel Causality Test)
FE	Fixed Effects (Model)
FEM	Fixed Effects Model
GMM	Generalized Method of Moments
OLS	Ordinary Least Squares
POLS	Pooled Ordinary Least Squares
REM	Random Effects Model
VAR	Vector Autoregression

VECM	Vector Error Correction Model
ADF	Augmented Dickey–Fuller Test (for stationarity)
AIC	Akaike Information Criterion
BIC	Bayesian Information Criterion (also Schwarz Criterion)
FGLS	Feasible Generalized Least Squares
HQIC	Hannan–Quinn Information Criterion
LM	Lagrange Multiplier Test
VIF	Variance Inflation Factor (for multicollinearity)
ASEAN	Association of Southeast Asian Nations
EU	European Union
OECD	Organisation for Economic Co-operation and Development
Next11 (N-11)	Next Eleven Emerging Economies

Chapter 1

Introduction

Tourism is often described as an important driver of both economic development and the improvement of human wellbeing, with impacts that spread over many sectors such as hospitality, travel, retail, and cultural services. At the world level, the tourism sector is significant in the generation of gross domestic product (GDP), employment, and foreign exchanges. Additionally, the sector is critical in the development of infrastructure and regional integration, especially in nations that have high comparative advantages in natural or cultural resources [(UNWTO, 2022); (Sinclair & Stabler, 1997)].

In high income economies, the tourism sector is typically integrated within well-developed institutional structures, high order infrastructure, and diverse markets. These countries reap high spending inflows of tourists, which in turn boost high quality services, contribute macro-economic stability, and stimulate the development of travel and hospitality technology [(Song et al., 2012)]. However, in the emerging world, tourism is the crucial driver of structural change. They harness underemployed assets, reduce unemployment, and cushion foreign exchange deficits. Nevertheless, the development of tourism in such environments is often constrained by poor governance, poor quality infrastructure, and environmental weakness [(Weaver & Lawton, 2006); (Cárdenas García et al., 2015)].

The complexities of the impacts of tourism are increasingly assessed through multidimensional frameworks that take in not only economic development (e.g., GDP), but also human development (e.g., HDI), governance, and environmental sustainability. Through such views, this study examines whether tourism acts as the driver of development (Tourism-Led Development, TLD) or the result of development (Development-Led Tourism, DLT). Through the application of econometric methodology and panel data from a representative sample of the world's nations, this study aims at determining the circumstances under which tourism is an influential contributor to national sustainable development..

1.1 Statement of the Research Problem

Even though tourism was always touted as the driver of national development, the realized developmental results vary from one nation to another. Additionally, when comparing developed and underdeveloped nations, the extent and magnitude at which tourism generates economic progress as well as human development vary significantly due to institutional quality, macro-economic environment, as well as socio-environmental settings and discrepancies.

A central unresolved question centers on the conceptual conflation between Tourism-Led Development (TLD) and Development-Led Tourism (DLT). The former framework contends that tourism drives economic development and wellbeing in general, while the latter framework contends that development prerequisites in the forms of infrastructure, institutional quality, and equitable income redistribution should be in place prior to tourism's favorable outcomes. Despite numerous empirical studies, scarce comparative studies across sets of countries that systematically study the two frameworks within the same econometric framework are available.

Additionally, there is void in the research in relation to how governance indicators such as political stability and the exchange rate affect the moderating role of tourism's contribution in the growth of GDP and the Human Development Index (HDI). Additionally, the sustainable aspect of tourism is even then not the topic of in-depth study; that is, its impact on the long-term wealth indicators such as Adjusted Net Savings (ANS) of countries and if the environmental trade-offs yield its economic additions.

Thus, the focal point of the main problem researched in this work is that there is no comparative, holistic, and sustainability based study on the tourism based national development under various world economic scenarios.

1.2 Significance of the Study

This research is innovative, providing comparative examination of the contribution of tourism to economic and human progress under various developmental regimes. While the vast majority of studies focus on GDP only, this study brings in wider indicators like the Human Development Index (HDI) and Adjusted Net Savings (ANS) in addition to governance indicators like political stability, level of revenues, and exchange rates. By comparing the Tourism-Led Development (TLD) and Development-Led Tourism (DLT) models, the study elucidates whether national advancement is a product of, or precedes, national tourism. Its results contribute to theory as much as policy, matching national tourism policy with the United Nations Sustainable Development Goals (SDGs) and laying out a template for socially just and eco-friendly development.

Conventional tourism economics has relied on GDP as the sole indicator of success. The research here attempts to expand that narrow viewpoint by embracing multi-dimensions—bridging social equity, good governance, and environmental sustainability—their combination thus embracing a more holistic view of the developmental contribution of tourism.

1.2.1 Figures and Trends Supporting the Study

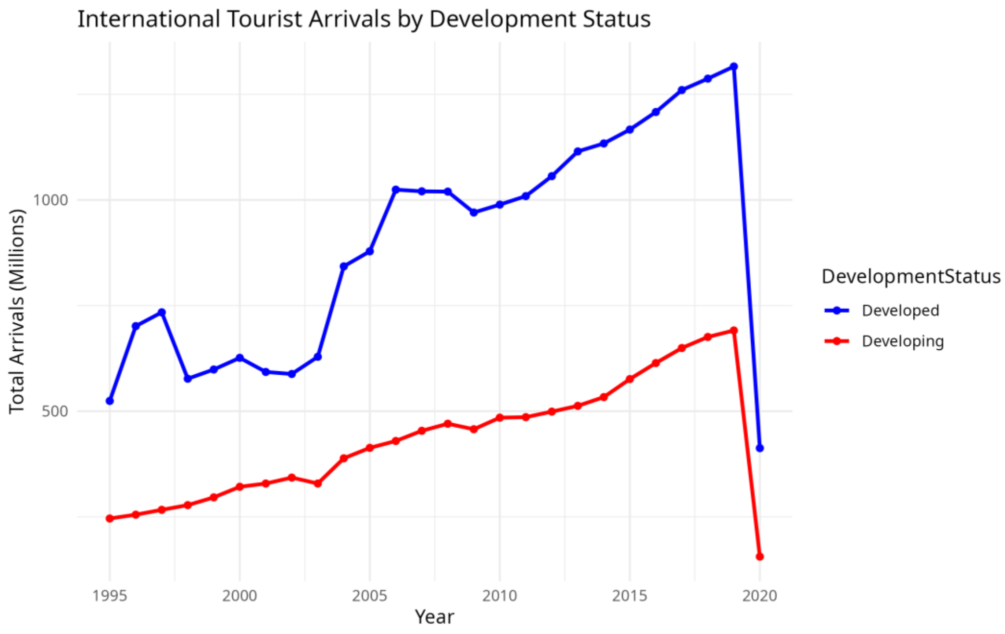


Figure 1. 1 International Tourist Arrivals by Development Status

Data Source: World Bank (Compiled by Author)

The chart offers a representation of the continued rise in international visitor arrivals for both developed and emerging economies from 1995 through 2019 that suggests that developed countries always drew more tourists. While emerging economies showed continuous expansion, the gap in arrivals remained significant. A dramatic decline in 2020 is evident across both sets, highlighting the global impacts of the COVID-19 pandemic on global travel, with the developed countries seeing a more pronounced decline in absolute terms due to their bigger tourism industries.

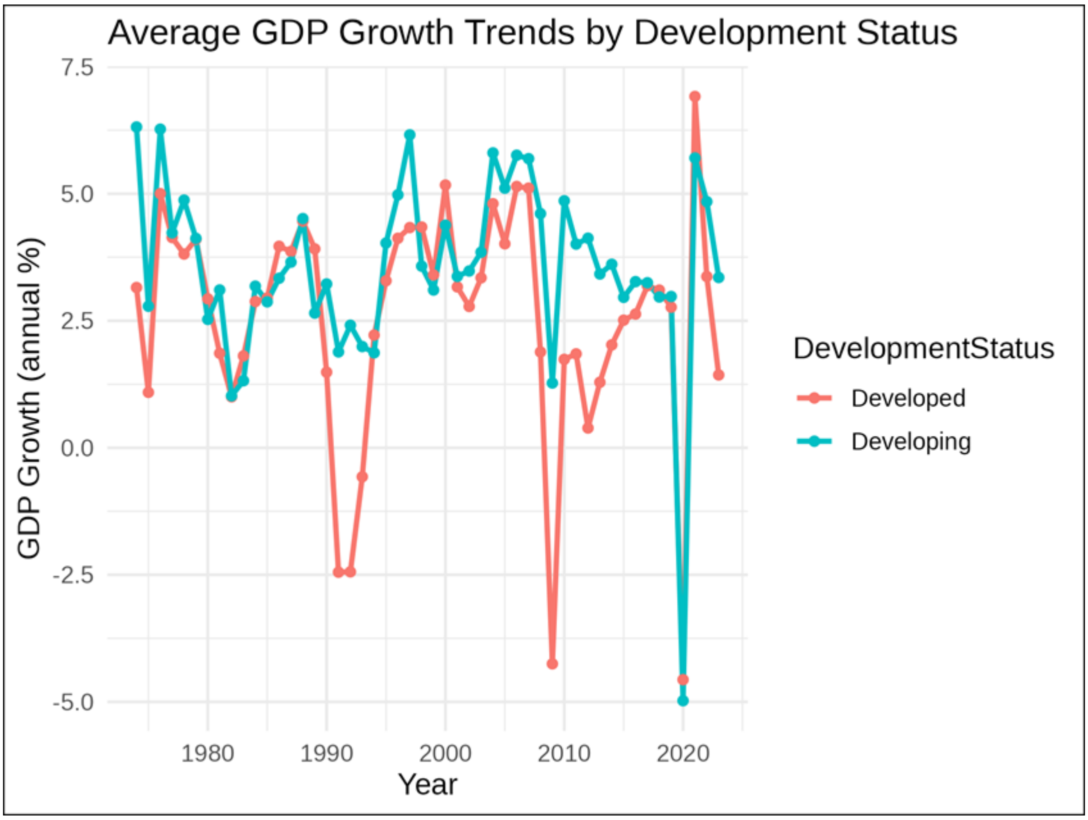


Figure 1. 2 Average GDP Growth Trends by Development Status

Developing countries show higher but more volatile growth rates compared to the more stable patterns seen in developed countries. The figure emphasizes the asymmetric effects of global downturns and policy changes.

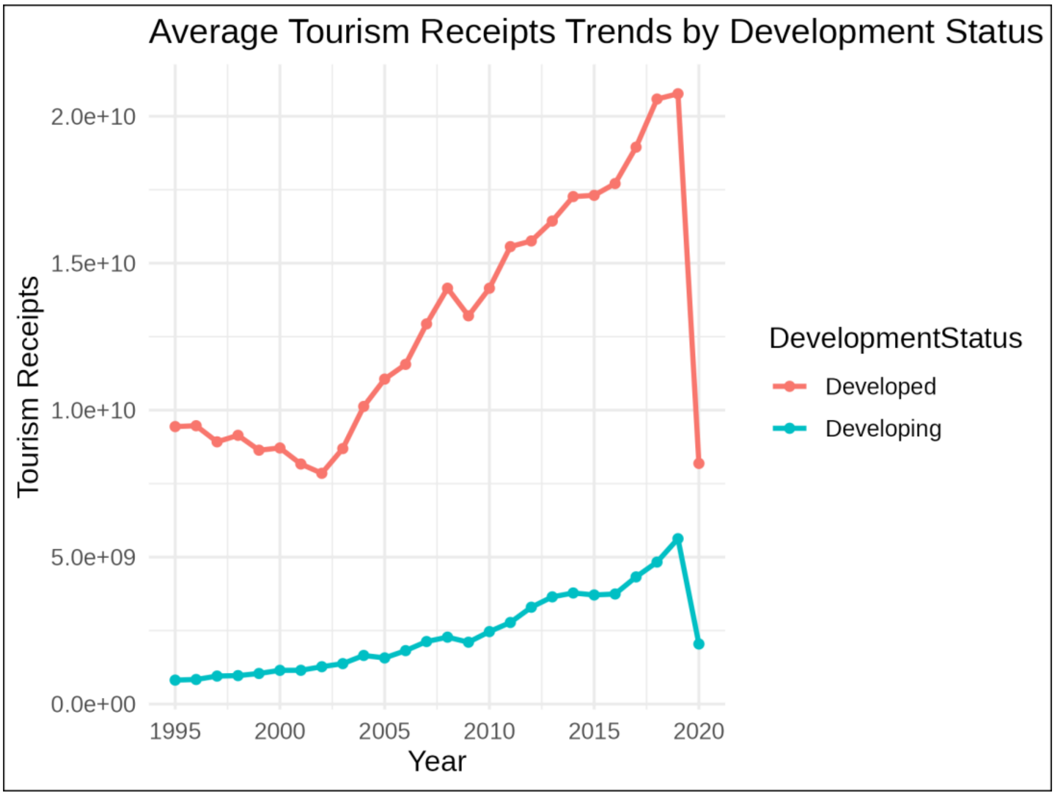


Figure 1. 3 Average Tourism Receipts Trends by Development Status

Data Source: World Bank (Compiled by Author)

The observed trend demonstrates a persistent and considerably elevated level of average tourism receipts in developed nations when juxtaposed with those of developing countries throughout the entire timeframe. Developed nations experienced a continuous rise in their receipts beginning in the early 2000s, culminating around the year 2019. The abrupt decrease in 2020 correlates with the onset of the global COVID-19 pandemic, which drastically hindered international travel. Conversely, developing countries also witnessed a gradual rise, albeit from a lower baseline and at a diminished growth rate. Their peak similarly occurred just prior to 2020, succeeded by a significant decline. This disparity in magnitude illustrates the structural advantages inherent in developed nations such as superior infrastructure, greater per capita tourism expenditure, and more mature tourism markets while the post2020 downturn underscores the susceptibility of global tourism flows to external disruptions.

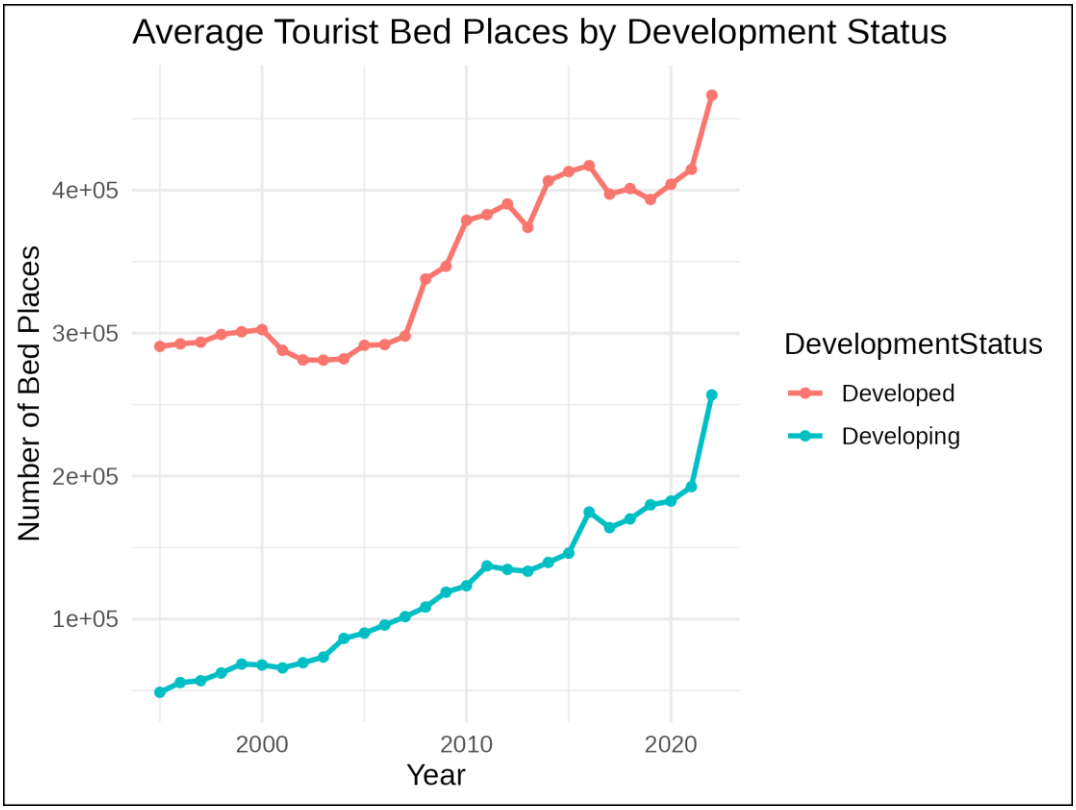


Figure 1. 4 Average Tourist Arrivals Trends by Development Status

Data Source: World Bank (Compiled by Author)

The chart displays that, over the period 1995-2023, the developed nations always had more tourist bed accommodations compared to their developing counterparts. However, the latter nations portray an uninterrupted and more remarkable growth trajectory, particularly after the year 2005, showing rising investments in tourism infrastructure. The notable increase registered after the year 2020 in both series reflects remarkable pandemic recovery. The progression solidifies the perception that tourism is increasingly propelling development in the developing economies while being the mature sector propelling continued economic activity in the developed nations.

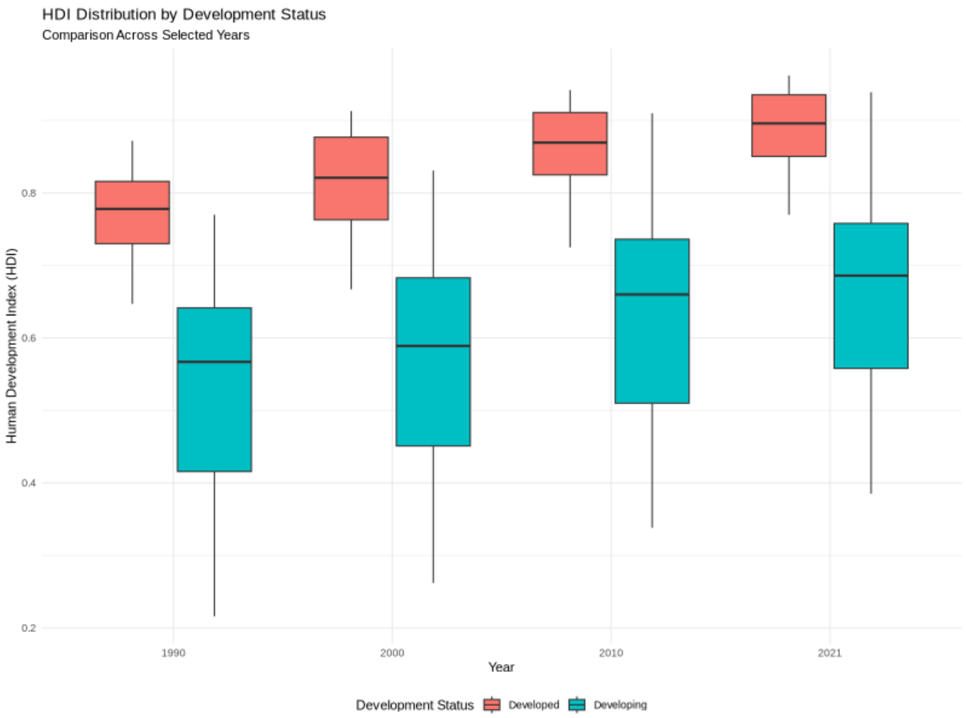


Figure 1. 5 HDI Boxplots for Selected Years (1990, 2000, 2010, 2021)

Data Source: World Bank (Compiled by Author)

The boxplot reflects the HDI pattern of developed and developing countries over chosen years—1990, 2000, 2010, and 2021—to reflect both differences and convergence patterns. The developed countries uniformly display greater and more constant HDI scores, indicating stable and high-level human development. The developing countries represent a continuous increase in median HDI over the period with the decrease in variability, particularly in the year 2021. The evidence visually reinforces the idea of long-run convergence in the achievement of human development with the developing countries continually catching up from their developed peers.

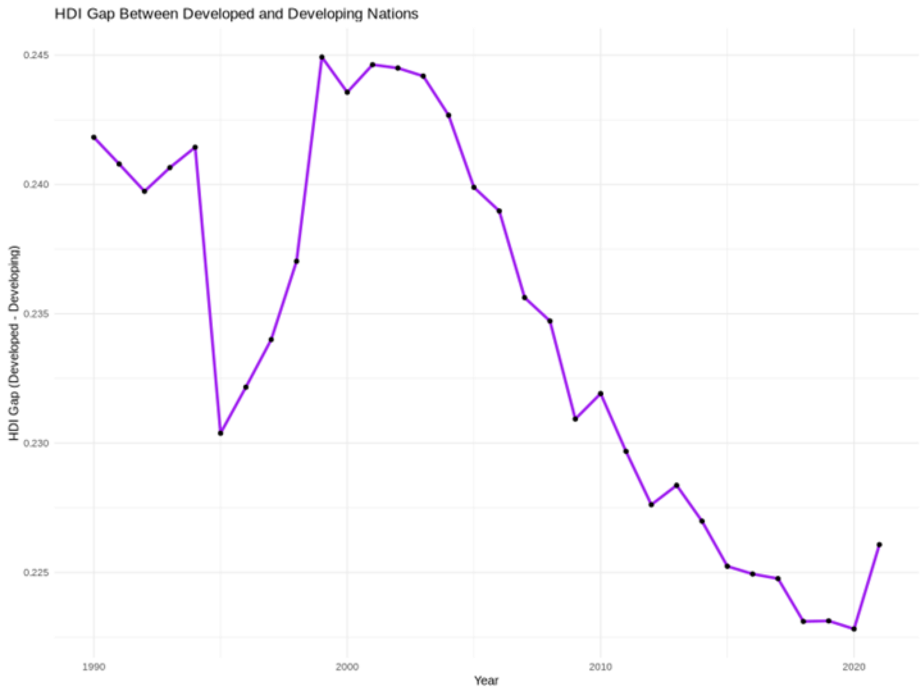


Figure 1. 6 HDI Gap between Developed and Developing Nations

Data Source: World Bank (Compiled by Author)

The figure shows the gap in the Human Development Index (HDI) across advanced and emerging economies from 1990 through 2021. The figure shows an obvious decline in the gap in the HDI during the period under study, reflecting convergence in developmental outcomes.

Since approximately the year 2000, the gap has continuously decreased, implying that countries in development have progressively closed the gap with developed countries in terms of HDI. The decreasing gap is an encouraging development in the health, education, and income sectors of the developing economies. The small increase in the year 2021 may be the result of the disruption triggered by COVID-19 that inordinately impacted low and medium income countries.

1.3 Scope of the Study

The subject of this research is a worldwide comparative investigation of the economic, social, and environmental effects of tourism in developed and developing countries. The study is carried out based on a panel dataset for the period between 1995 and 2023, comprising as many as 195 countries grouped by international institutions like the World Bank and the United Nations Development Programme (UNDP).

The study is limited to three main dimensions:

1. Economic Impact – Assessing the impact of tourism-related factors (e.g., receipts, occupancy rates, tourist arrivals) on GDP growth across different national settings.
2. Human Development Outcomes – Examining the impact of tourism on more general wellbeing indicators, including the Human Development Index (HDI).
3. Sustainability and Institutional Context – Examining the interplay between tourism and environmental performance (e.g., CO_2 emissions, Adjusted Net Savings), and governance indicators like political stability, income levels, and exchange rates.

Although the dataset reflects global patterns, the comparative perspective particularly separates countries by developmental maturity, allowing for targeted analysis of Tourism-Led Development (TLD) and Development-Led Tourism (DLT) trajectories.

1.4 Research Problem and Research Gap

Whereas the quantitative indicators of tourism's economic impacts in GDP contributions as well as in revenues from tourists affect no shortage of research in the academic literature (Brida, Cortés Jiménez, & Pulina, 2016; Cárdenas García, Sánchez Rivero, & Pulido Fernández, 2015), the long-run effects of tourism upon human development, equity, and environmental sustainability are inadequately researched. They are the essential characteristics, nonetheless, of the sustainable development paradigm; they have nonetheless failed to be usefully included in empirical work in tourism economics, at least in cross-country work in which the environmental as well as political context varies.

The overwhelming majority of research available so far have largely aimed at testing the Tourism-Led Growth (TLG) hypothesis using econometric techniques that examine the effects of tourism upon gross domestic product (GDP) (Sequeira & Campos, 2007; Dritsakis, 2004). These provide information upon immediate economic gain but typically neglect the way in which tourism affects or alleviates holistic development. Additionally, there is little research examining if the conditions surrounding development would in themselves affect tourism, ascertaining a reverse causality that remains conceptually underdeveloped. The current study seeks to fulfill this void in knowledge through examining the bidirectional relationship specifically between tourism and development, thus contrasting the Tourism-Led Development (TLD) and Development-Led Tourism (DLT) paradigms.

Unlike the previous research utilizing growth based indicators, such as the GDP growth rate, this approach does little justice in reflecting genuine national welfare advancements. Literature that employs broader development indicators, such as the Human Development Index (HDI), Adjusted Net Savings (ANS), and environment centric sustainability indicators is scarce (Gnegne, 2009; Thiry & Cassiers, 2010; Drastichová, 2017). These yield more holistic perspectives on welfare, equity, as well as long-term intergenerational sustainability but are underrepresented within the tourism economy discipline.

Even if the quantity of works utilizing alternative development indicators remains small, the analytical frame is mainly limited to descriptive or correlational analysis, with few systematic causal researches. For instance, the ANS, which is the measure of the investment in human capital, the depletion of assets, as well as environmental degradation, was recognized as the better variable measuring sustainable development (Hess, 2010; Cunhae Sá & Leitão, 2018); however, this variable is rarely applied in tourism research frameworks utilizing econometric approaches.

In contrast, the present research advances the current knowledge base by explicitly addressing these conceptual and methodological gaps. It employs a multidimensional developmental framework grounded in Amartya Sen's Capability Approach (1999) and the Sustainable Development Goals (SDGs) framework to assess tourism's role in achieving broader developmental outcomes. Utilizing an unbalanced panel dataset across multiple countries that spans from 1995 to 2023, this investigation applies rigorous econometric methodologies, including Granger causality testing, Fixed and Random Effects models, and Analysis of Variance (ANOVA), to analyze both economic and social variables (such as literacy rates, the Gini index, and political stability) as well as environmental variables (including CO_2 emissions and ANS).

By marrying the structural indicators (such as institutional quality and infrastructure) with the outcome based indicators (such as human development and environmental performance), the study enables more subtle differentiation of the TLD and DLT group of countries. The thesis thus breaks through the typical growing orthodoxy, enabling the more context-sensitive and subtle understanding of the interaction of tourism and development trajectories within diverse national contexts.

1.5 Research Questions

The research is structured around three central questions that align with the study’s objectives and guide its comparative, empirical, and theoretical investigations:

1.5.1 Research Question I

How does tourism contribute to GDP growth in developed and developing nations, and what are the key differences in its impact across these economic contexts?

1.5.2 Research Question II

To what extent do tourism receipts, governance indicators, exchange rates, and income levels influence human development outcomes, as measured by the Human Development Index (HDI), in developed and developing countries?

1.5.3 Research Question III

How do Tourism-Led Development (TLD) and Development-Led Tourism (DLT) models differ in terms of their economic, environmental, and social sustainability, and what structural variables explain these differences?

1.6 Objectives of the Study

1. To analyze the differential impacts of tourism on GDP growth in developed and developing nations by examining key economic, governance, and environmental factors.
2. To analyze the impact of tourism, socio-economic factors, and governance indicators on the Human Development Index (HDI) in developed and developing nations.
3. To evaluate the Tourism-Led Development (TLD) and Development-Led Tourism (DLT) models from socio-economic and environmental perspectives.

It aims :

i. To analyze the relationship between tourism and economic development.

ii. To compare the economic, social, and environmental impacts of Tourism-Led Development TLD and Development-Led Tourism DLT nations, identifying key trends in GDP growth, social equity, and environmental sustainability.

iii. To classify countries based on their tourism development relationship and examine how governance, infrastructure, and socio-economic factors influence tourism's role in national development.

1.7 Organisation of the study

Chapter Number	Chapter Name
1	Introduction
2	Literature Review
3	Research Methodology
4	Tourism and GDP Growth Analysis and Discussion
5	Tourism Governance and HDI Analysis and Discussion
6	Tourism-Led vs Development-Led Tourism Models Analysis and Discussion
7	Results and Findings
8	Conclusion, Theoretical Contribution, Policy Implications and Future Directions

Chapter 2

Literature Review

2.1 Tourism and Economic Growth

The relationship between tourism and economic growth always attracted the attention of researchers, policymakers, and development practitioners. Many times, tourism is advocated as the core of the national plans of development due to the many benefits in foreign exchange in terms of earnings, employment generation, infrastructural development, and local development. As a services sector, tourism has the unique characteristics of linkage with other sectors and the creation of multiplier effects within the economy.

A vast majority of the empirical research concur with the strong association of the expansion of tourism with GDP development in various spaces and income levels. Kum et al. (2015) indicated that in the Next11 countries, there is the long-term statistical association between GDP and the arrival of tourists, with the latter facilitating economic development. Importantly, they established the unidirectional causality from GDP using tourism but with the consequence that economic development is capable of stimulating and initiating the development of tourism but not vice versa (Kum et al., 2015). Comparatively, in ASEAN countries, research conducted like the work of Holik (2016) revealed that the foreign tourist arrival, tourism income, and exchange rates contribute significantly to GDP mainly through the sequence of tourism driven growth (Holik, 2016).

Tourism-Led growth (TLG) hypothesis has been empirically confirmed in numerous applications. Risso (2018), for instance, applied the Granger causality test to a sample of 179 countries worldwide and found bidirectional strong causality between GDP per capita and tourism, verifying the feedback hypothesis. The estimates of the elasticities indicated that tourism receipt growth of 100% would lead to the GDP per capita growth of 7–10%, emphasizing the economic importance of tourism (Risso, 2018). Similar evidence was presented by Fawaz et al. (2014), whose panel data study of 144 countries verified the favourable influence of international tourism upon growth among various regional and income groupings (Fawaz et al., 2014).

However, more and more researchers assert that the association among tourism and economic development is seldom automatic or direct. Du et al. (2016) challenge too simplistic assumptions in their demonstration that tourism needs to intersect with other structural economic factors like capital accumulation and institutional quality in order to build long-term development. Their long Solow model of growth clarifies that investment in tourism is inadequate absent incorporation into national economic policy (Du et al., 2016). Likewise, Lanza (1998) suggests that specialization in tourism, as much as offering any comparative advantage, is highly contingent upon natural endowment quality and the capacity of the sector to innovate and create value in order to sustain its future (Lanza, 1998).

At the regional level, Brida and Risso (2010) confirmed that the tourism in South Tyrol permitted sustainable economic growth based on demandside drivers. However, they also confirmed that the economic growth did little in terms of supporting tourism, implying the presence of the oneway causal link that may reflect some regional or structure attributes (Brida & Risso, 2010). Similarly, Aratuo and Etienne (2019) concluded the same in the case of the United States, in which they confirmed that while some of the subsectors of tourists such as food services and accommodations had long-term impacts in terms of economic growth, others presented weak effects or no effects (Aratuo & Etienne, 2019).

Another significant aspect is related to the diverse effects of tourism in both developed and developing nations. Naik (2025) found that whereas tourism and infrastructure in developed countries are the main drivers of economic development, institutions like governance quality and bed occupancy levels become more significant in the context of developing nations. Such differences emphasize the necessity of tourism policies that are context specific, with due regard for local economic configurations and institutional capabilities (Naik, 2025).

Overall, the scholarship is unanimous in favor of a positive, at times mutual relationship between economic development and tourism. Nevertheless, the vigor, direction, and sustainability of the relationship continue to be dependent upon variable mediators such as the standard of governance, infrastructural grade, pool of human resources, and environmental management. Therefore, tourism is poised as an influential economic catalyst, but the efficiency will be dependent upon strategic alignment with the broader developmental ends.

A notable weakness in previous research is the tendency to confuse development with economic growth and using GDP as a universal variable in many instances. Though GDP expansion captures the expansion in economic output only, the same is silent on sustainability, environmental degradation, or losses in human capital. Such narrow perspective underpinned policies that gave topmost importance to current expansion and often at the detriment of future wellbeing.

Adjusted Net Savings (ANS), introduced as a measure by the World Bank, is a better and more precise measure of development because investment in human capital, depletion of natural assets, and environmental degradation are included in the measure. Unlike GDP, with no link with welfare and sustainability, ANS shows the latter. Actual research, for instance, established that there is a positive but moderate linkage of the ANS with the welfare measures such as the Human Development Index (HDI) and infant mortality (Gnegne, 2009).

Moreover, current research identifies ANS as the primary long-term economic sustainability and investment attractiveness motivator. It more accurately captures the development's economic, environmental, and social dimensions than GDP (RudenkoSudarieva & Shevchenko, 2021), (Drastichová, 2017).

Moreover, there is evidence that the ANS puts more emphasis on sustainable development than traditional proxies of growth or savings, as other regional works (Din et al., 2021), (Hess, 2010) indicated. What's more, scholars indicated that such indexes like the ANS embody the environmental and social values that tend to be left out in the GDP based examination (Thiry & Cassiers, 2010). In spite of this, the dominant discussion within conventional development texts almost entirely focuses upon economic growth, while omitting the deeper observations from the perspective of ANS. The latter highlights the notable gap within the scholarship: the importance of clearly delineating growth from development, as well as promoting ANS as the better barometer of inclusive and sustainable progress.

2.2 Governance and Institutional Factors

Institutional and governance structures are the success factors of the outcomes of tourism development. Good government is more than administrative efficacy; it is transparent decision-making, accountability, and interaction among stakeholders that ensure destinations' resilience, inclusiveness, and competitiveness.

Empirical research verifies that institutional strength is significantly connected to tourist performance. Panel data for 65 developing countries was utilized by Khan, Ahmad, and Haleem (2021) to establish that proxies for government effectiveness, political stability, and regulatory quality significantly promoted tourism spending and employment, although investor sentiment was undermined by terrorism and corruption. Corresponding results are revealed by Daryaei et al. (2012) to demonstrate that institutional terms positively contributed to tourism for OECD as well as developing countries, although effects were larger for countries with poor governance. Education and literacy were also facilitating elements for advanced countries.

For Europe, Beha (2023) demonstrated that rule of law and government effectiveness institutional characteristics mattered to tourist arrival and employment growth, highlighting the institution's role in broader socio-economic results. Beyond macro-level indicators, the participative and collaborative structures of governance that, for instance, Afirisal (2022) proposed for Indonesia and Bichler & Lösch (2019) for South Tyrol, point to the role of trust, leadership, and local engagement to foster sustainability and legitimacy of policies for tourism. In similar strands, Moscardo (2011) and Pulido-Fernández & Pulido-Fernández (2019) advocate for participative models that emphasize transparency, inclusiveness, and stakeholder accountability. Theoretically, governance is considered today as dynamic, networked process of many actors with diversified interests and relations of power (Queiróz & Rastrollo-Horrillo, 2015). Within such models, tourism generates not only economic success but equity, social involvement, and social capital. Governance and equity are hence not distinct matters but strongly connected: equitable results in tourism tend to be contingent upon the institutional context that oversees redistributed resources, guarantees inclusiveness, and reduces risks of corruption and instability.

2.3 Tourism and Social Equity

The function of governance and institutional frameworks in the growth of tourism is a critical field of interest under the field of tourism scholarship, particularly in relation to sustainability, equity, and long-term economic planning. For tourism, governance is more than the efficiency of public institutions and adherence to the requirements of the law but the framework under which the diverse stakeholders are involved in the act of making choices, coordinating activities, and exercising mutual accountability. Effective governance thus fosters the strategic development of tourism locations based on better resilience, competitiveness, and inclusiveness.

Empirical evidence always proves that better institutional quality is linked with better tourism performance. Working with panel data from 65 emerging economies, Khan, Ahmad, and Haleem (2021) developed a governance index using variables like governmental effectiveness, voice and accountability, political stability, and quality of regulation. The study found that all the governance indicators had statistically significant positive impacts on the development of tourism—i.e., in terms of tourist expenditure, domestic participation, and employment contributions. The study further established the negative impacts of terrorism and corruption that affect investors' confidence and threaten the perceived destination image (Khan et al., 2021).

In their comparison of countries, Daryaei et al. (2012) compared 30 OECD countries with 30 developing countries and concluded that institutional variables like regulator quality and political stability boosted tourism in both sets but with more significant impacts in the context of the latter countries with more severe governance issues. Education and literacy were particularly found to significantly influence tourism development only in the context of OECD countries, while this implies that building institutional capacity requires the accumulation of human capital in order to maximize the benefits of tourism (Daryaei et al., 2012).

In the European context, Beha (2023) explored the connection between institutional quality and tourism in 27 European Union member countries. Her results confirmed that governance attributes, particularly rule of law, voice and accountability, and government effectiveness, are important drivers of the increase in both the number of tourists that arrive and jobs within the tourism sector. These findings highlight the crucial role played in both the development of tourism as well as more general socio-economic outcomes in the presence of strong institutions (Beha, 2023).

In addition to macro-level measures, the principle of collaborative and participatory governance has gained significant prominence in the scholarship related to destination management. Afrisal (2022) showed that in Indonesia, collaborative governance approaches enabled the co-creation of tourism policies through the collaboration of governmental institutions, local societies, and private parties. Participatory structures enabled the creation of tourism products that draw upon local realities and strengthened the legitimacy of tourism governance structures (Afrisal, 2022). Likewise, Bichler and Lösch (2019) revealed in their case analysis of South Tyrol that destination leadership, trust, and institutional support were instrumental in overcoming the challenges related to collaborative governance and gaining synchronized destination development (Bichler & Lösch, 2019).

Governance is also essential in ensuring that tourism delivers sustainable development. Citing Moscardo (2011), the use of knowledge systems, communities, and training programs in the formulation of tourism governance is instrumental. She believed that there is the need in shifting the paradigm of governance from regulation and command to empowerment and facilitation in order to harmonize tourism with other environmental and societal objectives (Moscardo, 2011). Similarly, Pulido Fernández and Pulido-Fernández (2019) also favored the idea of multiple-phased governance framework, namely diagnosing, strategic planning, implementation, and tracking. Their framework that is being promoted is in favor of transparency, inclusiveness, and coordination with the stakeholders as the fundamental aspects of sustainable management of tourism (Pulido Fernández & Pulido-Fernández, 2019).

Theoretically, the governance is increasingly networked and dynamic with various actors who possess various interests, roles, and power dynamics. Effective destination governance, as maintained in the argument of Queiróz and RastrolloHorrillo (2015), demands that the stakeholders engage at every step of the continuum of tourism policy from the planning phase to the implementation, evaluation, and feedback loops. The governance here is more institutional arrangement than the development of accountability culture and collective responsibility (Queiróz & RastrolloHorrillo, 2015). In short, the current scholarship emphatically points out that governance and institutional issues are core and not marginal in the attainment of sustainable and effective tourism development. Good governance is imperative in enhancing the effectiveness of tourism policies, fostering stakeholder engagement, mitigating the risk of corruption and instability, and aligning tourism activities with sustainable societal goals. As such, there is the imperative of building strong governance structures at both local and national levels as a way of transforming tourism potential into sustainable and inclusive development outcomes.

2.4 Environmental Impact of Tourism

Secondary data researches on data have thus become integral to the understanding of the carbon footprint of tourism expansion, particularly with reference to international arrivals of tourists and tourism receipts. Through the use of panel datasets from the World Bank, UNWTO, as well as from countries themselves, the researches establish if environmental sustainability is strengthened or weakened by tourism expansion.

A frequently cited study of Le and Nguyen (2021) assessed 95 nations in the period from 1998 through 2014 based on the STIRPAT framework. Their study confirmed that travel related to tourism generates more CO_2 emissions due mainly to the mode of transportation, while tourism generated revenue can have the capability of mitigating the emissions related to heating as well as that from electricity—implying that tourist revenue could encourage the use of cleaner technology in certain scenarios (Le & Nguyen, 2021).

In the Mediterranean context, Yildirim et al. (2021) tested the EKC hypothesis in 15 countries using data from the years 2001–2017. The regime based specification identified tourist arrivals as increasing carbon in the initial stages but subsequently reducing it after some eventual threshold of development is passed. Of special note was that tourism receipts reduced the emissions in more developed contexts, highlighting the national capacity effect in terms of being able to cope with environmental impacts (Yıldırım et al., 2021).

Broader synthesis is presented by Zhang (2022) in a meta study of 47 researches. He determined that arrivals of tourists and tourism receipts contribute to rising levels of CO_2 emissions and energy consumption but with variation at the regional as well as method level. Those with stricter environmental regulations as well as infrastructures can more effectively lessen the impacts (Zhang, 2022).

National findings further tease out the tourism–emissions relationship. For Turkey, Bahar and Demir (2023) established that foreign visitor arrivals significantly augment the emission of CO_2, whereas tourism receipts have a dampening effect. These contrasting effects imply that the quantity as well as the quality of tourism is important with high value tourism being potentially used to finance environmental protection (Bahar & Demir, 2023).

In Malaysia, Solarin (2014) found that tourists are long-term emitters of CO_2 but short term contributors to GDP. This highlights the danger of environmentally costly tourism that is economically beneficial only in narrow terms—a big challenge facing low income economies that don't have sustainability frameworks (Solarin, 2014).

From a developmental perspective, Sharif et al. (2017) utilized time series data from Pakistan to illustrate that fluctuations in tourist arrivals can Granger cause an increase in CO_2 emissions. Their findings advocate for national policies aimed at reconciling the environmental consequences of tourism while optimizing its economic benefits (Sharif et al., 2017).

Introducing more international frame of reference, Lodhi et al. (2024) reviewed the case of 123 countries and established that growing levels of CO_2 diminish tourism arrivals, in particular where environmental conditions specifically worsen. The negative relationship forms the foundation of the argument that environmental degradation suppresses the long-term viability of tourism as evidence supporting cleaner patterns of growth (Lodhi et al., 2024).

Third, Tugcu and Topcu (2018) investigated the impact of various kinds of anthropogenic emissions (gaseous, liquids, and solid fuels) on receipts of premier tourist destination areas. They found that gaseous fuel is associated with receipts in the positive direction, whereas solid fuel and fuel liquids are associated with receipts in the negative direction, especially in the short period—it means tourists avoid areas with noticeable environmental degradation (Tugcu & Topcu, 2018).

2.5 Global and Regional Studies

Diverse sets of global as well as local scholarship examines the nuanced dynamics between tourism, economic development, governance, as well as sustainability within various geopolitics as well as socio-economic contexts. Such scholarship frequently accesses secondary information provided via global institutions such as the World Bank, UNWTO, as well as WTTC, along with national statistical authorities, in order to identify patterns over space as well as over time.

By applying a multiregional input-output framework in the global value chain framework, Liu (2022) inspected the value of tourism in the Thai economy and its spill-over in the world economy. The findings reported high domestic linkages of tourism with national economies but low connectivity with world value chains, reflecting that the global economic value of tourism depends on better infrastructures in trade and aligning the governance (Liu, 2022).

Similarly, Hussain and Nawaz (2024) also predicted the panel of 103 countries using the CSARDL model and established that tourism revenues significantly contribute to GDP both in the short and long term. However, the governance effect was institutions pecific and varied across institutional contexts. Their study exemplifies that effective legal and regulatory systems are critical in tapping the economic dividends from tourism globally (Hussain & Nawaz, 2024).

In examining local tourism development in Europe, Presutti and Torrisi (2009) assessed local indicators like linguistic capabilities and the density of the hotels. They determined that the level of regional openness, as measured through air travel measures and linguistic diversities, is significantly correlated with labor productivity as well as economic growth. Their evidence underpins the idea that tourism is positive in terms of economic growth in addition to improving international integration and the formation of the human capital (Presutti & Torrisi, 2009).

In the Latin American context, Camelo Avedoy et al. (2020) implemented a comparative study concerning the development of tourism in Mexico and Cuba. The cross-sectional study emphasized how tourism policies consistent with globalization have brought regional sites into the world tourism market, improving foreign exchange inflows as well as offering employment opportunities. However, the authors recommend that the inequality among the regions remains, with the employment results being often experienced in the scenario of underemployment as well as poor wage jobs in the informal sector (Camelo Avedoy et al., 2020).

Som et al. (2013) investigated the resilience frameworks of Southeast Asian tourism under various crises, such as natural disasters and political disturbances. Through the use of secondary data, they confirmed that regional cooperation and development triangles assisted countries in co-marketing their tourism products as well as sustaining visitor flows in the face of outward interruptions. Nevertheless, the strategies were limited through governance capabilities as well as dissimilar infrastructures within the countries in question (Som et al., 2013).

In the case of Africa, Meyer et al. (2017) utilized pooled panel cointegration to evaluate the role of tourism in economic development in the Vaal Triangle region of South Africa. Regional development was significantly driven by tourism through the analysis of the period from 2001 to 2015 based on available secondary data. The development was, however, challenged through the absence of infrastructure as well as policy consistency. Through their qualitative research in the form of local stakeholders' interviews, they focused on the importance of inclusive governance and capacity building in order to sustain the use of tourism as a development tool (Meyer et al., 2017).

A Farmaki (2015) study in Cyprus investigated regional network governance using semi-structured interviews in combination with secondary institutional information. The research identified that public-private tourism organizations did not have the autonomy in the decision making processes and were limited due to the presence of economic austerity, the role of the external tour operators, and the absence of community participation. The study implies that context-specific governance structures are significant in fostering sustainable regional tourism (Farmaki, 2015). Finally, Kushnir and Brenzovych (2019) investigated global patterns utilizing data from the UNWTO and the World Bank. Their findings indicated that the number of tourist arrivals and associated revenues have steadily increased across most regions, with Asia and Europe leading in both volume and growth. However, various destinations in Africa and the Middle East, despite possessing significant potential, lag due to inadequate infrastructure and on-going political instability, highlighting stark disparities in regional performance and equity in tourism benefits (Kushnir & Brenzovych, 2019).

2.6 TCCM Based Literature Review Table

Table 2. 1 TCCM Based Literature Review

Author(s)	**Theory**	**Context**	**Variables**	**Methodology**	**Key Findings**
Aistov & Nikolaeva (2019)	TLGH	116 countries	Tourism receipts, GDP	Panel causality	Empirical support for TLGH
Albaladejo et al. (2018)	Environmental dynamics	Model	Tourism, pollution	Dynamic model	Tourism growth needs sustainability
Anson & Avin (2016)	TLGH	India	Tourism receipts, GDP	Correlation & regression	Tourism positively impacts GDP; potential underutilized
Antonakakis et al. (2019)	Country clustering	113 countries	Tourism, GDP	Panel VAR	Causality depends on economic cluster
Aratuo & Etienne (2019)	Sectoral analysis	USA	Subsectors: lodging, food	Industry level time series	Certain subsectors impact GDP
Aslan (2014)	TLGH	Turkey	Tourism expenditure (by education), GDP	ARDL & Hatemi J Causality	Bidirectional causality from educated tourist spending
Badulescu et al. (2018)	ARDL	CEE	Tourism, GDP	ARDL causality	Country level long run relationships

Badulescu et al. (2020)	TLGH	Romania	Tourism arrivals, GDP	Cointegration, Granger	Tourism → GDP in short run; feedback in arrivals
Badulescu et al. (2020)	TLGH	Romania	Tourism receipts, GDP	Granger causality	Bidirectional causality between tourism receipts and GDP
Balaguer & CantavellaJorda (2002)	TLGH	Spain	Tourism, GDP	Cointegration	Tourism drives GDP in Spain
Banday & Kocoglu (2015)	TLGH	India	Tourism earnings, GDP	Cointegration & Granger	Bidirectional causality and long-run association
Bento (2016)	TLGH	Portugal	Domestic/foreign tourism, GDP	Cointegration & Granger	Domestic tourism causes GDP growth
Brida & Risso (2010)	TLGH	South Tyrol	Tourists, GDP	Cointegration & causality	Tourism causes GDP growth
Brida & Risso (2010)	TLGH	South Tyrol	Tourism demand, GDP	Johansen cointegration, Granger	Tourism causes GDP in long run, no reverse causality
Brida et al. (2008)	TLGH	Chile	Tourism receipts, GDP	Cointegration	Tourism supports long run GDP
Brida et al. (2009)	TLGH	Colombia	Tourism expenditures, GDP	Cointegration tests	Tourism Granger causes GDP
Brida et al. (2020)	Economic regimes	80 countries	GDP growth, tourist arrivals	Clustering, trees	Clusters show performance patterns

Çağlayan et al. (2012)	Regional causality	135 countries	Tourism revenue, GDP	Panel Granger causality	Direction of causality varies by region
CárdenasGarcía et al. (2015)	Development linkage	144 countries	Tourism, GDP	Regression	Tourism boosts GDP in higher income nations
CastroNuño et al. (2013)	Metaanalysis	Multiple countries	Tourism and GDP elasticity	Meta analysis of 87 estimates	Positive but varying elasticity between tourism and GDP
Čerović et al. (2016)	TLGH	Serbia, Montenegro, Macedonia	Tourism metrics, GDP	Panel regression	EU integration boosted tourism which correlated with GDP
Changliang (2011)	TLGH	China	Tourism consumption, GDP	Comparative analysis	Positive link between GDP per capita and tourism demand
Cheam (2012)	TLGH + Investment Freedom	Malaysia	Tourism receipts, GDP, macro vars	VECM & Johansen	Tourism affects growth via multiple indirect paths
Cristian (2020)	TLGH	EU & global	Tourism, GDP	Statistical summary	Top 5 markets showed strong GDP tourism links pre-COVID
Das et al. (2024)	Volatility causality	Cambodia	Tourism volatility, GDP volatility	Symmetric/asymmetric TVC	Volatile tourism affects GDP in select periods

Dhakal et al. (2016)	VECM causality	Nepal	GDP, expenditure, forex earnings	VECM, Granger	Bidirectional GDP spending, GDP → forex earnings
Dhungana (2023)	Tourism GDP causality	Nepal	Arrivals, exchange, stay length	Time series	Tourism and GDP have causal links
Dritsakis (2004)	TLGH	Greece	Tourism revenues, GDP	VAR & Granger	Unidirectional causality from tourism to GDP
Du et al. (2016)	Solow Model	109 countries	Tourism investment, capital	Growth model	Tourism must complement broader strategy
Durbarry (2004)	TLGH	Mauritius	Tourism receipts, GDP	Johansen cointegration	Tourism has long run effect on GDP
EugenioMartin et al. (2004)	TLGH	Latin America	Tourism & income	Panel estimation	Tourism causes income growth only beyond income threshold
Fandra (2017)	TLGH	ASEAN	Tourist arrivals, GDP per capita	Panel cointegration	Bidirectional causality between tourism and GDP
Fandra (2017)	TLGH	ASEAN countries	Tourist arrivals, GDP per capita	Panel cointegration & Granger	Bidirectional causality between tourism and GDP
Fawaz et al. (2014)	TLGH	144 countries	Tourism, GDP	Panel data	Positive effect of tourism on growth

Figini & Patuelli (2021)	Tourism Impact Estimation	EU	Tourism share of GDP	Tourism Satellite Accounts	Tools to compute total tourism contribution to GDP
Ghali (1976)	Early TLGH	Hawaii	Tourism, GDP	Simple regression	Tourism linked to GDP growth
Ghosh (2011)	TLGH	India	Tourist arrivals, GDP	Cointegration & VAR	No long or short-term causality
Gofurova (2023)	Global Review	Global regions	Tourism sector % of GDP	Descriptive economic analysis	Tourism's GDP share dropped during pandemic; varies by region
Gooroochurn & Sinclair (2005)	Tourism productivity	Global	Tourism contribution, GDP	Panel analysis	Tourism productivity boosts GDP
Gövdeli & Direkçi (2017)	Panel cointegration	OECD	Tourism revenue, GDP	Panel cointegration	Positive long run relationship
Gul & Özer (2018)	Frequency domain causality	Turkey	Tourism income, GDP	Frequency domain Granger	Short run causality GDP → tourism
Gungor et al. (2015)	TLGH	Next11 countries	Tourist arrivals, GDP	Panel causality	Tourism arrivals have long run effect on GDP
Holik (2016)	TLGH	ASEAN	GDP, tourist revenue, exchange rate	Panel regression	Tourism boosts GDP

Ilban & Liceli (2022)	TLGH + Firm Performance	Turkey	Tourism growth, GDP, ROA/ROE	TodaYamamoto	Tourism and GDP influence firm performance
Kantarcı et al. (2014)	Investment & GDP	Balkan countries	Tourism investment, GDP	Correlation	Govt/private investment → spending → GDP growth
Kaur & Sharma (2015)	Multiplier effect	India	FTAs, capital investment	Regression	Tourist arrivals drive GDP
Khalil et al. (2007)	Multiplier effect	Pakistan	Tourism, GDP	Time series	Tourism generates income and jobs
Kharatyan & Tigranyan (2021)	TLGH	Armenia	Tourism receipts, GDP	VAR & Granger causality	Short run bilateral causality, no long run link
Ksamawan et al. (2019)	Global Tourism Economics	Continents	Tourist visits, GDP	Error Correction Model	Tourism affects GDP in Asia, EU, MENA but not America
Kum et al. (2015)	TLGH	Next11 countries	Tourist arrivals, GDP	Panel cointegration	Unidirectional causality from tourism to GDP
Lanza (1998)	Comparative Advantage	Global	Tourism specialization, resource use	Theoretical	Long-term growth depends on sustainability
Lee & Chang (2008)	TLGH	OECD & non OECD	Tourism receipts, GDP	Panel cointegration	Stronger TLGH effects in non OECD countries

Manole & Buiga (2022)	Accommodation based TLGH	Eastern Europe	Tourism nights, GDP	VAR model	Partial causality from tourism indicators
Mete (2021)	TLGH + Economic Freedom	Mediterranean	Tourism, GDP, freedom indices	Dumitrescu Hurlin	Tourism revenue causes GDP; freedom effects vary
Mose & Nyoni (2022)	TLGH	Zimbabwe	Tourism revenue, GDP	ARDL & Granger	TLGH valid in short and long run
Munir et al. (2015)	TLGH	Malaysia	Tourism receipts, GDP	ARDL, cointegration	Bidirectional causality
Munir et al. (2015)	TLGH	Malaysia	Tourism arrivals, GDP	ARDL & Gregory Hansen	Bidirectional long run causality
Naik (2025)	Institutional Theory	Dev. vs. Dev'ing	Governance, occupancy	Panel regression	Tourism growth drivers differ by context
Naik (2025)	Comparative TLGH	Global – Dev vs. Dev'ing	Expenditure, GDP, governance	Panel FE/RE models	Tourism affects GDP differently by development level
Narayan et al. (2010)	TLGH	Pacific Island countries	Tourism & GDP	Panel estimation	Tourism positively impacts GDP
Nowak et al. (2007)	TLGH + FDI	Spain	Tourism, GDP, FDI	Dynamic model	Tourism stimulates GDP via FDI

Nunkoo et al. (2020)	Meta analysis	113 studies	Tourism growth link	Meta regression	Evidence favors TLGH; findings sensitive
Oh (2005)	TLGH	Korea	Tourism & GDP	Johansen & VECM	No long run causality; weak support for TLGH
Pata (2021)	Shock asymmetry	G10	Tourism arrivals, GDP	Asymmetric panel causality	Positive tourism shocks drive GDP
Pata (2021)	TLGH	G10 countries	Tourist arrivals, GDP	Asymmetric panel causality	Tourism causes GDP under positive shocks
Paudel et al. (2023)	Sustainable tourism	5 South Asian countries	Tourism, GDP, CO_2	VAR Granger	GDP tourism links vary by country; CO_2 has indirect effects
PérezRodríguez et al. (2015)	Dependence theory	Spain, UK, Croatia	Tourism receipts, GDP growth	Copula GARCH	Asymmetric dependence; time varying in Croatia
PérezRodríguez et al. (2015)	TLGH	UK, Spain, Croatia	Tourism receipts, GDP	Copula GARCH	Significant positive dependence between tourism and GDP
PhungTran et al. (2014)	TLGH	5 European countries	FDI, ITA, GDP	VAR, Granger	Short run links among variables differ by country
Pina & MartínezGarcía (2013)	Endogenous Growth	Model based	Tourism services	Theoretical model	Tourism fuels long run growth

Pjanić & Mitrašević (2020)	TLGH	European Union	Tourism spending, GDP	SPSS regression	Business and domestic tourism predict GDP growth
PulidoFernández & CárdenasGarcía (2020)	Feedback Hypothesis	143 countries	Tourism, GDP	Structural equation model	Bidirectional relationship
Puranti et al. (2011)	Tradeled growth	74 countries	Trade, tourism, GDP	Log linear regressions	Both tourism and trade support growth
Rajapakse (2016)	Causality	Sri Lanka	GDP, ITA, FDI	VAR, Granger causality	GDP influences FDI and tourist arrivals
Rajapakse (2016)	FDI & Tourism	Sri Lanka	FDI, tourist arrivals, GDP	VAR & Granger	GDP affects FDI & tourism in short run; no cointegration
Risso (2018)	Feedback Hypothesis	179 countries	Tourism receipts, per capita GDP	Granger causality	Strong bidirectional causality
Risso (2018)	TLGH	179 countries	Tourist arrivals, receipts, GDP	Panel Granger causality	Bidirectional causality supports tourism growth feedback
Sahin & Uner (2013)	Export equivalent	Developing countries	Tourism income	Empirical	Tourism acts like export revenue
Samimi & Sadeghi (2011)	TLGH	Developing countries	Tourism & GDP	PVAR	Long run bidirectional causality supports TLGH

Seetanah (2011)	TLGH	19 island economies	Tourism receipts, GDP	Panel data	Tourism positively affects growth
Shahzad et al. (2017)	TLGH	Top 10 tourist destination	Tourism activity index, GDP	Quantile on quantile	Positive tourism growth link varies across countries
Sharma & Sharma (2015)	TLGH	India & Pakistan	Tourism earnings, GDP	ADF, Cointegration, Granger	Unidirectional causality from tourism to GDP
Sharma & Sharma (2015)	TLGH	India & Pakistan	Tourism earnings, GDP	Granger causality & cointegration	Unidirectional causality from tourism to GDP
Simonetti et al. (2019)	TLGH	EU	Tourism rev, arrivals, expenditure, GDP	Granger, cointegration	Long run relationships among tourism indicators and GDP
Simonetti et al. (2019)	TLGH	EU countries	Tourism rev/arrivals/expenditure, GDP	Granger & Johansen	Long run relationships found between tourism and GDP
Škrabić Perić & Vidovic (2017)	TLGH	11 EU countries	GDP, tourism receipts	Heterogeneous Granger	Bidirectional in some, GDP-led in others
Soylu (2020)	Granger causality	Top tourism economies	Tourism exp, arrivals, GDP	Panel causality	Mixed causality patterns
Soylu (2020)	TLGH	Top 8 tourist destination	Tourism receipts, GDP	Panel Granger	Bidirectional causality between tourism and GDP

Suhel & Bashir (2017)	Investment & causality	Indonesia	Tourists, spending, investment	Regression & causality	Tourism stimulates GDP
Suhel & Bashir (2017)	TLGH	Indonesia	Tourism investment, GDP	Granger & Regression	Tourism variables significantly influence GDP
Suresh & Senthilnathan (2014)	TLGH	Sri Lanka	Tourism earnings, GDP	Cointegration, Granger	GDP causes tourism; no reverse effect
Tiwari & Anjum (2016)	Multiplier & correlation	India	GSDP, tourist arrivals	Correlation analysis	Tourism strongly linked to regional GDP
Tomar (2024)	TLGH	Madhya Pradesh, India	Tourism, GDP	Granger causality	Long-term one way causality from GDP to tourism
Tugcu (2014)	TLGH	Mediterranean countries	Tourism, GDP	Panel Granger	Causality depends on country; EU more consistent
Vedapradha et al. (2017)	TLGH	India	Tourist arrivals, GDP	Regression & correlation	Domestic tourism significantly contributes to GDP
Vita & Kyaw (2016)	Income threshold	129 countries	Tourism, GDP	GMM	Tourism boosts GDP in mid/high income nations
Wu et al. (2020)	TLGH	11 Asian regions	Tourism receipts, arrivals, GDP	Wavelet causality	Time-varying bidirectional relationship confirmed

Yazdi et al. (2017)	TLGH	Iran	Tourism spending, GDP	ARDL & Granger	Bidirectional long and short run causality
YuChi & Lin (2018)	TLGH	Taiwan	FDI, GDP, ITA	Granger, cointegration	Bidirectional GDPITA link
Zhongcai (2009)	TLGH	China (4 provinces)	Tourism, GDP	Cointegration, Granger	1% tourism rise boosts GDP 0.26%

2.7 Summary of Gaps in Existing Literature

While much research has been conducted in this area, various aspects of limitation can be seen in them. Most of the literature has concentrated on the GDP contribution of tourism, employment, or foreign exchange, omitting the wider developmental aspects of equity, sustainability, and institutional quality. Comparative analysis of nations that clearly defines Tourism-Led Development (TLD) and Development-Led Tourism (DLT) is not yet common, and the nuanced difference in results under these two models is usually somewhat simplified. Governance and institutional heterogeneity, despite their theoretical recognition, are rarely systematically integrated into empirical models.

Environmental effects of tourism are another underexplored theme. Whereas studies at times note problems like CO_2 emissions, it is only rarely included within the fundamental nexus of tourism–development. Such exclusion is especially startling in the context of international focus over sustainability and climate-sensitive development pathways. In methodology too, much of the studies is limited to the application of static models or simple correlation-based research that does not consider causality and bi-directionality. Finally, theoretical contribution has been patchy. Whereas it is de rigueur to find studies citing concepts like the Tourism-Led Growth Hypothesis, Institutional Theory, or Amartya Sen's Capability Approach, comparatively few tests or extensions of them, through suitable econometrics, can be identified.

This thesis fills these gaps directly through a comparative and multi-dimensional analysis. Instead of depending only on GDP, it utilizes human development, sustainability, and governance indicators to procure a more holistic representation of the developmental contribution of tourism. Panel econometric methods and Granger causality are employed to test the nexus of tourism–development for all those countries that are developing, as well as those that are already developed, thus clarifying whether tourism is largely a by-product of, or an antecedent to, development. It also explores the role of mediation by institutional quality, macro-economic conditions, and governance, thus answering questions of why different contributions are made by tourism in different contexts.

By dividing countries into TLD and DLT groups and comparing economic, social, and environmental outcomes, the analysis moves beyond descriptive to provide causal and policy-relevant results. It does so by bridging theory and empirics: the Tourism-Led Growth Hypothesis is tested, as much as broader frameworks of, for example, Amartya Sen's Capability Approach and the Sustainable Development Goals. The net output is such that the analysis situates tourism not as an isolable sectoral phenomenon, but as a multi-dimensional force that interacts with governance, equity, and sustainability in determining national development trajectories.

Chapter 3

Research Methodology

3.1Theoretical Background of the Study

It is a well-known fact that tourism is a strong force in economic growth, job creation, foreign exchange earnings, and development of infrastructure. However, the outcomes of tourism influence on the national development as a whole are complex and dependent on the situations in countries and many. Such effects are also complex and they need high level of theoretical basis to comprehend the multifold effects of tourism in different socio-economic and institutional set ups. In the present research paper, the three theoretical frameworks, i.e. the Tourism-Led Growth Hypothesis (TLGH), the Capability Approach of Amartya Sen and the Institutional Theory provide an extensive outlook to the analysis of interfaces of tourism and development.

3.1.1 Tourism-Led Growth Hypothesis (TLGH)

Tourism is one of the potential sources of growth especially in the countries endowed with natural and cultural resources as postulated in the Tourism-Led Growth Hypothesis (TLGH). The hypothesis is that tourism plays a role in enabling growth of economies through earning of foreign exchange, creation of jobs, transfer of technology as well as instigating an investment in infrastructure and services sector (Balaguer &CantavellaJordà, 2002). Tourism has been referred to as a "invisible export" in that it earns income by virtue of external demand, thereby leading to domestic production as well as enhancing diversification of economies (Sequeira & Campos, 2007).

Empirical evidence indicates that tourism in a number of developing nations has been a significant driver of GDP acceleration, a trend that has hitherto been termed Tourism-Led Development (TLD). However, sceptics contend that TLD is based on too elementary assumptions, as it does not take into consideration structural limitations that are inbuilt in host economies. For instance, income leakage, dependence of tourism-based economies upon fluctuating international market forces, as well as marginalization of locals in tourism dividends, can completely undermine its development impacts (Sharpley, 2009).

Furthermore, TLGH does not adequately consider absorptive capacity differences in different countries, which is a country's capacity to absorb and make use of foreign input such as infrastructure, knowledge, and capital. Infrastructure sufficiency, good governance, as well as income distribution, are among the factors that greatly determine whether Tourism-Led economic gains are transformed into wider development results (Du et al., 2016).

3.1.2 Amartya Sen's Capability Approach

Amartya Sen's Capability Approach provides a more inclusive conceptualization of development by moving away from aggregate measures of economics to people's welfare. The approach contends that development is about the extension of people's capability to live lives that people value (Sen, 1999). As an alternative to focus primarily on GDP or income measures, the Capability Approach attaches importance to improvement of important freedoms and opportunities, including access to care, education, and distributive economic participation.

When applied to tourism, this reasoning is that it can contribute to the development of the people in terms of increasing their freedom and welfare rather than due to its economic contribution (Scheyvens, 2011). To ensure that tourism actually plays any role in development, it should have redistributive arrangements and accountable governance where the revenues are converted into social capital, such as better literacy, access to medical services, and distribution of incomes (Robeyns, 2005).

This strategy also reveals market-based policy shortcomings of a tourism policy since most of the time, policies only benefit the elites and transnational capital at the cost of local people. The institutional environments otherwise would be low, or the ruling apparatus was biased, tourism may be seen to bring about a simulated economic life, yet it is not always so that tourism would turn out to have a developmentally beneficial impact in any sense.

3.1.3 Institutional Theory

The Institutional Theory offers a critical perspective according to which the relations of tourism-development can be considered placing institutions in the limelight of the stage whereby the developmental trajectories are determined. Following North (1990), institutions are both formal and informal rules governing social, economic, and political relations. The standard of such institutions greatly affects program success in development, especially in terms of allocation of resources, distribution of benefits, as well as settlement of conflict.

Under Institutional Theory, the extent to which tourism promotes development is dependent on the governance scenario. Those countries that are blessed with strong institutions, characterized by features of transparency, accountability, political stability, and effective regulatory frameworks, are more effective in harnessing tourism towards holistic development (RodriguezPose, 2013). Conversely, situations involving corrupt practices, weak enforcement of regulations, and sociopolitical disturbances usually witness tourism exacerbating economic leakage, inequality, and environmental degradation (Khan et al., 2021).

Institutional Theory accounts for differing development outcomes across countries that possess equivalent tourism resources. Countries that engage in participative tourism planning, support equal resource allocation, and environmentally supportive policy tilt towards achieving balanced outcomes in the economies, socially, as well as environmentally.

3.1.4 Relevance of the Study

In consideration of varying experiences of both developed and developing countries in employing tourism as a means of development, above theoretical frameworks are central to this work. TLGH stresses that tourism has the potential to be a source of economic growth, but the Capability Approach is more inclusive in its evaluation system, taking into account the human development, and social equity. In its turn, the institutional Theory emphasizes the strong role of governing and regulatory institutions in this aspect. The multifaceted effect of tourism on the growth of the Gross Domestic Product (GDP), Human Development Index (HDI) and the sustainability indicators Adjusted Net Savings (ANS) in a general sample of countries across the world is the empirical analysis of this study as formulated using its models. With the adding of the governance aspect that is the political stability and income distribution, this study can think in detail about the situation when tourism can be regarded as a developing factor as much as a temporary flow of incoming finances.

3.2 Theoretical Foundation

Each of the studies is anchored on the positivistic research paradigm that contains epistemological position, according to which there is objectively determined reality, which can be cognized through the quantifiable collection and analysis of the data. The strategy fits well the prime center of the study, which is testing hypothesis on the economic and development effects of tourism using econometric models. The positivistic approach implies that the empirical approach, statistical support, and repeatable procedures will be employed, as the qualitative paradigms of research would indicate (Saunders et al., 2019).

This instance uses deductive research design, which goes deductively, i.e. abstractly, of theory informed paradigms, in this instance, Tourism-Led Growth Hypothesis (TLGH), Modernization Theory, Institutional Theory and Capability Approach, to empirical verification of assumptions due to involvement of structured data. This is due to the fact that the theory base allows a holistic critical analysis of interlinkages between tourism and macro-economic development, human development and environmental sustainability (Sen, 1999; North, 1990; Rostow, 1960).

The method is comparative in nature and based on a longitudinal panel structure of data, where the data of multiple countries will be studied within a long-period of time (1995–2023). This method not only enables time but also cross-national comparisons which enhances the generalizability and analytical richness of the findings.

With the use of techniques of quantitative research, the proposed study aims at identifying the relations of causality and interdependence between variables through the application of statistical tools, including panel regression tests, Granger causality tests, and the analysis of variance tests. Through these methods, empirical analysis of interplays in the development process has become possible to differentiate TLD and DLT, and thereby enhance both the scope and policy implications of inferences (Baltagi, 2008; Hsiao, 2014).

3.3 Research Methodology using research Onion Model

The Research Onion Model

The conceptual framework proposed by Saunders, Lewis, and Thornhill (2019) as the Research Onion Model is an effective way of systematizing the research design in terms of the methodological choice, i.e., starting with the philosophical grounds and concluding with the way to interpret the data analytically. All the elements of this model have been carefully constructed to ensure that the methodologies adopted match the objectives of the study that will aim at determining the different impacts of tourism on economic growth and human development in developed and developing countries.

Layer 1: Research Philosophy – Positivism

Research philosophy could be taken as the core of assumptions and beliefs that lead to the knowledge creation and development (Saunders et al., 2016). Saunders identifies five major perspectives of this process, which include positivism, interpretivism, pragmatism, critical realism, and postmodernism. The philosophy mostly used in the present study is a positivist, the current research implies that it has adapted to a positivist mind, one that believes in the existence of a real world that can be subjected to empirical observation in terms of measurements and analysis. The present course of work assumes a positivist approach as it focuses on measurable variables such as the GDP growth, HDI, the revenues produced by tourism, political stability, and the CO 2 emission, which are statistically measurable.

Layer 2: Research Methodology – Deductive

The deductive and the inductive approaches are two significant methods of research that are frequently used (Saunders et al., 2016). The positivist philosophy and quantitative methodology are also closely related, as the deductive approach begins with the analysis of literature and accepted theories in order to formulate hypotheses. Data are then collected and analyzed to prove these hypotheses and the results are based on which they support or refute the initial assumptions and hence refine the theories (Bryman, 2001). In comparison, inductive approach is linked to interpretivist philosophy and the qualitative methodology. This method is aimed at creating new theories based on insights of empirical observations and grounded evidence, which may be then generalised to a broader setting (Bernard, 2013). It has however been condemned to be limited by virtue of the fact that the limited information of the researchers might hamper their capability to critically connect the findings of the empirical studies on the theoretical models (Myers and Klein, 2011). The deductive form of reasoning is based on informed reasoning, meaning that it is logical, predictive and empirically testable, because of the influence of theoretical frameworks including TLGH, the Capability Approach, Modernization Theory, and Institutional Theory. The type of research design chosen in the current study is deductive research design because the proposed study will focus on establishing a cause effect relationship among the variables under investigation.

Layer 3: Research Methodology – Quantitative Analysis

There are three general types of research methods quantitative, qualitative, and mixed-methods (Saunders et al., 2016). The quantitative methodology uses numbers and statistical models to measure relationships, hypothesis testing, and generalisation (Creswell and Creswell, 2018). Conversely, qualitative research focuses on the use of subjective senses and insights (Denzin and Lincoln, 2011) whereas mixed methods embraces the two to bring an element of depth and measurement (Tashakkori& Teddlie, 2010).

In the present study, a quantitative approach has been selected, as the objectives involve assessing the causal relationships between tourism-related variables and economic, social, and environmental indicators. Specifically, three dependent variables are examined: GDP growth (annual % change), Human Development Index (HDI), and Adjusted Net Savings (ANS). These are analysed against independent variables such as tourism receipts, CO_2 emissions, tourist arrivals, political stability, exchange rates, literacy levels, Gini index, and income levels. To ensure robustness, a range of econometric models have been applied, including unit root tests, pooled OLS regression, fixed effects model (FEM), random effects model (REM), log transformation, Breusch–Pagan test, Hausman test, Granger causality test, ANOVA, and panel data regression.

This methodology was chosen because quantitative econometric techniques allow for the identification of cause-and-effect relationships, ensure statistical validity, and facilitate generalisation across time and spatial contexts. Given these advantages and the nature of the study's objectives, the research adopts a quantitative methodological approach.

Level 4: Research Selection – Archival/secondary research

In line with Saunders et al. (2016), research strategy refers to the practical plan adopted to achieve research objectives, and may include surveys, experiments, case studies, grounded theory, action research, ethnography, or archival/secondary analysis. For the present study, the most suitable strategy is archival/secondary research combined with econometric modelling, as the analysis relies on existing datasets covering the period 1995–2023. The study draws on secondary data relating to tourism receipts, CO_2 emissions, political stability, exchange rates, income levels, literacy rate, Gini index, tourist arrivals, and other macro-economic indicators, which are subjected to a range of econometric techniques such as panel regression models (Pooled OLS, FEM, REM), unit root tests, Granger causality tests, ANOVA, and robustness diagnostics. This strategy is appropriate because it enables the use of large-scale panel and time-series data, ensures efficiency in data collection, and facilitates hypothesis testing through statistically rigorous models. Therefore, the research employs an archival/secondary data analysis strategy supported by econometric modelling.

Layer 5: Time Horizon – Longitudinal Analysis of Panels

As Saunders et al. (2016) note, research designs can be cross-sectional or in the form of a longitudinal time horizon. A cross-sectional research will gather data at one time point to present a picture of how variables relate but a longitudinal one will follow the variables throughout a long time to see patterns, relationships and causal connections. The current research uses longitudinal time horizon since it examines secondary panel. This long period gives an opportunity to study the short-run and long-run impacts of the tourism-related variables in the economic growth, human development, and environmental sustainability. The longitudinal approach makes the analysis more robust and offers more information about the trends in time and cause-effect associations due to the address of almost thirty years.

Layer 6: Data Collection and Data Analysis – Panel Data Econometrics

Data Collection

In this research, secondary sources of data are used to investigate the tourism and national development relationship in both developed and developing countries. The compilation of the datasets was based on reputable international organisations including the world bank, United Nations development programme (UNDP) and the United Nations world tourism organisation (UNWTO). Variables such as tourism receipts, GDP growth, Human Development Index (HDI), Adjusted Net Savings (ANS), political stability, exchange rates, income levels, literacy rates, Gini index, CO_2 emissions, and tourist arrivals were systematically collected for the period 1995–2023. Countries were classified based on the United Nations' development classification, with a total of 195 countries initially included, though some were excluded due to missing data points. To ensure consistency, all data underwent processes of integrity checks, cleaning, and standardisation before analysis

Data Analysis

The study adopts a quantitative analytical approach grounded in econometric modelling to assess causal linkages between tourism and development outcomes. Several statistical tools and tests were employed, including descriptive statistics, unit root tests for stationarity, Breusch–Pagan tests for heteroscedasticity, fixed and random effects models, Hausman tests for model selection, variance inflation factor (VIF) tests for multicollinearity, and robustness checks. For causal relationships, Granger causality tests were applied to distinguish between Tourism-Led Development (TLD) and Development-Led Tourism (DLT) trajectories. Furthermore, ANOVA was used to evaluate differences in socio-economic and environmental indicators (e.g., literacy rates, CO_2 emissions, income inequality and GDP) between TLD and DLT groups. By integrating these methods, the study not only identifies statistically significant determinants of GDP growth and HDI but also provides a comparative framework to evaluate the long-run sustainability of tourism's role in national development

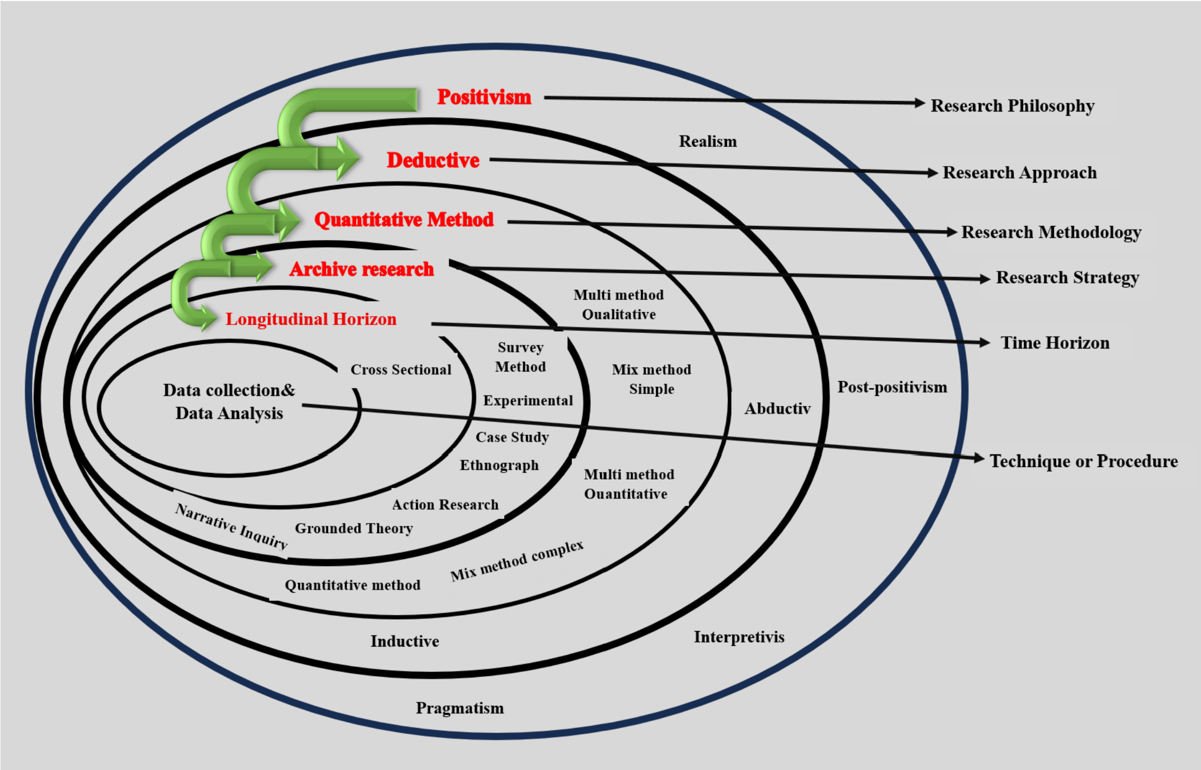
Sampling Method and Sample Design

Sampling Method

This research adopts a non-probability purposive sampling method, since the selection of entities was determined by the availability and completeness of data across countries. Instead of surveying individuals, the study draws upon secondary macro-level data for nations classified as developed and developing by the United Nations (2023). Out of 195 countries, only those with consistent and reliable data for the chosen period (1995–2023) were retained for analysis, while countries with substantial missing values were excluded automatically by the statistical software to maintain validity and robustness of results

Sampling Design

The sample design was constructed in alignment with the three main research objectives. For Objective I, the dataset includes countries where indicators such as tourism receipts, tourist arrivals, CO_2 emissions, political stability, exchange rates, and income levels were consistently available, enabling the testing of their effects on GDP growth. For Objective II, the sampling frame was restricted to those nations with complete records of Human Development Index (HDI) alongside governance and tourism variables, ensuring comparability across developed and developing contexts. For Objective III, the sample was further classified into Tourism-Led Development (TLD) and Development-Led Tourism (DLT) groups based on Granger causality results. This stratification permitted the evaluation of socio-economic and environmental differences between the two groups. Overall, the sample design thus ensures representativeness at a global level while maintaining methodological rigour by aligning variables with each research objective



Source: Adapted from Saunders et al. (2012, p.128)

Figure 3. 1 The Research Onion Framework

3.3.1 Objective I: Sampling Design for Tourism's Impact on GDP Growth

To investigates the relationship between tourism and GDP growth using a balanced panel dataset covering the period from 1995 to 2023. The selection of countries was driven by data availability for key macro-economic and tourism indicators.

Sampling frame

The sampling frame consists of country year observations for all sovereign nations with available secondary macroeconomic and tourism statistics for 1995–2023. Countries are classified as developed or developing using the United Nations scheme, and the unit of analysis is the national panel (Unbalanced). Core variables required for Objective I include GDP growth (annual %) as the dependent variable and the tourism–governance covariates used in the econometric models (e.g., tourism receipts, tourist arrivals, CO_2 emissions, occupancy measures, political stability, exchange rate, income level, tourism expenditure). Data are sourced from the World Bank, UNDP, and UNWTO; the initial universe comprises 195 countries, subject to data sufficiency checks and standardisation routines prior to analysis. This frame is chosen to maximise external validity, enable developed–developing comparisons, and ensure alignment with the study's longitudinal design and archival strategy.

Inclusion criteria

Countries are included if (i) they are recognised in the UN classification used for grouping; (ii) they have consistent series for GDP growth and the Objective-I regressors over the study window sufficient for panel estimation (after cleaning and standardisation); and (iii) their indicators pass basic integrity checks needed for unit-root testing, FE/RE modelling, and diagnostic tests (Breusch–Pagan, Hausman, VIF). Inclusion ensures that each retained country contributes enough time-series depth to identify causal/associational patterns and supports robust within/between variation necessary for the chosen econometric specifications

Exclusion criteria

Countries are excluded when (i) key variables are missing for substantial portions of 1995–2023, leading the software to drop them automatically; (ii) series are non-comparable due to definitional breaks that cannot be harmonised; or (iii) extreme data sparsity would undermine model convergence or inflate leverage/instability in estimates. Exclusions protect construct comparability, reduce measurement error, and preserve the assumptions of panel estimators and diagnostic tests, thereby enhancing internal validity of the GDP-growth models.

Final Sample

For Objective I, the study classified countries into developed and developing categories using the United Nations (UN) regional convention, wherein Europe, Northern America, Japan, Australia, and New Zealand are considered "developed," while Africa, Asia (excluding Japan), Latin America and the

Caribbean, and Oceania (excluding Australia and New Zealand) are grouped as "developing" (United Nations, 2023). This classification was validated against the IMF World Economic Outlook (WEO) roster, which distinguishes between "Advanced Economies" and "Emerging Market and Developing Economies" (International Monetary Fund, 2023). Countries with missing data were excluded, resulting in a final sample of 164 countries (32 developed, 132 developing). This approach is consistent with previous tourism–growth studies that adopt a binary classification of developed versus developing nations for panel econometric analysis (Lee & Chang, 2008; Paramati et al., 2017).

3.3.2 Objective II: Sampling Design for Tourism and Human Development

To assesses the influence of tourism and governance indicators on the Human Development Index (HDI) for the period 1995 to 2022.

Sampling frame

The sampling frame comprises country year observations for all UN-classified developed and developing nations with available secondary statistics on Human Development Index (HDI) and the required covariates tourism receipts, political stability, exchange rate, and income level for the period 1995–2022. Data are drawn from recognised international repositories (World Bank, UNDP, UNWTO), and organised as a panel (unbalanced where needed) to align with the longitudinal design and fixed-effects estimation adopted for Objective II. Descriptive summaries and the modelling set-up for the HDI objective are presented in Chapter 5, where the variables (logged where appropriate) and the FEM choice are documented. This frame is chosen to (i) allow within-country inference on HDI dynamics, (ii) retain global coverage across development groups, and (iii) match the econometric requirements for panel diagnostics (unit-root, Breusch–Pagan, Hausman) and fixed-effects modelling.

Inclusion criteria

Countries are included when they (a) appear in the UN development classification used for grouping, (b) have consistent HDI series and the four regressors over sufficient years between 1995 and 2022 to support panel estimation, and (c) pass basic data integrity and comparability checks so that variables can be log-transformed and used in Fixed Effects Models (FEM) with robust inference. These criteria ensure adequate time variation within each country, comparability of constructs across nations, and compliance with the diagnostics that justified FEM for HDI (e.g., Hausman).

Exclusion criteria

Countries are excluded when (a) key HDI or covariate series are missing for substantial parts of 1995–2022, (b) definitional breaks render indicators non-comparable and cannot be harmonised, or (c) data sparsity would compromise model convergence or inflate leverage in FEM estimates. In practice, entities failing these checks are dropped programmatically during cleaning and estimation—an approach already noted in the project materials—thereby protecting internal validity and estimator assumptions.

Final sample

For Objective II, which assessed the influence of tourism and governance on human development, the classification again followed the UN regional convention, with adjustments to ensure consistency across available Human Development Index (HDI) data (United Nations, 2023). This produced a reduced sample of 96 countries, consisting of 38 developed and 58 developing nations. To validate robustness, we compared our assignments with the IMF Advanced Economy list and World Bank income groups, noting strong consistency in classification (International Monetary Fund, 2023; World Bank, 2023). Similar binary groupings have been employed in the tourism and development literature; for instance, Fang, Yin, and Wu (2021) explicitly divided 102 economies into 31 developed and 71 developing countries using World Bank classification thresholds, while Paramati et al. (2017) compared CO_2–tourism–growth relationships across developed and developing groups. These precedents strengthen the legitimacy of our grouping strategy.

3.3.3 Objective III: Classification of Countries Using Granger Causality (TLD vs. DLT)

To explores the directionality of causality between tourism arrivals and environmental sustainability, measured via Adjusted Net Savings (ANS), from 1995 to 2021.

Sampling frame

The sampling frame consisted of all United Nations–classified countries for which annual data were available on international tourism arrivals and ANS in the World Bank and UN datasets. Initially, 195 countries were screened; however, only those with sufficient data continuity were retained for econometric testing. This frame was chosen to ensure broad global representation while maintaining data integrity for causality analysis.

Inclusion criteria

Countries were included if (i) annual data on tourism arrivals and ANS were consistently available for a minimum of 20 years during 1995–2021; and (ii) the time series met the requirements for lag optimisation under the Granger causality framework (Granger, 1969).

Exclusion criteria

The exclusion criteria included (i) absence of sufficient and continuous data series on tourism arrivals or ANS; (ii) inconsistencies in definitions rendered the data non comparable; or (iii) the series were too short to use effectively as lag structures. The countries that exhibit no statistically significance in both directions in Granger causality were also excluded in TLD-DLT based regressions.

Sample size

The final sample was 99 countries after the data sufficiency constraints have been implemented, with each country having at least 20 years of annual data on tourism arrivals and ANS. This level was necessary in order to permit non-negligible lag structures in Granger causality testing and to produce meaningful statistical inferences.

Data Collection and Sources

This research paper solely relies on the secondary data that were sourced through internationally recognised and reputable databases to form reliability, consistency and cross-country comparability. The secondary data selection was determined by the fact that the study involved secondary data because longitudinal and panel econometric techniques mandated harmonised data sets spanning various decades.

The data contain a broad set of macroeconomic, social and environmental indicators within the three objectives of the research. The United Nations World Tourism Organization (UNWTO) was used to gather tourism related variables including tourism receipts, tourist arrivals and tourism expenditure. Economic measures such as GDP growth, Exchange rates and income levels and the environmental indicators such as CO 2 and Adjusted Net Savings (ANS) were obtained in World Development Indicators at the World Bank. The variables that were used to gather information on social and governance related aspects were listed as Human Development Index (HDI), literacy rates, Gini index and political stability which were provided by the United Nations Development Programme (UNDP) and World Governance Indicators (WGI). The UNDP HDI rankings and World Bank income levels were used to classify countries into developed and developing categories.

These internationally standardised datasets also lead to the fact that the variables are comparatively methodologically similar across countries and over time which facilitates the validity of cross-country econometric analysis. Furthermore, using reliable and highly referenced sources of data, the study minimizes the potential outcome of a measurement error and strengthens the conclusions of study findings.

Time Frame

Accordingly, the period from 1995 to 2021 was selected to capture Causality dynamics between tourism, economic development (ANS). The panel dataset utilised in this study covers the period 1995 to 2023, thereby providing a comprehensive span of 28 years. Such an extended timeframe is essential for capturing both short-term shocks and long-term structural trends that shape the relationship between tourism, economic growth, human development, and environmental sustainability. Within this period, the dataset reflects the influence of critical global and regional events, including the 2008 global financial crisis, the COVID-19 pandemic, and a series of political and institutional reforms across different regions. Incorporating these episodes strengthens the empirical analysis by situating the econometric results within a broader socio-economic and historical context. Consequently, the longitudinal scope not only enhances the robustness and reliability of the findings but also ensures their relevance for policy formulation in the face of evolving global challenges (World Bank, 2023).

Table 3. 1: Population and Sample size for Developed and Developing Countries

Source / Framework	**Total Countries Recognized**	**Developed Countries**	**Developing Countries**	**Notes & Citations**	**Papers Using Similar Classification**
United Nations (UN DESA/UNCTAD, 2023)	195 UN member states + 2 observers	≈43 (“developed regions”: Europe, Northern America, Japan, Australia/NZ)	≈152 (“developing regions”: Africa, Asia excl. Japan, Latin America & Caribbean, Oceania excl. Australia/NZ)	UN, *World Economic Situation and Prospects 2023*	
IMF (2023)	190 member countries	40 Advanced Economies	150 Emerging Market & Developing Economies	IMF, *World Economic Outlook 2023*	

Objective I (GDP Growth)	164	32	132	UN-based grouping + IMF Advanced list; exclusions for missing data	Paramati et al. (2017); Dritsakis (2012); Tiwari (2011)
Objective II (Tourism & HDI)	96	38	58	Subset of countries with consistent HDI and covariates	Fang et al. (2021); Gössling et al. (2015); Antonakakis et al. (2015)
Objective III (TLD vs. DLT Classification)	99	*	*	Countries regrouped by Granger causality into Tourism-Led or Development-Led	Oh (2005); Narayan (2004); Seetanah (2011); Payne & Mervar (2010)

–*(classified by causality, not by dev. status)

Source: (Compiled by Author)

Table 3. 2: Data Sources, Objectives, and Definitions of Variables Used in the Study

Variable	Objective(s)	Source	Definition	Definition Reference
Tourism Receipts	I, II, III	World Bank; WTTC (supplementary)	Total inbound tourism expenditure, including payments by international visitors for goods and services.	World Bank. (2023). International tourism, receipts (current US$). https://data.worldbank.org/indicator/ST.INT.RCPT.CD
Room Occupancy Rate	I	UNWTO	Percentage of available rooms occupied in a given period.	UNWTO. (2023). Glossary of tourism terms. https://www.unwto.org/glossarytourismterms
Bed Place Occupancy Rate	I	UNWTO	Percentage of available bed places occupied in a given period, assessing accommodation capacity use.	UNWTO. (2023). Glossary of tourism terms. https://www.unwto.org/glossarytourismterms
Exchange Rate	I, II, III	World Bank	Official exchange rate of domestic currency per US dollar (annual average).	World Bank. (2023). Official exchange rate (LCU per US$). https://data.worldbank.org/indicator/PA.NUS.FCRF
Political Stability	II, III	Worldwide Governance Indicators (WGI)	Perceptions of likelihood of government destabilisation or unconstitutional/violent overthrow.	Kaufmann, Kraay, &Mastruzzi. (2010). The Worldwide Governance Indicators. World Bank.
Income Level (GDP per capita)	I, II, III	World Bank	GDP divided by midyear population.	World Bank. (2023). GDP per capita (current US$). https://data.worldbank.org/indicator/NY.GDP.PCAP.CD
Adjusted Net Savings (ANS)	III	World Bank	Net savings adjusted for education expenditure, resource depletion, and pollution damage.	World Bank. (2023). Adjusted net savings (% of GNI). https://data.worldbank.org/indicator/NY.ADJ.SVNG.GN.ZS

Human Development Index (HDI)	II	UNDP	Composite index of health, education, and living standards.	UNDP. (2023). Human Development Index (HDI). https://hdr.undp.org/datacenter
Tourist Arrivals	I, III	UNWTO	Number of international tourists staying at least one night in the destination.	UNWTO. (2023). Glossary of tourism terms. https://www.unwto.org/glossarytourismterms
Tourism Expenditure per Tourist	I, II	UNWTO; WTTC	Average amount spent per tourist (accommodation, transport, food, activities).	UNWTO. (2023). Measuring expenditure. https://www.unwto.org/statistics
Gini Index (Income Inequality)	III	World Bank (WDI)	Measure of income distribution (0 = equality, 100 = inequality).	World Bank. (2023). Gini index. https://data.worldbank.org/indicator/SI.POV.GINI
Literacy Rate	III	UNESCO; World Bank	Percentage of population (15+) who can read and write.	UNESCO Institute for Statistics. (2023). Literacy rate, adult total (%). https://data.uis.unesco.org
CO_2 Emissions	III	World Bank (WDI)	Carbon dioxide emissions from fossil fuel use and industry, per capita.	World Bank. (2023). CO_2 emissions (metric tons per capita). https://data.worldbank.org/indicator/EN.ATM.CO2E.PC

Source: (Compiled by Author)

3.4 Data and Analytical Readiness

3.4.1 Data Integrity and Standardization

To ensure reliability and comparability, the datasets employed in this study were subjected to a comprehensive data preparation process involving cleaning, transformation, and validation. This multistep procedure enhanced the consistency of the panel data and aligned it with the econometric requirements of the study.

First, normalization and log transformation were applied to variables that exhibited high skewness, such as tourism receipts, income levels, and CO_2 emissions. This step ensured that the assumptions of linear regression models were satisfied and that extreme values did not bias the results. Second, stationarity checks were carried out through unit root tests, including the Augmented Dickey–Fuller (ADF) test and the Fisher-type panel unit root test, to confirm that the time-series properties of the variables met the prerequisites for panel econometric analysis (Baltagi, 2008).

Third, the issue of missing data was addressed systematically. Where missingness was random and remained within acceptable thresholds, list wise deletion was applied. However, countries with severe or systematic gaps in their data were excluded from the corresponding sample frame to preserve the validity of statistical inferences.

Finally, alignment and merging procedures were undertaken to harmonize data sourced from multiple international databases. The use of ISO 3166 country codes was made to achieve consistency and all variables have been transformed into an annual frequency and converted into similar units (e.g. economic indicators are standardised to USD). This standardisation made sure that data sets in various sources were compatible and the analysis was an articulate and coherent panel structure.

3.4.2 Software and Analytical Readiness

Each and every dataset was systematically sorted, pre-processed, and validated to make sure it is of adequate quality to be considered in sophisticated econometric modelling. Merging and transformation of data was conducted with the help of R statistical software where packages like dplyr and tidyr are utilised to restructure, clean and normalise the variables. The validity of these processes was checked using cross-tabulations, descriptive summaries and diagnostic checks hence internal consistency was achieved and the possibility of data-processing errors were reduced.

Following this, the harmonised data were put in analytical form so that they could be estimated in R and E- view. R was used to handle data management, transformations and preliminary statistics checks whereas E-Views was used to perform econometric estimation including panel regressions, Granger causality tests and robustness diagnostics. Along with the establishment of a consistent empirical basis of the thesis, such a multistage preparation also helped to make the findings transparency, reproducibility, and analytically valid. The ability to perform rigorous hypothesis testing, produce strong model estimates, and draw policy-relevant inferences of the tourism-development nexus was possible by making sure that data were appropriately organized and were software-friendly.

3.5 Variable Definitions and Operationalization

The following table summarises the dependent and independent variables used across the three research objectives, along with the econometric models applied, study period, and key supporting citations.

Table 3. 3: Variable Definitions and Operationalization

Objective	Dependent Variable	Independent Variables	Econometric Models Used	Period of Study	Key Citations
Objective I: To analyse the impact of tourism on GDP growth in developed and developing nations	GDP Growth (Annual % Change)	Tourism Receipts, CO_2 Emissions, Establishment Numbers, Bed Occupancy Rates, Average Length of Stay, Political Stability, Exchange Rate, Income Level, Tourist Arrivals, Tourism Expenditure	Unit Root Tests (Stationarity), Pooled OLS Regression, Fixed Effects Model (FEM), Random Effects Model (REM), Log Transformation, Breusch–Pagan Test (Heteroscedasticity), Hausman Test (Model Selection), Variance Inflation Factor (VIF) Test (Multicollinearity)	1995–2023	Meo et al. (2020); Mwamba et al. (2020); Juwita et al. (2021); Nguyen (2018); Pérez-Rodríguez et al. (2015)
Objective II: To evaluate the effect of tourism and governance factors on human development	Human Development Index (HDI)	Tourism Receipts, Political Stability, Exchange Rate, Income Level	Unit Root Tests (Stationarity), Pooled OLS Regression, Fixed Effects Model (FEM), Random Effects Model (REM), Log Transformation, Breusch–Pagan Test (Heteroscedasticity), Hausman Test (Model Selection), Variance Inflation Factor (VIF) Test (Multicollinearity)	1995–2022	Cahyanti&Fevriera (2020); Okon (2016); Soleman et al. (2022); Majchrzak-Jaszczyk (2022)
Objective III: To classify countries into Tourism-Led Development (TLD) and Development-Led Tourism (DLT) models	Adjusted Net Savings (ANS)	Tourism Arrivals, CO_2 Emissions, Literacy Rate, Gini Index, Political Stability, Exchange Rate	Unit Root Tests (Stationarity), Granger Causality Test (Causality), ANOVA (Group Differences), Panel Data Regression	1995–2021	Gavrilović &Radivojevic (2019); Dimaria (2018); Boos (2015)

3.6 Analytical Tools and Econometric Models

To empirically examine the complex, multidimensional relationships between tourism and development outcomes, this study applies a suite of advanced econometric techniques, with a focus on panel data analysis, causality testing, and model robustness. Each method is selected based on its suitability for the data structure (multicountry, multiyear) and the nature of the hypotheses under investigation.

The econometric strategy is structured according to the study's three core objectives.

3.6.1 Methodology for Objective I: Analyzing Tourism's Impact on GDP Growth

To evaluate the impact of tourism and governance variables on GDP growth in developed and developing nations.

Econometric Models Applied for Objective I:

Step 1: Stationarity diagnostics (pre-estimation)

Apply the Augmented Dickey–Fuller (ADF) and Fisher-type panel unit root tests to every time-series variable to verify stationarity an essential prerequisite for valid regression inference. Where non-stationarity is detected, transform the series (e.g., log or first-difference) until the stationarity condition is satisfied (Baltagi, 2008).

Step 2: Panel model estimation.

Estimate both Fixed Effects (FEM) and Random Effects (REM) specifications to account for unobserved, country-specific heterogeneity while exploiting the longitudinal structure of the data. Retain identical covariate sets and sample for comparability across the two estimators.

Step 3: Model selection.

Use the Hausman specification test to decide between FEM and REM. A significant test statistic indicates correlation between regressors and unit effects hence FEM is preferred for consistency; a non-significant result supports REM as the more efficient estimator (Hausman, 1978).

Step 4: Heteroskedasticity Diagnosis

Finally, diagnostic checks are conducted to test for heteroskedasticity. The Breusch–Pagan test is applied to detect non-constant error variance. In the case of the heteroskedasticity, the estimates are corrected by using the robust standard errors hence ensuring reliability and validity of the regression outcomes.

Step 5: Multicollinearity Assessment Using Variance Inflation Factor (VIF)

In order to verify the soundness of the estimation and ensure the soundness of the coefficient estimates, it was confirmed that there was no multicollinearity between the regressors with the help of the Variance Inflation Factor (VIF). Based on the classic threshold which was suggested by (Hair et al., 2019), those variables whose VIF exceeded 10 were considered to be signaling extreme multicollinearity and were removed or further analyzed.

Model Specification:

ADF equation (unit root test):

$$\boldsymbol{\triangle\, yt = \mu + \gamma y(t-1) \sum_{\{i=1\}}^{\{p\}} \beta i \Delta y(t-i) + \varepsilon t}$$

Where:

- $\triangle\, yt = yt - y(t-1)$ (the first-difference series)
- μ = Constant (drift term)
- $\gamma y(t-1)$=Lagged level term for unit root testing
- $\sum_{\{i=1\}}^{\{p\}} \beta i \Delta y(t-i)$=Added lagged differences to control for autocorrelation
- εt =Error term

Panel Regression Models:

1. For Developed Countries (Random Effects Model REM):

$$GDP_{it} = \alpha + \beta_1 TR_{it} + \beta_2 INFRA_{it} + \beta_3 ER_{it} + \beta_4 PS_{it} + \beta_5 IL_{it} + \beta_6 CO_{2it} + u_i + \varepsilon_{it}$$

Where:

- i=country Cross sectional unit
- t=Times (Years)
- α=Intercept
- GDP_{it} = GDP growth rate for country i at time t.
- TR_{it} = Tourism Receipts
- $INFRA_{it}$ =Tourism infrastructure (e.g. Occupancy rate, establishment).
- ER_{it}=Exchange rate
- PS_{it}=Political Stability
- IL_{it}=Income Level (GDP per Capita)
- CO_{2it}=CO_2 emissions
- u_i= Country-Specific Random effect
- ε_{it}= idiosyncratic error term

2. For Developing Countries (Fixed Effects Model FEM):

$$GDP_{it} = \alpha_i + \beta_1 TR_{it} + \beta_2 INFRA_{it} + \beta_3 ER_{it} + \beta_4 PS_{it} + \beta_5 IL_{it} + \beta_6 CO_{2it} + \varepsilon_{it}$$

Where:

- i=country Cross sectional unit
- t=Times (Years)
- α_i=Country specific intercept capturing unobserved Heterogeneity (fixed effect)
- GDP_{it} = GDP growth rate for country i at time t.
- TR_{it} = Tourism Receipts
- $INFRA_{it}$ =Tourism infrastructure (e.g. Occupancy rate, establishment).
- ER_{it}=Exchange rate
- PS_{it}=Political Stability
- IL_{it}=Income Level (GDP per Capita)
- CO_{2it}=Carbon dioxide Emission
- ε_{it}= idiosyncratic error term

3.6.2 Methodology for Objective II: Assessing Tourism and Governance Effects on HDI

To determine how much the tourism and macro-governance indicators determine the outcome of Human Development Index (HDI).

Econometric Models Appliedfor Objective II:

Step 1: Variable preparation and transformations.

Combine HDI panel (1995–2022) and tourism receipts, income level (GDP per capita), political stability and exchange rate. Log-transform the continuous regressors (e.g., ln TR, ln IL, ln ER) to reduce skewness and permit elasticity-based interpretation. For the dependent variable, use ln HDI as the main specification (ensuring strictly positive values); as a robustness check, apply a logit transform of HDI to respect its 0–1 bounds. Harmonise units/years, resolve outliers prudently (e.g., light winsorisation), and ensure consistent country codes for merges.

Step 2: Panel estimation (FEM & REM).

Estimate both Fixed Effects (FEM) and Random Effects (REM) using the same covariates and sample so results are comparable. Include time effects (year dummies) to absorb common shocks (e.g., the 2008 crisis, COVID-19). Use country-clustered robust standard errors to account for heteroskedasticity and within-country serial correlation.

Step 3: Model selection and comparative checks.

Apply the Hausman specification test to decide between FEM (consistency when unit effects correlate with regressors) and REM (efficiency when they do not). For benchmarking only, estimate a pooled OLS model on the identical specification; corroborate panel suitability with the F-test (FEM vs pooled) and the Breusch–Pagan LM test (REM vs pooled), while emphasising panel methods for their control of time-invariant heterogeneity.

Step 4: Diagnostics and robustness.

Diagnose heteroskedasticity (Breusch–Pagan/White) and, if present, retain robust/clustered standard errors; test for serial correlation (e.g., Wooldridge) and cross-sectional dependence (e.g., Pesaran CD), reporting Driscoll–Kraay or panel-corrected errors where warranted. Check multicollinearity via VIF and re-specify if needed; finally, run functional-form robustness (e.g., HDI logit transform; alternative governance proxies) and present comparative tables (FEM/REM/pooled), stating the preferred model based on Hausman and the diagnostics.

Model Specification:

ADF and Fisher type tests were applied to confirm stationarity.

For Developed Countries (Fixed Effects Model):

$$\boldsymbol{HDI_{it} = a_i + \beta_2 PS_{it} + \beta_3 ER_{it} + \beta_4 IL_{it} + \varepsilon_{it}}$$

Where:

- i=country Cross sectional unit
- t=Times (Years)
- HDI_{it} = Human Development Index of country i at time t.
- a_i = country-specific intercept (fixed effect).
- TR_{it} = tourism receipts.
- PS_{it} = political stability.
- ER_{it} = exchange rate.
- IL_{it} = income level (GDP per capita).
- ε_{it} = error term.

For Developing Countries (Fixed Effects Model):

$$\boldsymbol{HDI_{it} = a_i + \beta_1 TR_{it} + \beta_2 PS_{it} + \beta_3 ER_{it} + \beta_4 IL_{it} + \varepsilon_{it}}$$

- i=country Cross sectional unit
- t=Times (Years)
- HDI_{it} = Human Development Index of country i at time t.
- a_i = country-specific intercept (fixed effect capturing unobserved heterogeneity).
- TR_{it} = tourism receipts.

- PS_{it} = political stability.
- ER_{it} = exchange rate.
- IL_{it} = income level (GDP per capita).
- ε_{it} = idiosyncratic error term.

3.6.3 Methodology for Objective III: Evaluating TLD vs. DLT Models

To determine whether tourism leads to development (TLD) or if development precedes tourism growth (DLT), using environmental and social indicators as moderators.

Econometric Tools Used for Objective III:

Step 1: Granger causality tests.

The analysis begins with the application of Granger causality tests to examine the direction of causality between tourism-related variables and Adjusted Net Savings (ANS). This procedure helps to classify countries into two categories: Tourism-Led Development (TLD), where tourism arrivals Granger-cause ANS, and Development-Led Tourism (DLT), where ANS Granger-causes tourism arrivals. The countries that do not have substantial causal associations do not proceed to any further analysis of the countries based on classification.

Step 2: Analysis of Variance (ANOVA) for group differences.

The ANOVA will follow the classification with the aim of determining whether or not there is significant difference between the key social and environmental indicators of the TLD and the DLT groups. They are Gini index (income inequality), CO 2 and literacy rates and GDP. This Analysis provides some statistical evidence on whether the average of these indicators differs systematically between the two groups of countries.

Step 3: Panel regression by group.

Finally, the panel regression models of TLD and DLT are estimated. This provides it with the better analysis of the effect of the explanatory factors such as political stability, exchange rate, and tourist arrival in each category on sustainability performance. The regressions based on classification will ensure that the details of TLD and DLT countries are identified and analyzed respectively to enhance the analysis process and make it more valuable than a pooled analysis.

Model Specification – Granger Causality:

$$\boldsymbol{Y1t = \alpha + \sum_{\{i=1\}}^{\{p\}} \beta i Y1(t-i) + \sum_{\{j=1\}}^{\{q\}} \gamma j Y2(t-j) + \varepsilon t}$$

Where:

- Y1t=dependent Variable at time t.
- Y1, (t-i) = lags of dependent Variable.
- Y2, (t-j) =lags of the explanatory variable.
- α=Constant term
- $\beta i, \gamma j$= Coefficient of lagged Terms.
  p,q= optimal lag length (Chosen Via AIC or SIC)
- εt=error term

ANOVA Hypothesis:

$$H_0: \mu\_TLD = \mu\_DLT \text{ vs. } H_1: \mu\_TLD \neq \mu\_DLT$$

Panel Regression Model for GDP:

$$GDP_{it} = \alpha + \beta_1 TA_{it} + \beta_2 CO_{2it} + \beta_3 LIT_{it} + \beta_4 GINI_{it} + \beta_5 LE_{it} + \beta_6 UR_{it} + \varepsilon_{it}$$

Where:

- i=country Cross sectional unit
- t=Times (Years)
- α=Intercept
- GDP_{it} = GDP growth rate for country i at time t.
- TA_{it} = Tourism Arrivals

- CO_{2it}=Carbon dioxide Emission per capita
- LIT_{it}=Literacy Rate
- $GINI_{it}$=Gini Index (Income inequality)
- LE_{it}=Life Expectancy at Birth
- UR_{it}=Urbanization Rate
- ε_{it}= idiosyncratic error term

The empirical grouping of countries into TLD or DLT by using feedback loops and time lags used in development processes make this methodology possible.

3.7 Validity, Reliability and Robustness Checks

This research used a rigorous design to ensure credibility, generalizability, and stability of the empirical findings, which incorporated validity, reliability, and robustness of the findings. The following are used: multicounty panel data, econometric test of specifications, and a battery of diagnostic tests to increase methodological robustness and inference

3.7.1 Validity

Internal validity is remedied by applying panel data models that correct for unobserved heterogeneity at both cross-country and time levels. Consistency and efficiency in estimation were also achieved by the use of the Hausman specification test of model selection between Fixed Effects (FE) and Random Effects (RE). Another Granger causality test, which established directional relationship between tourism and development variables, supported the causal interpretation of the current study.

The coverage of income groups, systems of governance, and regions causes further external validity by the fact that the sample of 195 countries covers the world. The comparability and relevance of the indicators, including GDP growth, HDI, and CO_2 emissions, can be achieved due to the standardized use of the indicators by respected organizations, including World Bank, UNDP, and UNWTO.

3.7.2 Reliability

It was also strengthened by using well established and standardized international secondary data. The definitions of the variables were all operationalized using the generally agreed definitions. The study period was 28 years (1995–2023) and therefore allowed us to identify the patterns that have been maintained over time. By using EViews and R, data transformation (e.g., log transformation) and unit root tests and diagnostics of models were done consistently across datasets; hence, results can be replicated.

3.7.3 Robustness Checks

These subsequent diagnostic procedures were employed in testing the empirical results' strengths:

Stationarity.

To prevent spurious regressions, the Augmented Dickey–Fuller (ADF) and Fisher-type panel unit root tests were employed. Variables were considered stationary if the test statistics were significant at the 1%, 5%, or 10% levels ($p < 0.10$). Non-stationary variables were either differenced or log-transformed until they satisfied stationarity requirements, ensuring the validity of panel regressions.

Multicollinearity.

Multicollinearity was assessed using the Variance Inflation Factor (VIF). A VIF value above 10 was treated as a critical threshold (Hair et al., 2019), indicating severe multicollinearity. Variables approaching or exceeding this limit were carefully examined for redundancy, and, where necessary, adjustments were made to maintain stability in coefficient estimates.

Heteroskedasticity.

The Breusch–Pagan test was applied to test for heteroskedasticity. A p-value below 0.05 indicated rejection of homoskedasticity, confirming unequal error variances across units. To address this issue, all affected models were re-estimated using robust standard errors, ensuring unbiased inference despite heteroskedasticity.

Model fit.

Several fit measures guided model specification. The adjusted R^2 was used, with values closer to 1.0 indicating stronger explanatory power. The Akaike Information Criterion (AIC) was applied, where lower values signified better model fit. In addition, F-tests were employed to confirm joint significance of regressors at the 5% level ($p < 0.05$), thereby validating the overall explanatory strength of the models.

Group-specific models.

To account for structural heterogeneity, separate estimations were performed for developed and developing nations. This disaggregation allowed comparison across groups and ensured that results reflected differences in economic and institutional contexts, strengthening external validity.

Causality.

Granger causality tests were conducted to identify directionality between tourism and development indicators. Significance levels at 1%, 5%, and 10% were applied as thresholds. Where the null hypothesis of non-causality was rejected, causal links were confirmed, providing empirical evidence of whether tourism Granger-causes development indicators or vice versa.

Methodological Considerations

Several caveats are in order. First, model selection between FE and RE was made by Hausman tests. But this is assuming that unobserved effects are time invariant, while dynamic country characteristics over time might be ignored. Second, heteroskedasticity was detected and corrected by robust errors, while cross-sectional dependence and serial correlation are not modelled in a direct manner. Third, in certain models, high R^2 value might be overfitting, especially in models with small sample sizes. Fourth, although panel data address many of the endogeneity issues, this work had not employed instrumental variables methods, so structural causality is not possible to infer.

On HDI regressions, log transformation of the data helped normality, although it could not correct fully for index boundedness. Unexpected signs of coefficients and insignificance of major variables could indicate unobserved lags or contextual differences. Small group sizes and dependence upon Granger causality restrict strong causal claims under the TLD and DLT approach. However, clear reporting and identical methodology improve interpretation.

Lastly, whether to adopt variables in levels following stationarity tests depended upon the theoretical argument of long run interpretation. Pooled OLS estimation appeared in cross-group inference alone and does not take over FE/RE estimates. The study acknowledges data frequency, gaps in coverage, and limitations of variable construction in depicting complex bidirectional associations.

3.8 Hypotheses of the Study

The study formulates hypotheses corresponding to each objective to empirically validate relationships using panel data techniques across different country classifications.

3.8.1 Main and Sub-Hypotheses for Objective I for GDP Growth – Developed and Developing Countries

Table 3. 4: Main and Sub-Hypotheses for Objective I for GDP Growth – Developed and Developing Countries

Hypothesis Statement
H_{01}: Tourism receipts do not significantly affect GDP growth. H_{01}a: Tourism receipts do not significantly affect GDP growth in developed countries. H_{01}b: Tourism receipts do not significantly affect GDP growth in developing countries. **H_{11}: Tourism receipts significantly affect GDP growth.** H_{11}a: Tourism receipts significantly affect GDP growth in developed countries. H_{11}b: Tourism receipts significantly affect GDP growth in developing countries.

H_{02}: CO_2 emissions do not significantly affect GDP growth. H_{02}a: CO_2 emissions do not significantly affect GDP growth in developed countries. **H_{12}: CO_2 emissions significantly affect GDP growth.** H_{12}a: CO_2 emissions significantly affect GDP growth in developed countries.
H_{03}: Number of tourism establishments does not significantly affect GDP growth. H_{03}a: The number of tourism establishments does not significantly affect GDP growth in developed countries. H_{03}b: The number of tourism establishments does not significantly affect GDP growth in developing countries. **H_{13}: Number of tourism establishments significantly affects GDP growth.** H_{13}a: The number of tourism establishments significantly affects GDP growth in developed countries. H_{13}b: The number of tourism establishments significantly affects GDP growth in developing countries.
H_{04}: Bed place occupancy rate does not significantly affect GDP growth. H_{04}a: Bed place occupancy rate does not significantly affect GDP growth in developed countries. H_{04}b: Bed place occupancy rate does not significantly affect GDP growth in developing countries. **H_{14}: Bed place occupancy rate significantly affects GDP growth.** H_{14}a: Bed place occupancy rate significantly affects GDP growth in developed countries. H_{14}b: Bed place occupancy rate significantly affects GDP growth in developing countries.

H_{05}: Room occupancy rate does not significantly affect GDP growth. H_{05}a: Room occupancy rate does not significantly affect GDP growth in developed countries. H_{05}b: Room occupancy rate does not significantly affect GDP growth in developing countries. **H_{15}: Room occupancy rate significantly affects GDP growth.** H_{15}a: Room occupancy rate significantly affects GDP growth in developed countries. H_{15}b: Room occupancy rate significantly affects GDP growth in developing countries.
H_{06}: Average length of stay does not significantly affect GDP growth. H_{06}a: Average length of stay does not significantly affect GDP growth in developed countries. H_{06}b: Average length of stay does not significantly affect GDP growth in developing countries. **H_{16}: Average length of stay significantly affects GDP growth.** H_{16}a: Average length of stay significantly affects GDP growth in developed countries. H_{16}b: Average length of stay significantly affects GDP growth in developing countries.
H_{07}: Political stability does not significantly affect GDP growth. H_{07}a: Political stability does not significantly affect GDP growth in developed countries. H_{07}b: Political stability does not significantly affect GDP growth in developing countries. **H_{17}: Political stability significantly affects GDP growth.** H_{17}a: Political stability significantly affects GDP growth in developed countries. H_{17}b: Political stability significantly affects GDP growth in developing countries.
H_{08}: Exchange rate does not significantly affect GDP growth. H_{08}a: Exchange rate does not significantly affect GDP growth in developed countries. H_{08}b: Exchange rate does not significantly affect GDP growth in developing countries. **H_{18}: Exchange rate significantly affects GDP growth.**

H_{18}a: Exchange rate significantly affects GDP growth in developed countries. H_{18}b: Exchange rate significantly affects GDP growth in developing countries.
H_{09}: Income level does not significantly affect GDP growth. H_{09}a: Income level does not significantly affect GDP growth in developed countries. **H_{19}: Income level significantly affects GDP growth.** H_{19}a: Income level significantly affects GDP growth in developed countries.
H_{010}: Expenditure does not significantly affect GDP growth. H_{010}a: Expenditure does not significantly affect GDP growth in developed countries. H_{010}b: Expenditure does not significantly affect GDP growth in developing countries. **H_{110}: Expenditure significantly affects GDP growth.** H_{110}a: Expenditure significantly affects GDP growth in developed countries. H_{110}b: Expenditure significantly affects GDP growth in developing countries.
H_{011}: Tourist arrivals do not significantly affect GDP growth. H_{011}a: Tourist arrivals do not significantly affect GDP growth in developed countries. H_{011}b: Tourist arrivals do not significantly affect GDP growth in developing countries. **H_{111}: Tourist arrivals significantly affect GDP growth.** H_{111}a: Tourist arrivals significantly affect GDP growth in developed countries. H_{111}b: Tourist arrivals significantly affect GDP growth in developing countries.

3.8.2 Hypotheses for Objective II: Impact on Human Development Index

Table 3. 5: Hypotheses for Objective II: Impact on Human Development Index

H_{012}: Tourism receipts do not significantly affect HDI. H_{012}a: Tourism receipts do not significantly affect HDI in developed countries. H_{012}b: Tourism receipts do not significantly affect HDI in developing countries. **H_{12}: Tourism receipts significantly affect HDI.** H_{12}a: Tourism receipts significantly affect HDI in developed countries. H_{12}b: Tourism receipts significantly affect HDI in developing countries.

H_{013}: Political stability does not significantly affect HDI.

H_{013}a: Political stability does not significantly affect HDI in developed countries.

H_{013}b: Political stability does not significantly affect HDI in developing countries.

H_{13}: Political stability significantly affects HDI.

H_{13}a: Political stability significantly affects HDI in developed countries.

H_{13}b: Political stability significantly affects HDI in developing countries.

H_{014}: Exchange rate does not significantly affect HDI.

H_{014}a: Exchange rate does not significantly affect HDI in developed countries.

H_{014}b: Exchange rate does not significantly affect HDI in developing countries.

H_{14}: Exchange rate significantly affects HDI.

H_{14}a: Exchange rate significantly affects HDI in developed countries.

H_{14}b: Exchange rate significantly affects HDI in developing countries.

H_{015}: Income level does not significantly affect HDI.

H_{015}a: Income level does not significantly affect HDI in developed countries.

H_{015}b: Income level does not significantly affect HDI in developing countries.

H_{15}: Income level significantly affects HDI.

H_{15}a: Income level significantly affects HDI in developed countries.

H_{15}b: Income level significantly affects HDI in developing countries.

3.8.3 Hypotheses for Objective III: Tourism-Led vs. Development-Led Sustainability

Granger Causality Tests:

- **H_3a:** Tourism Granger-causes Adjusted Net Savings (ANS).
- **H_3b:** Adjusted Net Savings (ANS) Granger-causes tourism growth.
- **H_3c:** The causality between tourism and ANS varies by country, with some showing unidirectional, bidirectional, or no causality.

Group Comparisons: TLD vs. DLT Models

1. **Gini Index:**
   H_{016}: There is no significant difference in income inequality between TLD and DLT nations.
   H_{16}: There is significant difference in income inequality between TLD and DLT nations.
2. **Literacy Rate:**
   H_{017}: There is no significant difference in literacy rates between TLD and DLT nations.
   H_{17}: There is significant difference in literacy rates between TLD and DLT nations.
3. **CO_2 Emissions:**
   H_{018}: There is no significant difference in CO_2 emissions between TLD and DLT nations.
   H_{18}: There is significant difference in CO_2 emissions between TLD and DLT nations.
4. **GDP (US$):**
   H_{019}: There is no significant difference in GDP between TLD and DLT nations.
   H_{19}: There is significant difference in GDP between TLD and DLT nations.

Model Fit Hypotheses:

H_{020}: Regression models for TLD and DLT countries do not differ significantly in their fit.
H_{20}: TLD models show significantly better fit and predictive power than DLT models.

Predictor Based Hypotheses:

1. **Tourism Arrivals:**
   H_{021}: Tourism arrivals do not significantly affect GDP in either group.
   H_{21}: Tourism arrivals significantly affect GDP in both TLD and DLT countries
2. **Political Stability:**
   H_{022}: Political stability does not significantly influence GDP in either group.
   H_{22}: Political stability significantly influences GDP.
3. **Exchange Rate:**
   H_{023}: Exchange rate does not significantly affect GDP in either group.
   H_{23}: Exchange rate significantly affects GDP.

Chapter 4

Tourism and GDP Growth

This chapter analyzes the economic impact of tourism on GDP growth across developed and developing countries. Using panel data models, it examines how tourism receipts, infrastructure utilization, and macro-economic factors contribute to national income, assessing the relevance of the Tourism-Led Growth Hypothesis (TLGH) through empirical evidence and contextual variations.

4.1 Descriptive Statistics of Variables for Developed and Developing Countries

Descriptive statistics provide an essential first step in understanding the distribution, central tendency, and variability of the data used in this study. By calculating measures such as the mean, standard deviation, minimum, and maximum values for each variable across both developed and developing countries, the study ensures a clearer picture of the relative differences and similarities across groups. This distinction is crucial, as tourism's economic, social, and environmental impacts may vary substantially depending on the level of development, institutional quality, and structural capacity of nations.

The significance of descriptive statistics lies in their ability to summarize large datasets into interpretable patterns, thereby offering a foundation for subsequent econometric analysis. For example, examining variations in GDP growth, tourism receipts, and tourist arrivals allows the study to highlight the scale of tourism activity and its potential macro-economic impact. Similarly, exploring variables such as CO_2 emissions, political stability, and income levels helps in linking tourism to sustainability and development indicators.

The following table presents the descriptive statistics of all key variables used in the econometric analysis. The variables are categorised under economic (GDP growth, income level, exchange rate, tourism receipts, tourist arrivals), social (political stability, literacy rate, Gini index), and environmental indicators (CO_2 emissions, bed occupancy rates, average length of stay). This systematic comparison between developed and developing countries establishes the empirical groundwork for hypothesis testing and regression modelling in later sections.

Table 4. 1 Descriptive Statistics of Economic, Social, and Environmental Variables for Developed and Developing Countries (1995–2023)

Variable	Mean (Developed)	Std. Dev. (Developed)	Min (Developed)	Max (Developed)	Mean (Developing)	Std. Dev. (Developing)	Min (Developing)	Max (Developing)
GDP Growth (Annual % Change)	2.50841	4.443647	-32.1186	54.1993	3.541021	7.424303	-64.0471	153.4926
Tourism Receipts (US$)	1.28E+10	2.72E+10	2,80,00,000	2.42E+11	2.40E+09	5.76E+09	1,00,000	6.44E+10
CO_2 Emissions (metric tons)	2,81,529.20	7,84,842.30	141.9961	57,75,807	92,399.66	5,96,310.20	0	1,09,44,686
Establishment Numbers	6,865.74	13,531.10	12	78,730	2,082.19	4,507.03	5	38,523
Bed Occupancy Rates	3,48,488.20	6,08,320.30	912	42,74,333	1,13,345.40	3,06,023.90	52	30,64,684
Average Length of Stay (days)	51.72896	12.34269	10.59	91.32	52.42893	16.45385	0.12	92
Political Stability (Index)	0.631542	0.702145	-2.14245	1.964211	0.20773	0.989693	-3.31295	1.758681
Exchange Rate (LCU/US$)	75.72623	240.3503	0.00018	1,909.44	7,78,723.70	7,23,36,893	8.10E+14	6.72E+09
Income Level (GDP per capita, US$)	3.75E+13	1.85E+14	1.15E+09	1.87E+15	2.16E+14	1.41E+15	1.33E+08	1.88E+16
Tourist Arrivals	2,67,645.60	6,98,720.40	459	54,91,227	55,193.73	1,54,005.50	42	17,09,966

Source:(Compiled by Author)

As presented in Table 4.1, GDP growth demonstrates greater variability in developing countries, with a mean of 3.54 (SD = 7.42; Min = –64.05; Max = 153.49) compared to a mean of 2.51 (SD = 4.44; Min = –32.12; Max = 54.20) for developed economies. This indicates higher economic volatility in developing nations.

Tourism receipts highlight a substantial disparity, averaging US$ 1.28E+10 (SD = 2.72E+10; Range = 2.80E+07–2.42E+11) in developed economies, versus US$ 2.40E+09 (SD = 5.76E+09; Range = 1.00E+05–6.44E+10) in developing ones. Tourist arrivals follow a similar pattern of concentration in advanced economies. Developed countries record an average of 267,646 arrivals (SD = 698,720; Min = 459; Max = 5,491,227), whereas developing nations average just 55,194 arrivals (SD = 154,006; Min = 42; Max = 1,709,966). This gap highlights the unequal distribution of international tourism flows, where developed economies benefit from stronger infrastructure, better connectivity, and higher global brand visibility, while developing countries remain relatively marginal players in the tourism market.

Environmental indicators further illustrate differences. CO_2 emissions are significantly higher in developed nations at 281,529 (SD = 784,842; Min = 142; Max = 5,775,807), while developing countries report a lower mean of 92,400 (SD = 596,310; Min = 0; Max = 10,944,686). Bed occupancy rates also follow this pattern, averaging 348,488 (SD = 608,320; Range = 912–4,274,333) in developed versus 113,345 (SD = 306,024; Range = 52–3,064,684) in developing countries. Establishment numbers reflect a similar gap, with averages of 6,866 (SD = 13,531; Min = 12; Max = 78,730) for developed and 2,082 (SD = 4,507; Min = 5; Max = 38,523) for developing countries.

Social indicators reveal governance disparities. Political stability is stronger in developed countries, with a mean index of 0.63 (SD = 0.70; Range = –2.14–1.96), compared to 0.21 (SD = 0.99; Range = –3.31–1.76) in developing nations. Exchange rates show stark contrasts: developed economies report relative stability with a mean of 75.73 (SD = 240.35; Range = 0.00018–1,909.44), while developing nations exhibit extreme volatility, averaging 778,724 (SD =

72,336,893; Min = 8.10E+14; Max = 6.72E+09), suggesting weaker currency stability.

Income levels also highlight sharp inequalities, with GDP per capita averaging US$ 3.75E+13 (SD = 1.85E+14; Range = 1.15E+09–1.87E+15) in developed countries, compared to US$ 2.16E+14 (SD = 1.41E+15; Range = 1.33E+08–1.88E+16) in developing economies.

Overall, the descriptive statistics in Table 4.1 confirm systematic disparities between developed and developing countries. Developed nations exhibit higher tourism receipts, tourist arrivals, stronger institutional stability, and greater environmental pressures, while developing countries show higher GDP growth rates but greater volatility, weaker governance, and more fragile exchange rate structures. These contrasts form the empirical basis for examining the heterogeneous impacts of tourism on growth, development, and sustainability.

4.2 Unit Root Testing

Unit root testing ensures that the series are free from non-stationarity, which could otherwise lead to spurious results. The Fisher-type panel unit root test was applied, as it is suitable for unbalanced panels and allows testing across multiple countries simultaneously. The test relies on the threshold criterion of $p < 0.05$; rejection of the null hypothesis confirms stationarity, whereas values above the threshold indicate non-stationarity requiring further transformation.

Table 4. 2 For Developed Fisher Unit Root Test: For Stationarity

Statistic	**Value**
Chi-squared	998.79
p-value	< 2.2e16
Alternative Hypothesis	Stationarity

Source:(Compiled by Author)

As presented in **Table 4.2**, the Fisher unit root test for developed countries yields a Chi-squared statistic of 998.79 with a *p*-value of < 2.2e-16. Since the *p*-value is well below the 0.05 threshold, the null hypothesis of a unit root is rejected, confirming that the variables under consideration are stationary. This outcome ensures that the econometric analysis for developed countries can be conducted on reliable data series without the risk of spurious regression results.

Table 4. 3 For Developing Fisher Unit Root Test: For Stationarity

Statistic	Value
Chi-squared	2883.5
p-value	< 2.2e-16
Alternative Hypothesis	Stationarity

Source:(Compiled by Author)

As presented in **Table 4.3,** the Fisher unit root test for developing countries yields a Chi-squared statistic of 2883.5 with a *p*-value < 2.2e-16. Since the *p*-value is far below the conventional thresholds of 1%, 5%, and 10%, the null hypothesis of non-stationarity is decisively rejected. This confirms that the variables in the developing country dataset are stationary, thereby meeting the fundamental requirement for panel regression and causality testing in this study.

4.3 Breusch–Pagan (BP) Test

Before proceeding with regression estimation, it is important to verify whether the error terms in the panel data models exhibit constant variance. The Breusch–Pagan (BP) test is applied for this purpose, where the null hypothesis assumes homoscedasticity (constant variance of residuals), while rejection of the null indicates the presence of heteroscedasticity. Detecting heteroscedasticity is crucial, as it may bias standard errors and inference; thus, if identified, robust standard errors are employed to correct for this issue.

Table 4. 4 Breusch–Pagan Test for Heteroscedasticity – Developed Countries

Test	BP Statistic	Degrees of Freedom	p-Value	Conclusion
Breusch–Pagan Test	391.51	—	< 0.0001	Heteroscedasticity detected

Source:(Compiled by Author)

The p-value is highly significant (< 0.0001), leading to a rejection of the null hypothesis of homoscedasticity. This confirms the presence of heteroscedasticity in the residuals of the regression model for developed countries. As a result, robust standard errors were applied in the random effects model to ensure valid inference.

Table 4. 5 Breusch–Pagan Test for Heteroscedasticity – Developing Countries

Test	BP Statistic	Degrees of Freedom	p-Value	Conclusion
Breusch–Pagan Test	391.51	—	< 0.0001	Heteroscedasticity detected

Source:(Compiled by Author)

As presented in **Table 4.5**, the Breusch–Pagan test yields a BP statistic of 391.51 with a *p*-value < 0.0001. This result is highly significant, leading to the rejection of the null hypothesis of homoscedasticity. Hence, heteroscedasticity is confirmed in the developing countries dataset, implying that the variance of error terms is not constant. To maintain robustness and reliability of econometric estimations, corrective measures such as the use of heteroscedasticity-robust standard errors are applied in subsequent regression analyses.

4.4 Hausman Test

The Hausman test is employed to determine the most appropriate panel data model fixed effects or random effects by testing whether the unique errors (unobserved individual effects) are correlated with the regressors. The null hypothesis assumes that there is no correlation, favouring the random effects model.

Table 4. 6 Hausman Test for Model Selection – Developed Countries

Test	Test Statistic	Degrees of Freedom	p-Value	Conclusion
Hausman Test	—	—	0.281	Random effects model chosen

Source:(Compiled by Author)

As shown in **Table 4.6**, the Hausman test produces a p-value of 0.281, which is greater than the conventional threshold of 0.05. This indicates that the null hypothesis that the random effects model is more appropriate than the fixed effects model cannot be rejected. Therefore, the random effects model is selected for the analysis, as it provides consistent and efficient estimates while accounting for both within- and between-country variations.

Table 4. 7 Hausman Test for Model Selection – Developing Countries

Test	Test Statistic	Degrees of Freedom	p-Value	Conclusion
Hausman Test	—	—	< 0.05	Fixed effects model chosen

Source:(Compiled by Author)

As presented in Table 4.7, the Hausman test for developing countries yields a p-value less than 0.05, leading to the rejection of the null hypothesis that supports the random effects model. Accordingly, the fixed effects model is preferred, as it accounts for unobserved country-specific heterogeneity and ensures more reliable and consistent estimates when analysing the relationship between tourism and development variables in developing economies.

4.5 Interpretation of Regression Results – Developed Countries (Random Effects Model)

In order to assess the relationship between tourism-related and macro-economic factors and GDP growth in developed economies, regression analysis was carried out using the Random Effects Model. This specification was selected based on the Hausman test, which confirmed that the random effects approach provides consistent and efficient estimates by accounting for both cross-country and time-series variations. The model integrates key explanatory variables such as tourism receipts, tourist arrivals, CO_2 emissions, establishment numbers, occupancy rates, exchange rates, income levels, and political stability. The results, presented in Appendix Table 4.7, offer valuable insights into how these factors influence the economic performance of developed nations within the study period.

Table 4. 8 : Regression Results for Developed Countries (Random Effects Model)

Hypo.	Relationship	Coefficient	p-Value	Significance	Decision
$H_{11}a$	Tourism receipts → GDP	9.56E+11	0.062	****	Supported
$H_{12}a$	CO_2 emissions → GDP	1.00E-05	0.364	—	Not Supported
$H_{13}a$	Establishments → GDP	2.00E-04	0.000	***	Supported
$H_{14}a$	Bed occupancy → GDP	6.66E-02	0.232	—	Not Supported
$H_{15}a$	Room occupancy → GDP	2.49E-01	0.000	***	Supported
$H_{16}a$	Avg. stay → GDP	4.20E-01	0.553	—	Not Supported
$H_{17}a$	Political stability → GDP	4.90E-01	0.548	—	Not Supported
$H_{18}a$	Exchange rate → GDP	1.55E-03	0.864	—	Not Supported
$H_{19}a$	Income level → GDP	3.52E+14	0.030	*	Supported
$H_{110}a$	Expenditure → GDP	4.54E+11	0.415	—	Not Supported
$H_{111}a$	Tourist arrivals → GDP	2.45E+09	0.936	—	Not Supported

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, **** $p < 0.10$
Source:(Compiled by Author)

As per Table 4.8, the hypothesis testing for developed countries reveals a selective pattern of supported and unsupported relationships between tourism-related and macro-economic factors and GDP growth. $H_{11}a$ (Tourism receipts → GDP, $\beta = 9.56E+11$, $p = 0.062$) is supported at the 10% level, suggesting that although tourism earnings contribute to GDP, their impact in developed economies is relatively marginal, reflecting the saturation of mature tourism markets. By contrast, $H_{12}a$ (CO_2 emissions → GDP, $\beta = 1.00E–05$, $p = 0.364$) is not supported, indicating that environmental pressures do not directly influence GDP growth in these economies. Among the strongest drivers, $H_{13}a$ (Establishments → GDP, $\beta = 2.00E–04$, $p < 0.001$) and $H_{15}a$ (Room occupancy → GDP, $\beta = 0.249$, $p < 0.001$) are both supported, showing that structural tourism capacity and efficient utilization of accommodation facilities significantly enhance growth. Conversely, $H_{14}a$ (Bed occupancy → GDP, $\beta = 0.0666$, $p = 0.232$) and $H_{16}a$ (Average stay → GDP, $\beta = 0.420$, $p = 0.553$) are not supported, highlighting that occupancy at the bed level and length of stay do not yield strong macro-economic effects. Similarly, institutional and macro-level factors such as $H_{17}a$ (Political stability → GDP, $\beta = 0.490$, $p = 0.548$) and $H_{18}a$ (Exchange rate → GDP, $\beta = 0.00155$, $p = 0.864$) fail to show significance, reflecting limited variability across developed nations. Importantly, $H_{19}a$ (Income level → GDP, $\beta = 3.52E+14$, $p = 0.030$) is supported, underscoring the role of per-capita income in sustaining economic growth and amplifying tourism's contribution. In contrast, $H_{110}a$ (Expenditure → GDP, $\beta = 4.54E+11$, $p = 0.415$) and $H_{111}a$ (Tourist arrivals → GDP, $\beta = 2.45E+09$, $p = 0.936$) are not supported, implying that tourist spending and volume of arrivals, while substantial, do not independently drive GDP growth once structural and income factors are considered. Econometric modeling of developed economies identifies a selective and important group of macro-economic and tourism variables, which happen to impact GDP growth meaningfully. Tourism receipts exhibit a noticeable though moderate effect ($\beta = 9.56E+11$, $p = 0.062$), demonstrating tourism receipts' favorable effect on economic growth, though marginal significance here hints at few additional returns in mature markets. That aligns with evidence, based on which, after destinations become characterized by market maturity, tourism's growth effect tends toward stabilization in developed countries (Ocal & Aslan, 2014).

Structural capacity indicators, on the other hand, show significant strength. Establishments show a large and significant positive correlation ($\beta = 2.00E{-}04$, $p < 0.001$) and reflect the tourist infrastructure's enabling of sustained growth. Room occupancy demonstrates a large and significant impact ($\beta = 0.249$, $p < 0.001$) and suggests efficient use of accommodation capacity augments sector productivity and its spill-overs into the general economy. Previous evidence likewise underscores structural efficiency and capacity utilization at the core of tourism's maximum economic impact (Tungbenchasirikul et al., 2020; Kantarci et al., 2014).

Next, we have the level of income as a significant GDP driver ($\beta = 3.52E{+}14$, $p = 0.030$), validating the role of per-capita income in maintaining growth. Beyond supporting domestic spending, higher income accelerates tourism's role through higher-value demand segments attracted. The finding is in line with findings of rising tourism demand and receipts through world income growth and globalization (Soofi et al., 2018; Tse, 1999).

In summary, the supported hypotheses for developed countries include $H_{13}a$ (Establishments), $H_{15}a$ (Room occupancy), and $H_{19}a$ (Income level), with $H_{11}a$ (Tourism receipts) receiving support. These results confirm that in advanced economies, structural capacity and high-income levels are more critical drivers of tourism-led growth, while volume-based indicators such as arrivals, length of stay, or expenditure play only a limited role.

Table 4. 9 Model Fit Statistics – Developed Countries (Random Effects Model)

Statistic	Value
Adjusted R^2	0.498
Model Type	Random Effects Panel Model

Source:(Compiled by Author)

As shown in **Table 4.9,** the Adjusted R^2 value of 0.498 indicates that nearly 49.8% of the variation in GDP growth among developed countries is explained by the explanatory variables included in the model. This demonstrates a reasonably good explanatory power for panel data in macro-economic research.

The model specification as a Random Effects Panel Model confirms that country-specific unobserved heterogeneity is assumed to be uncorrelated with the independent variables, making it the appropriate choice for this dataset.

4.6 Interpretation and Discussion of Regression Results – Developing Countries (Fixed Effects Model)

For developing countries, the Fixed Effects (FE) model was adopted as the most suitable specification, following diagnostic tests that revealed significant heteroscedasticity (Breusch–Pagan test) and highlighted the importance of accounting for within-country variations rather than between-country differences. This choice ensures that country-specific, time-invariant factors—such as institutional structures, cultural dynamics, or baseline infrastructure levels are controlled for, allowing the analysis to focus on the dynamic influence of tourism-related and macro-economic variables on GDP growth. The regression outcomes, as reported in **Appendix Table 4.10**, provide insight into which factors significantly contribute to economic growth in developing economies, with particular emphasis on tourism infrastructure, expenditure, and arrivals.

Table 4. 10 Regression Results – Developing Countries (Fixed Effects Model)

Hypo.	Relationship	Coefficient	p-Value	Significance	Decision
$H_{11}b$	Tourism receipts → GDP	4.68E+11	0.879	—	Not Supported
$H_{13}b$	Establishments → GDP	2.70E–04	0.295	—	Not Supported
$H_{13}b_2$	Room numbers → GDP	2.00E–05	0.133	—	Not Supported
$H_{14}b$	Bed occupancy → GDP	0.16100	0.01	**	Supported
$H_{15}b$	Room occupancy → GDP	0.03300	0.653	—	Not Supported
$H_{16}b$	Average stay → GDP	0.32400	0.382	—	Not Supported
$H_{17}b$	Political stability → GDP	0.48800	0.685	—	Not Supported
$H_{18}b$	Exchange rate → GDP	9.90E–04	0.141	—	Not Supported
$H_{110}b$	Expenditure → GDP	-5.83e-10	0.046	*	Supported
$H_{111}b$	Tourist arrivals → GDP	5.29E+07	0.074	****	Supported

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, **** $p < 0.10$

Source:(Compiled by Author)

As per the table 4.10 for developing countries, the hypothesis H_{1}b (tourism receipts → GDP) is not supported (β = 4.68E+11, p = 0.879), showing no measurable effect on growth. H_{13}b (establishment numbers → GDP) is also not supported (β = 2.70E–04, p = 0.295), as is the related H_{13}b extension on room numbers (β = 2.00E–05, p = 0.133), suggesting that tourism infrastructure scale does not by itself drive GDP expansion.

In contrast, H_{14}b (bed occupancy rate → GDP) is supported (β = 0.161, p = 0.010), pointing to the importance of capacity utilization in developing economies. However, H_{15}b (room occupancy rate → GDP) is not supported (β = 0.033, p = 0.653), while H_{16}b (average length of stay → GDP) is also not supported (β = 0.324, p = 0.382), indicating that occupancy intensity and tourist stay duration have no significant effect.

Institutional and macro-economic variables similarly show limited relevance: H_{17}b (political stability → GDP) is not supported (β = 0.488, p = 0.685), and H_{18}b (exchange rate → GDP) is not supported (β = 9.90E–04, p = 0.141).

On the other hand, H_{110}b (expenditure → GDP) is supported (β = -5.83E+10, p = 0.046), confirming the positive role of direct tourist spending. Likewise, H_{111}b (tourist arrivals → GDP) is supported (β = 5.29E+07, p = 0.074), underlining the growth impact of visitor flows.

For countries in development, the exploration demonstrates GDP growth is strongly influenced by variables directly connected with tourism demand and utilization than by aggregate structural indicators. Bed occupancy rate exhibits a significant positive impact (β = 0.161, p = 0.010), and it demonstrates efficient accommodation use is key in increasing economic benefits. This aligns with findings that at developing destinations, capacity utilization acts more rapidly than infrastructure stock growth on GDP (Badulescu et al., 2020).

Tourist expenditure is also a major contributor (β = -5.83E+10, p = 0.046), supporting the critical role of direct spending within regional economies. In developing countries, GDP growth is driven by capacity utilization and tourist arrivals, while the negative effect of expenditure (β = –5.83E+10, p = 0.046) suggests that leakages and import dependence may limit the developmental benefits of tourism spending (Badulescu et al., 2020; Oh, 2005; Balcilar et al., 2014)

In addition, tourist arrival rates at the global level correlate significantly with GDP (β = 5.29E+07, p = 0.074), and visitor flows thus emerge strongly as a catalyst for economic growth. This aligns with the findings of research, in which in emerging economies, rising tourist figures tend to train demand for infrastructure and services, thus pushing up output (Al-mulali et al., 2014; Munir et al., 2015).

In summary, the supported hypotheses for developing countries are $H_{14}b$ (bed occupancy), $H_{110}b$ (expenditure), and $H_{111}b$ (tourist arrivals). All other hypotheses including those related to tourism receipts, establishment and room numbers, average length of stay, political stability, and exchange rates are not supported, indicating that GDP growth in developing economies depends more on effective capacity use, actual tourist spending, and arrival volumes rather than broader structural or institutional factors.

Table 4. 11 Model Fit Statistics – Developing Countries (Fixed Effects Model)

Statistic	**Value**
Adjusted R^2	0.205
Model Type	Fixed Effects Panel Model

Source:(Compiled by Author)

As shown in **Table 4.11,** the Fixed Effects model for developing countries explains about 20.5% of the variation in GDP growth, which is modest compared to developed economies. This suggests that while some tourism-related and macro-economic variables significantly contribute to growth, a large proportion of variability is driven by unobserved or external factors not captured in the model. The selection of the Fixed Effects specification is justified as it accounts for within-country heterogeneity, aligning with the structural characteristics of developing economies.

4.7 Multicollinearity Check: Variance Inflation Factor (VIF) Test

Before proceeding with the interpretation of regression results, it is essential to ensure that the explanatory variables do not suffer from multicollinearity, as this can distort coefficient estimates and inflate standard errors. To address this, the **Variance Inflation Factor (VIF) test** was conducted for all independent variables included in the panel regression models. According to established econometric guidelines, a VIF value greater than **10** indicates severe multicollinearity, while values below **5** are generally considered acceptable and not problematic (Gujarati & Porter, 2009). The test results for both developed and developing country specifications are summarised in **Table 4.12**.

The results of the VIF test for both developed and developing country models are presented below:

Table 4. 12 Variance Inflation Factor (VIF) Test Results

Feature	VIF
CO_2 Emissions	8.8528
Establishment Number	5.9420
Bed Place	5.2686
Room Rate	5.9132
Average Length of Stay	2.2241
Tourism Receipts	3.7580
Political Stability	1.7599
Exchange Rate	1.9555
Income Level	6.0907
Expenditure	7.7518
Tourist Arrivals	2.3231

Source:(Compiled by Author)

As presented in Table 4.12, the Variance Inflation Factor (VIF) values for the explanatory variables range from 1.76 (Political Stability) to 8.85 (CO_2 Emissions). Most variables, such as Tourism Receipts (VIF = 3.76), Tourist Arrivals (VIF = 2.32), and Average Length of Stay (VIF = 2.22), fall comfortably below the threshold of 5, indicating no multicollinearity concerns. However, certain variables namely CO_2 Emissions (8.85), Expenditure (7.75), Income Level (6.09), Establishment Numbers (5.94), Room Rate (5.91), and Bed Place Occupancy (5.27) exhibit VIF values between 5 and 10, which suggests moderate multicollinearity. While not severe enough to invalidate the regression, this indicates that these predictors may share overlapping explanatory power. Overall, the results confirm that the models are not affected by critical multicollinearity, though careful interpretation of coefficients is necessary for variables with higher VIF values.

4.8 Fixed Effects Estimates – Developing Countries

To further assess the role of unobserved heterogeneity in shaping GDP growth among developing countries, a Fixed Effects (FE) panel regression was employed. This approach controls for country-specific, time-invariant characteristics such as governance quality, institutional capacity, cultural context, and historical legacies that are not directly included as explanatory variables but nonetheless influence growth dynamics. The resulting country-specific intercepts (α_i) capture each nation's baseline growth potential after adjusting for tourism receipts, establishment numbers, exchange rate, and other tourism indicators. A higher (positive) intercept suggests that intrinsic factors within a country enhance its ability to transform tourism into economic development, whereas lower or negative intercepts indicate structural constraints that limit this transformation. The estimated intercepts for all countries included in the model are reported in Table 4.13.

Table 4. 13 Country-Specific Fixed Effects Estimates (α_i) – Developing Countries

Country	Alpha	Country	Alpha	Country	Alpha	Country	Alpha

ALBANIA	0.0012	CÔTE D'IVOIRE	0.0005	LAO PEOPLE'S DEM. REP.	0.0012	PERU	0.0015
ALGERIA	0	DEM. REP. OF THE CONGO	0.0012	LEBANON	0.0006	PHILIPPINES	0.0012
ANGOLA	-0.0009	DOMINICAN REPUBLIC	0.0022	LESOTHO	0.0012	POLAND	-0.0001
ARGENTINA	0.0017	ECUADOR	0.0012	LIBERIA	0.0012	PUERTO RICO	0.0012
ARMENIA	0.0012	EGYPT	0.0045	LIBYA	0.0012	ROMANIA	0.0012
ARUBA	0.0012	EL SALVADOR	0.0012	LIECHTENSTEIN	0.0012	RUSSIAN FEDERATION	0.0012
AZERBAIJAN	0.0012	EQUATORIAL GUINEA	0.0012	MADAGASCAR	0.0023	RWANDA	0.0012
BAHAMAS	0.001	ESWATINI	0	MALAWI	0.0012	SAUDI ARABIA	0.001
BANGLADESH	0.0012	ETHIOPIA	0.0012	MALAYSIA	0.0012	SENEGAL	0.0012
BELARUS	0.0035	FIJI	0.0012	MALI	0.0005	SIERRA LEONE	0.0015
BELIZE	0.0005	FRENCH POLYNESIA	0.0012	MAURITANIA	0.0012	SOLOMON ISLANDS	0.0012
BENIN	0.0033	GABON	0.0012	MAURITIUS	0.0014	SOMALIA	0.0012
BERMUDA	0.0008	GAMBIA	0.0012	MEXICO	0.0006	SOUTH AFRICA	0.0012
BHUTAN	0.0049	GEORGIA	0.0013	MICRONESIA (FEDERATED STATES OF)	0.0012	SRI LANKA	0.0017
BOLIVIA (PLURINATIONAL STATE OF)	-0.0015	GHANA	0.0022	MONGOLIA	0.0012	SUDAN	0.0012
BOSNIA AND HERZEGOVINA	-0.0043	GREENLAND	0.0012	MOROCCO	-0.0003	SURINAME	0.0012
BOTSWANA	-0.0093	GUATEMALA	0.0009	MOZAMBIQUE	0.0012	SYRIAN ARAB REPUBLIC	0.0016
BULGARIA	0.0338	GUINEA-BISSAU	0.0012	MYANMAR	0.0012	TAJIKISTAN	0.0012
BURKINA FASO	0.0202	GUINEA	0.0012	NAMIBIA	0.0012	THAILAND	0.0012
BURUNDI	0.0012	GUYANA	0.0012	NEPAL	0.0012	TIMOR-LESTE	0.0012
CAMBODIA	0.0012	HAITI	0.0012	NETHERLANDS (KINGDOM OF THE)	0.0012	TOGO	-0.0004
CAMEROON	-0.0003	HONDURAS	0.0014	NETHERLANDS ANTILLES	0.0012	TRINIDAD AND TOBAGO	0.0012

CENTRAL AFRICAN REPUBLIC	0.0015	HUNGARY	-0.0002	NEW CALEDONIA	0.0012	TUNISIA	0.0012
CHAD	0.0012	INDIA	0.0014	NICARAGUA	0.0012	TURKMENISTAN	0.0012
CHILE	0.0005	INDONESIA	0.0007	NIGERIA	0.0012	TÜRKIYE	0.0012
CHINA, HONG KONG SAR	0.0012	IRAN (ISLAMIC REPUBLIC OF)	0.0012	NIGER	0.0009	UGANDA	0.0017
CHINA	0.0012	IRAQ	0.0012	NORTH MACEDONIA	0.001	UKRAINE	0.0012
COLOMBIA	0.0027	ISLE OF MAN	0.0012	OMAN	0.0003	URUGUAY	0.0012
CONGO	0.0006	JAMAICA	0.0016	PACIFIC ISLANDS, TRUST TERRITORY	0.0012	UZBEKISTAN	0.0012
COSTA RICA	0.0012	JORDAN	0.0012	PAKISTAN	0.0012	VENEZUELA (BOLIVARIAN REP. OF)	0.0012
CROATIA	0.0006	KAZAKHSTAN	0.0011	PANAMA	0.0014	VIET NAM	0.0012
CUBA	0.0012	KENYA	0.0012	PAPUA NEW GUINEA	0.0012	ZAMBIA	0.0012
CZECHIA	0.0009	KYRGYZSTAN	0.0012	PARAGUAY	0.0012	ZIMBABWE	0.0013

Source:(Compiled by Author)

As presented in Table 4.13, the estimated country-specific fixed effect intercepts (α_i) reveal significant heterogeneity across developing economies in their baseline growth potential after controlling for tourism and macro-economic variables. These intercepts capture unobserved, time-invariant country characteristics such as institutional quality, governance capacity, infrastructure, and historical legacies that condition how effectively tourism translates into GDP growth.

At the upper end, countries such as Bulgaria ($\alpha = 0.0338$), Burkina Faso ($\alpha = 0.0202$), Bhutan ($\alpha = 0.0049$), Egypt ($\alpha = 0.0045$), and Belarus ($\alpha = 0.0035$) exhibit the most positive intercepts. These relatively stronger baselines reflect institutional stability, favorable structural conditions, or policy environments that enable more effective conversion of tourism inflows into growth.

At the lower end, countries including Botswana ($\alpha = -0.0093$), Bosnia & Herzegovina ($\alpha = -0.0043$), Bolivia ($\alpha = -0.0015$), Angola ($\alpha = -0.0009$), and Togo ($\alpha = -0.0004$) show negative or near-zero intercepts. These results highlight structural challenges—such as resource dependence, fragility, or governance bottlenecks—that limit the developmental gains from tourism.

In the middle range, large emerging economies such as India, Indonesia, China, Uganda, and Myanmar register intercepts close to zero, indicating moderate baseline capacities. Although their exact α_i values are smaller in magnitude than those of extreme outliers, this reflects the fact that their structural potential aligns closely with the average developing economy. Their ability to translate tourism into growth therefore depends less on baseline advantages and more on policy interventions, infrastructure expansion, and institutional strengthening.

Overall, the distribution of α_i values underscores that developing countries are far from homogenous in their structural capacity to leverage tourism for growth. Some countries enjoy stronger intrinsic baselines, while others face enduring disadvantages. This heterogeneity highlights the importance of tailored tourism and development strategies, rather than applying uniform policy prescriptions across diverse contexts.

Table 4. 14 Summary of Hypothesis Testing – Developed vs. Developing Countries

Hypo.	Relationship	Developed Countries (Sub-Hypothesis "a")	Decision	Developing Countries (Sub-Hypothesis "b")	Decision
H_{11}	Tourism receipts → GDP	$H_{11}a$: β = 9.56E+11, p = 0.062	Supported	$H_{11}b$: β = 4.68E+11, p = 0.879	Not Supported
H_{12}	CO_2 emissions → GDP	$H_{12}a$: β = 1.00E–05, p = 0.364	Not Supported		
H_{13}	Establishments → GDP	$H_{13}a$: β = 2.00E–04, p = 0.000	Supported	$H_{13}b$: β = 2.70E–04, p = 0.295	Not Supported
H_{14}	Bed occupancy → GDP	$H_{14}a$: β = 0.0666, p = 0.232	Not Supported	$H_{14}b$: β = 0.161, p = 0.010	Supported
H_{15}	Room occupancy → GDP	$H_{15}a$: β = 0.249, p = 0.000	Supported	$H_{15}b$: β = 0.033, p = 0.653	Not Supported
H_{16}	Avg. stay → GDP	$H_{16}a$: β = 0.420, p = 0.553	Not Supported	$H_{16}b$: β = 0.324, p = 0.382	Not Supported
H_{17}	Political stability → GDP	$H_{17}a$: β = 0.490, p = 0.548	Not Supported	$H_{17}b$: β = 0.488, p = 0.685	Not Supported
H_{18}	Exchange rate → GDP	$H_{18}a$: β = 0.00155, p = 0.864	Not Supported	$H_{18}b$: β = 0.00099, p = 0.141	Not Supported
H_{19}	Income level → GDP	$H_{19}a$: β = 3.52E+14, p = 0.030	Supported		
H_{110}	Expenditure → GDP	$H_{110}a$: β = 4.54E+11, p = 0.415	Not Supported	$H_{110}b$: β = -5.83E+10, p = 0.046	Supported
H_{111}	Tourist arrivals → GDP	$H_{111}a$: β = 2.45E+09, p = 0.936	Not Supported	$H_{111}b$: β = 5.29E+07, p = 0.074	Supported

Source:(Compiled by Author)

As per Table 4.14, the results clearly differentiate between the sub-hypotheses for developed and developing countries. For developed economies, supported hypotheses include $H_{11}a$ (tourism receipts, β = 9.56E+11, p = 0.062), $H_{13}a$ (establishments, β = 2.00E–04, p = 0.000), $H_{15}a$ (room occupancy, β = 0.249, p = 0.000), and $H_{19}a$ (income level, β = 3.52E+14, p = 0.030). These findings indicate that tourism infrastructure, capacity utilization, and income levels are the dominant channels through which GDP growth is influenced in advanced economies.

In developing countries, the significant determinants of GDP growth are bed occupancy ($\beta = 0.161$, $p = 0.010$), tourist expenditure ($\beta = -5.83E+10$, $p = 0.046$), and tourist arrivals ($\beta = 5.29E+07$, $p = 0.074$). These results indicate that growth is shaped primarily by how effectively available capacity is utilized and by the scale of visitor inflows. Prior studies similarly highlight that in emerging economies, accommodation utilization and tourist arrivals directly enhance output by stimulating service demand and employment (Badulescu et al., 2020). However, the negative sign of tourist expenditure suggests that higher spending may not always translate into broad-based economic gains. This counterintuitive result has been linked to issues such as leakages, where revenues flow to foreign-owned firms, and the reliance on imports to satisfy tourist demand, both of which reduce local multiplier effects (Oh, 2005; Balcilar et al., 2014).

Overall, the evidence shows that developed countries ($H_{1}1a$, $H_{1}3a$, $H_{1}5a$, $H_{1}9a$) rely on structural depth and income effects, while developing countries ($H_{1}4b$, $H_{1}10b$, $H_{1}11b$) depend on operational efficiency and immediate inflows. Sub-hypotheses related to CO_2 emissions, political stability, exchange rates, average length of stay, and in some cases establishments, were not supported in either context, highlighting their limited direct influence on GDP growth.

This disparity illustrates mature markets gaining growth from the quality and performance of infrastructure, and new markets from volume-related outcomes and direct spending. These conclusions reflect earlier reports delineating the fact that while advanced nations realize decreasing marginal returns from tourist influxes, developing nations keep gaining massive growth gains through demand-driven variables (Ocal & Aslan, 2014; Al-mulali et al., 2014; Sharma & Sharma, 2015).

Chapter 5

Tourism, Governance and HDI

This chapter explores how tourism influences human development by evaluating its relationship with the Human Development Index (HDI). Fixed effects panel models assess the impact of tourism receipts, income levels, political stability, and exchange rates on welfare outcomes, integrating econometric results with development theory insights.

5.1 Descriptive Statistics

Descriptive statistics provide an essential first step in empirical analysis by summarising the key features of the dataset and highlighting the central tendencies, dispersion, and range of the variables under study. In the context of this research, descriptive statistics are employed to compare developed and developing countries across core indicators of human development, tourism activity, and macro-economic stability over the period 1995–2023. This preliminary assessment not only establishes the underlying distributional properties of the data but also informs the validity and reliability of subsequent econometric models.

By presenting mean values, standard deviations, minimums, and maximums for each variable, the descriptive analysis enables a structured comparison between advanced and emerging economies. Specifically, it highlights disparities in Human Development Index (HDI) scores, the scale of tourism receipts, institutional quality (political stability), and exchange rate variability. These descriptive patterns provide valuable context for understanding how structural differences between developed and developing economies shape the tourism–development nexus and set the stage for the panel regression analysis presented in the following sections.

Table 5. 1 Descriptive Statistics of Variables by Development Status (1995–2023)

Variable	Mean (Developed)	Std. Dev. (Developed)	Min (Developed)	Max (Developed)	Mean (Developing)	Std. Dev. (Developing)	Min (Developing)	Max (Developing)
Year	2008.64	8.03	1995	2023	2009.18	7.89	1995	2023
Human Development Index (HDI)	0.85	0.05	0.72	0.97	0.61	0.11	0.24	0.82
Tourism Receipts (US$)	15.3B	28.5B	0.1M	242B	1.3B	5.2B	0.1M	69B
Political Stability (Index)	0.65	0.41	–1.10	1.75	0.45	0.85	–3.18	1.2
Exchange Rate (LCU/US$)	2.35	1.2	0.001	9.5	1.3M	120M	0.003	6.7B

Source:(Compiled by Author)

As shown in Table 5.1, developed and developing countries display substantial differences across human development, tourism, governance, and macro-economic indicators over the period 1995–2023.

The Human Development Index (HDI) is consistently higher in developed nations, with a mean of 0.85 (SD = 0.05; Min = 0.72; Max = 0.97), indicating universally high living standards across education, health, and income dimensions. In contrast, developing countries record a lower mean HDI of 0.61 (SD = 0.11; Min = 0.24; Max = 0.82), reflecting wide disparities in human development outcomes, with some nations still struggling at very low levels.

Tourism receipts reveal stark contrasts. Developed countries average US$ 15.3 billion (SD = 28.5B; Min = 0.1M; Max = 242B), highlighting their dominance in capturing global tourism revenues. Developing countries, however, lag significantly with an average of only US$ 1.3 billion (SD = 5.2B; Min = 0.1M; Max = 69B), where earnings are more modest and concentrated among a few high-performing destinations such as Thailand or Mexico.

Turning to political stability, developed economies demonstrate a stronger and more consistent institutional environment with a mean score of 0.65 (SD = 0.41; Min = –1.10; Max = 1.75). On the other hand, developing countries show a lower mean of 0.45 (SD = 0.85; Min = –3.18; Max = 1.20), coupled with much wider variability, pointing to political fragility and instability that can hinder tourism and human development.

The exchange rate data further reinforces this disparity. Developed nations maintain relative currency stability, with a mean of 2.35 LCU/US$ (SD = 1.20; Min = 0.001; Max = 9.5). In contrast, developing economies face extreme volatility, with an average exchange rate of 1.3 million LCU/US$ (SD ≈ 120M; Min = 0.003; Max = 6.7B), reflecting inflationary pressures, external shocks, and weaker financial systems. Such volatility has direct implications for international tourism competitiveness and affordability.

In summary, the descriptive results highlight systemic structural differences: developed countries enjoy higher HDI values, stronger political stability, stable currencies, and far greater tourism earnings, while developing nations remain constrained by wider inequalities, governance challenges, and macro-economic volatility. These differences underscore the importance of stratifying the analysis by development status when examining the tourism–development nexus.

5.2 Unit Root Tests Results

Before proceeding with panel regression analysis, it is essential to examine the stationarity of the variables used in the study, as non-stationary data may lead to spurious regression results and unreliable inferences. The Fisher-type panel unit root test, proposed by Maddala and Wu (1999), was applied to both developed and developing country datasets to test whether the variables including GDP growth, tourism receipts, CO_2 emissions, political stability, exchange rate, income level, and related tourism indicators are stationary. This method is particularly suitable for unbalanced panel data, as it aggregates the p-values of individual Augmented Dickey–Fuller (ADF) tests across cross-sectional units. The null hypothesis assumes the presence of a unit root (non-stationarity), while rejection of the null indicates stationarity.

Table 5. 2 Fisher-Type Unit Root Test – Developed Countries

Statistic	Value
Chi-squared	434.42
p-value	< 2.2e16
Alternative Hypothesis	Stationarity

Source:(Compiled by Author)

As presented in Table 5.2, the Fisher-type unit root test for developed countries yields a Chi-squared statistic of 434.42 with a p-value of < 2.2e-16. Since the p-value is far below the conventional significance thresholds of 1%, 5%, and 10%, the null hypothesis of a unit root (non-stationarity) is decisively rejected. This result confirms that the variables included in the model are stationary.

Table 5. 3 Fisher-Type Unit Root Test – Developing Countries

Statistic	Value
Chi-squared	561.49
p-value	< 2.2e-16
Alternative Hypothesis	Stationarity

Source:(Compiled by Author)

As presented in Table 5.3, the Fisher-type unit root test for developing countries yields a Chi-squared statistic of 561.49 with a p-value of < 2.2e-16. Since the p-value is well below the conventional thresholds of 1%, 5%, and 10%, the null hypothesis of a unit root (non-stationarity) is decisively rejected. This indicates that the variables in the dataset for developing countries are stationary.

5.3 Breusch–Pagan Test

Before proceeding with panel regression analysis, it is essential to examine whether the variance of error terms is constant across observations, a condition known as homoscedasticity. Violation of this assumption leads to heteroscedasticity, which can bias standard errors, distort test statistics, and undermine the reliability of inference.

The Breusch–Pagan (BP) Test was applied to detect the presence of heteroscedasticity in both developed and developing country models. The null hypothesis of the test assumes homoscedasticity (constant error variance), while rejection of the null indicates the presence of heteroscedasticity (non-constant error variance). If heteroscedasticity is detected, the use of robust standard errors becomes necessary to ensure valid and efficient estimation in panel regression models.

Table 5. 4 Breusch–Pagan Test for Heteroscedasticity – Developed Countries

Test	BP Statistic	Degrees of Freedom	p-Value	Conclusion
Breusch–Pagan Test	24.16	4	0.0000 74	Heteroscedasticity detected

Source:(Compiled by Author)

As presented in **Table 5.4** the Breusch–Pagan (BP) test for developed countries yields a statistic of 24.16 with 4 degrees of freedom and a p-value of 0.000074. Since the p-value is far below the conventional significance thresholds of 1%, 5%, and 10%, the null hypothesis of homoscedasticity is rejected. This result confirms the presence of heteroscedasticity in the residuals of the developed country regression model. Consequently, robust standard errors were employed in subsequent estimations to ensure that inference remains valid and unbiased despite the violation of the homoscedasticity assumption.

Table 5. 5 Breusch–Pagan Test for Heteroscedasticity – Developing Countries

Test	BP Statistic	Degrees of Freedom	p-Value	Conclusion
Breusch–Pagan Test	97.86	4	< 0.001	Heteroscedasticity detected

Source:(Compiled by Author)

As presented in Table 5.5, the Breusch–Pagan (BP) test for developing countries reports a BP statistic of 97.86 with 4 degrees of freedom and a p-value < 0.001. Since the p-value is highly significant, the null hypothesis of homoscedasticity is rejected. This confirms the presence of heteroscedasticity in the regression residuals for developing countries. Consequently, robust standard errors were applied to ensure that the coefficient estimates and inferential statistics remain valid and reliable.

5.4 Hausman Test

The Hausman specification test (Hausman, 1978) is a widely used diagnostic tool in panel data econometrics to determine the appropriate choice between the Fixed Effects Model (FEM) and the Random Effects Model (REM). The test evaluates whether the unique errors (country-specific effects) are correlated with the explanatory variables. Under the null hypothesis, no correlation exists, favouring the use of REM, which is more efficient. Conversely, rejection of the null implies that FEM is more consistent and appropriate, as it accounts for unobserved heterogeneity that may bias the estimations. The decision is based on the chi-squared statistic and its corresponding p-value, with a threshold of 0.05 commonly applied for statistical significance.

Table 5. 6 Hausman Test Results – Developed Countries

Test	Chi-squared Statistic	Degrees of Freedom	p-Value	Preferred Model
Hausman Test	855.96	4	< 2e-16	Fixed Effects Model

Source:(Compiled by Author)

As presented in **Table 5.6**, the Hausman test for developed countries yields a Chi-squared statistic of 855.96 with 4 degrees of freedom and a highly significant p-value (< 2e-16). Since the p-value is far below the conventional 0.05 threshold, the null hypothesis that the random effects estimator is consistent is rejected. This outcome confirms that the **Fixed Effects Model** is the appropriate specification for developed countries, as it accounts for unobserved country-specific heterogeneity and ensures more reliable parameter estimates.

Table 5. 7 Hausman Test – Developing Countries

Test	Chi-squared Statistic	Degrees of Freedom	p-Value	Preferred Model
Hausman Test	500.76	4	< 2e-16	Fixed Effects Model

Source:(Compiled by Author)

As shown in Table 5.7, the Hausman test for developing countries yields a Chi-squared statistic of 500.76 with 4 degrees of freedom and an extremely small p-value (< 2e-16). Since the p-value is far below the 0.05 threshold, the null hypothesis that the random effects estimator is consistent is decisively rejected. This result strongly supports the use of the Fixed Effects Model (FEM) as the more appropriate specification for developing countries. The FEM ensures that unobserved country-specific characteristics are properly controlled for, thereby providing more reliable estimates of the impact of tourism and macro-economic determinants on GDP growth.

Why Fixed Effects Matter in Cross-Country Analysis?

The results of the Hausman tests **(Tables 5.6 and 5.7)** confirm that the Fixed Effects Model (FEM) is the preferred specification for both developed and developing countries. The rationale behind adopting FEM lies in its ability to control for time-invariant, country-specific characteristics such as colonial history, geographical endowments, cultural traditions, and longstanding institutional structures. These factors, while highly influential in shaping developmental trajectories, remain constant over time and could otherwise bias the estimates if left uncontrolled.

By differencing out these unobserved, fixed characteristics, the FEM ensures that the estimated coefficients reflect only the within-country variations over time. For example, the impact of changes in tourism receipts, exchange rate fluctuations, or political stability on human development (HDI) and GDP growth is assessed relative to a country's own trajectory rather than in direct comparison with other countries. This substantially reduces the risk of omitted variable bias and strengthens the internal validity of the findings.

In this way, the application of Fixed Effects Models allows the analysis to capture the true dynamic relationships between tourism, macro-economic determinants, governance factors, and developmental outcomes. It ensures that policy inferences are grounded not in structural differences across countries, but in the effects of measurable changes within each national context.

Table 5. 8 Fixed Effects Model Results – Developed Countries (HDI as Dependent Variable)

Hypo.	Variable	Relationship	Coefficient	Std. Error	t-Statistic	p-Value	Significance	Decision
$H_{12}a$	log(Tourism Receipts)	Tourism receipts → HDI	–0.00075	0.00109	–0.683	0.495	—	Not Supported
$H_{13}a$	log(Political Stability)	Political stability → HDI	0.03644	0.00277	13.15	< 2.2e-16	***	Supported
$H_{14}a$	log(Exchange Rate)	Exchange rate → HDI	–0.01078	0.00131	–8.21	5.93E-15	***	Supported
$H_{15}a$	log(Income Level)	Income level → HDI	0.01189	0.00095	12.5	< 2.2e-16	***	Supported

Source:(Compiled by Author)

As per Table 5.8, the fixed effects estimation for developed countries reveals mixed evidence regarding the determinants of human development. $H_{12}a$ (Tourism receipts → HDI) shows a negative and insignificant relationship (β = –0.00075, t = –0.683, p = 0.495), suggesting that additional tourism revenue does not substantially influence HDI in developed economies, where human development levels are already high. In contrast, $H_{13}a$ (Political stability → HDI) is strongly positive and highly significant (β = 0.03644, t = 13.15, p < 2.2e-16), confirming that stable governance directly enhances human development through institutional quality, education, and health improvements. Similarly, $H_{14}a$ (Exchange rate → HDI) is negative and significant (β = –0.01078, t = –8.21, p = 5.93e-15), implying that exchange rate depreciation undermines HDI by raising the costs of essential imports such as technology, medicines, and education inputs. Lastly, $H_{15}a$ (Income level → HDI) demonstrates a strong positive and significant effect (β = 0.01189, t = 12.50, p < 2.2e-16), indicating that higher income levels improve access to welfare, education, and healthcare, thereby reinforcing human development.

The estimation of fixed effects of developed nations emphasizes the significant role of institutional stability, exchange rate fluctuation, and levels of income in determining human development outcomes. Out of the determinants, political stability plays the most significant role in determining HDI ($\beta = 0.03644$, $t = 13.15$, $p < 0.001$), which is in line with findings revealing that political stability promotes inclusive growth and improves human development indicators in a direct manner in advanced nations (Meo et al., 2020).

Conversely, depreciation of the exchange rate reduces HDI significantly ($\beta = -0.01078$, $t = -8.21$, $p < 0.001$) Depreciation of the currency in this manner is assumed to increase prices of key imports of medications, medical technologies, and educational materials, thus limiting enhancements of human development's capability- and welfare-related dimensions. earlier research correspondingly reports openness of advanced nations' welfare measures to large and negative exchange rate shocks diminishing availability of advanced education and health inputs (Arslanturk & Atan, 2012).

Finally, the income level presents a large and positive correlation with HDI ($\beta = 0.01189$, $t = 12.50$, $p < 0.001$), so higher income per head expands coverage of healthcare, educational, and welfare services. It agrees with existing evidence whereby higher levels of income allow better human development through stepped-up spending on social infrastructure by both the public and the private sectors (Tse, 1999; Soofi et al., 2018).

Taken together, these results show that among the four tested determinants, political stability and income level act as positive and significant drivers of HDI, exchange rate fluctuations exert a significant negative impact, while tourism receipts are found to be insignificant. This highlights that structural and macro-economic fundamentals matter more than tourism inflows in sustaining human development in advanced economies.

Table 5. 9 Fixed Effects Model Results – Developing Countries (HDI as Dependent Variable)

Hypo.	Variable	Relationship	Coefficient	Std. Error	t-Statistic	p-Value	Significance	Decision
$H_{12}b$	log(Tourism Receipts)	Tourism receipts → HDI	0.00067	0.0008	0.848	0.397	—	Not Supported
$H_{13}b$	log(Political Stability)	Political stability → HDI	–0.00123	0.00099	–1.243	0.215	—	Not Supported
$H_{14}b$	log(Exchange Rate)	Exchange rate → HDI	0.00714	0.00216	3.309	0.00102	**	Supported
$H_{15}b$	log(Income Level)	Income level → HDI	0.09058	0.00295	30.702	< 2.2e-16	***	Supported

Source:(Compiled by Author)

As per Table 5.9, the regression results for developing countries indicate notable differences in how tourism and macro-economic variables influence human development (HDI). Beginning with $H_{12}b$, tourism receipts show a positive but statistically insignificant effect on HDI ($\beta = 0.00067$, $t = 0.848$, $p = 0.397$), leading to the rejection of the alternative hypothesis and indicating that tourism inflows alone do not significantly enhance HDI in developing economies. Similarly, $H_{13}b$, political stability is found to have no significant relationship with HDI ($\beta = –0.00123$, $t = –1.243$, $p = 0.215$), suggesting that, within these countries, variations in political stability may not translate directly into measurable improvements in human development outcomes.

By contrast, $H_{14}b$ is supported, as the exchange rate exerts a significant positive influence on HDI ($\beta = 0.00714$, $t = 3.309$, $p = 0.001$). This finding implies that favourable exchange rate conditions may improve international competitiveness, indirectly benefiting human development through stronger tourism and trade performance. Furthermore, $H_{15}b$ is strongly supported, with income level demonstrating a highly significant and substantial positive effect on HDI ($\beta = 0.09058$, $t = 30.702$, $p < 2.2e-16$). This result underscores the central role of economic capacity and household income in driving improvements in education, health, and overall human development in developing economies.

Regression results for emerging countries suggest instead that human development outcomes rely less on tourism and political stability than on macro fundamentals. Exchange rate situations exert a significant positive influence on HDI ($\beta = 0.00714$, $p = 0.001$, $t = 3.309$), so favorable exchange rates boost availability and accessibility of imported services and goods, valuable components of health and education outcomes. Previous research also highlights that for emerging economies, favorable or stable exchange rates promote overall welfare gains through promoting trade and tourism and reducing prices of needed imports (Al-mulali et al., 2014).

The most important predictor of HDI for emerging markets is the level of income ($\beta = 0.09058$, $t = 30.702$, $p < 0.001$). Higher national and household income expands education, healthcare, and social infrastructure delivery at once and accelerates human development. That aligns with previous research showing higher levels of finance most reliably predict augmented welfare and human capital in poor and middle-income countries (Soofi et al., 2018; Badulescu et al., 2020)

In summary, for developing countries, the supported hypotheses are $H_{14}b$ (exchange rate → HDI) and $H_{15}b$ (income level → HDI), while $H_{12}b$ (tourism receipts → HDI) and $H_{13}b$ (political stability → HDI) are not supported. This suggests that while structural macro-economic strength and financial resources are critical to human development, tourism receipts and political stability alone may not suffice to significantly uplift HDI without complementary institutional and policy support.

5.5 Multicollinearity Check: Variance Inflation Factor (VIF) Test

Before interpreting the regression results, it is essential to confirm that the explanatory variables do not suffer from multicollinearity, as this can inflate standard errors and distort coefficient estimates. To address this concern, the Variance Inflation Factor (VIF) test was conducted for all independent variables included in both the developed and developing country models. According to econometric conventions, a VIF value greater than 10 signals problematic multicollinearity, whereas values below 5 are generally considered acceptable and non-problematic (Gujarati & Porter, 2009). The results of the VIF test, presented in **Table 5.10**, provide reassurance on the robustness of the model by showing that collinearity among the regressors is not a significant issue in this study.

Table 5. 10 Variance Inflation Factor (VIF) Test Results

Feature	VIF
Tourism Receipts	1.0059
Political Stability	1.0146
Exchange Rate	1.0315
Income Level	1.0379

Source:(Compiled by Author)

As presented in **Table 5.10**, the Variance Inflation Factor (VIF) values for all explanatory variables tourism receipts (VIF = 1.0059), political stability (VIF = 1.0146), exchange rate (VIF = 1.0315), and income level (VIF = 1.0379) are very close to 1 and well below the conventional thresholds of 5 or 10. This clearly indicates the absence of problematic multicollinearity in the regression model. In other words, the independent variables are not strongly correlated with one another, ensuring that the estimated coefficients are stable and reliable. This strengthens the robustness of the regression results, as standard errors are unlikely to be inflated due to linear dependence among predictors.

5.6 Fixed Effects Country wise Estimates

In order to capture the unobserved heterogeneity across countries, the Fixed Effects (FE) regression model was employed. The FE specification assumes that each country possesses unique, time-invariant attributes such as geography, historical legacies, institutional quality, and cultural or social norms that influence human development outcomes but cannot be directly observed or measured in the dataset. By including a country-specific intercept (α_i), the model controls for these hidden characteristics, thereby isolating the effects of time-varying explanatory variables such as tourism receipts, political stability, and exchange rates.

The methodological rationale for adopting this approach lies in its robustness: as noted by Wooldridge (2010), the FE estimator effectively captures all unobserved, time-invariant differences between countries, minimising omitted variable bias and enhancing the reliability of causal inference in long-span panel datasets. This makes the model particularly suited to cross-country socio-economic development research, where structural conditions differ widely across nations.

The country-specific intercepts (α_i) estimated through the FE model represent the baseline level of development measured here through the Human Development Index (HDI) after controlling for the effect of the independent variables. Higher (less negative or more positive) intercepts suggest that intrinsic country-level characteristics are more favourable for development outcomes, while lower intercepts reflect deeper structural constraints. The detailed results for developing and developed countries are presented in Tables 5.X and 5.Y, respectively.

Table 5. 11 Comparative Fixed Effects Model Results – Developed vs. Developing Countries (HDI as Dependent Variable)

Hypo.	Variable	Relationship	Developed Countries	Decision	Developing Countries	Decision
H_{12}	Tourism Receipts	Tourism receipts → HDI	$H_{12}a$: $\beta = –0.00075$, $t = –0.683$, $p = 0.495$	Not Supported	$H_{12}b$: $\beta = 0.00067$, $t = 0.848$, $p = 0.397$	Not Supported
H_{13}	Political Stability	Political stability → HDI	$H_{13}a$: $\beta = 0.03644$, $t = 13.15$, $p < 2.2e-16$	Supported	$H_{13}b$: $\beta = –0.00123$, $t = –1.243$, $p = 0.215$	Not Supported
H_{14}	Exchange Rate	Exchange rate → HDI	$H_{14}a$: $\beta = –0.01078$, $t = –8.21$, $p = 5.93e-15$	Supported	$H_{14}b$: $\beta = 0.00714$, $t = 3.309$, $p = 0.00102$	Supported
H_{15}	Income Level	Income level → HDI	$H_{15}a$: $\beta = 0.01189$, $t = 12.50$, $p < 2.2e-16$	Supported	$H_{15}b$: $\beta = 0.09058$, $t = 30.702$, $p < 2.2e-16$	Supported

Source:(Compiled by Author)

As per Table 5.11: Comparative Fixed Effects Model Results – Developed vs. Developing Countries (HDI as Dependent Variable), the empirical findings reveal both similarities and divergences between developed and developing nations regarding the determinants of human development.

Starting with H_{12} (Tourism Receipts → HDI), the coefficients are insignificant for both developed ($\beta = –0.00075$, $t = –0.683$, $p = 0.495$) and developing countries ($\beta = 0.00067$, $t = 0.848$, $p = 0.397$). This indicates that tourism receipts, while economically important, do not directly translate into improvements in HDI in either group of nations. It suggests that revenues from tourism may not always be channelled effectively into long-term development outcomes such as education, health, and living standards.

For H_{13} (Political Stability → HDI), results differ sharply across contexts. In developed countries, political stability has a highly significant positive effect ($\beta = 0.03644$, $t = 13.15$, $p < 2.2e-16$), showing that consistent governance and institutional frameworks enhance human development. In contrast, the relationship is statistically insignificant in developing countries ($\beta = –0.00123$, $t = –1.243$, $p = 0.215$). This suggests that while governance structures are already strong and supportive in advanced economies, in developing nations political stability alone is insufficient to drive HDI gains without complementary factors such as institutional reforms, economic redistribution, or social investments.

In terms of H_{14} (Exchange Rate → HDI), both groups show significant results but in opposite directions. For developed countries, exchange rate movements negatively affect HDI ($\beta = –0.01078$, $t = –8.21$, $p = 5.93e-15$), implying that currency fluctuations may reduce international competitiveness or disrupt economic stability in ways that affect living standards. Conversely, in developing countries, the relationship is positive and significant ($\beta = 0.00714$, $t = 3.309$, $p = 0.00102$), reflecting that currency depreciation often improves tourism competitiveness and export revenues, thereby indirectly supporting human development.

Finally, H_{15} (Income Level → HDI) is strongly supported in both contexts, though the magnitude differs. In developed countries, the effect is positive and significant ($\beta = 0.01189$, $t = 12.50$, $p < 2.2e-16$), consistent with the idea that higher income levels sustain already high standards of human development. In developing nations, the coefficient is much larger ($\beta = 0.09058$, $t = 30.702$, $p < 2.2e-16$), indicating that rising income plays a far more transformative role in improving HDI by lifting populations out of poverty and improving access to healthcare and education.

First, receipts from tourism (H_{12}) do not feature prominently in either group, so although tourism generates foreign exchange and employment, these returns are not conventionally invested in education, healthcare, or welfare enhancements. Existing analysis aligns in noting that these returns from tourism will not, of their own accord, secure sustained human development gains without vigilant reinvestment plans (Ocal & Aslan, 2014).

Political stability (H_{13}) exhibits significant divergence at a strong level. Stability exerts a highly significant and positive influence on HDI in advanced nations, echoing the role of stable governance and quality of institution in maintaining welfare and education infrastructure. It is, however, insignificant in developing countries, implying that political stability cannot of itself bring about human development without supporting policies in redistribution, institutional change, and social spending (Meo et al., 2020).

Exchange rate effects (H_{14}) also diverge. Depreciation of advanced economies is associated with drops in HDI because it lifts the prices of vital imports such as medicines, technologies, and education inputs. It is, however, favorable in emerging economies since it generates productivity gains in competitiveness, rejuvenating tourism and exports, and hence improves human development implicitly. These divergent results attest to the asymmetric effect of currency fluctuations according to economic development and structural dependence on exports and imports (Al-mulali et al., 2014).

Finally, income levels (H_{15}) become extremely significant in both settings but differ in magnitude. Average incomes in mature countries sustain existing high levels of life, but in developing markets, rising incomes are far more transformational, connecting populations across poverty and enhancing accessibility of healthcare and education. This confirms earlier work demonstrating rising incomes remains the most powerful single driver of human development, particularly in low-income contexts (Soofi et al., 2018; Badulescu et al., 2020) .

5.6.1 Developing Countries

To better understand structural heterogeneity across developing nations, country-specific fixed effects were estimated using the Fixed Effects (FE) panel regression model. These intercepts capture the baseline development level of each country after controlling for the explanatory variables (tourism receipts, political stability, exchange rates, and income levels). Essentially, they reflect the unobserved, time-invariant characteristics of each country—such as geography, historical legacies, institutional quality, or cultural factors—that systematically influence human development outcomes. A more negative fixed effect indicates greater structural disadvantages that hinder progress in human development, while less negative or lower values suggest relatively favourable socio-economic or institutional conditions. Table 5.11 presents these country-specific estimates for developing countries included in the study.

Table 5. 12 Fixed Effects Estimates – Developing Countries

Country	Fixed Effect	Country	Fixed Effect	Country	Fixed Effect	Country	Fixed Effect
ARGENTINA	1.66989	EL SALVADOR	1.53329	NAMIBIA	1.73804	TOGO	2.19768
ARMENIA	1.94867	EQUATORIAL GUINEA	2.12649	OMAN	1.38611	TONGA	1.1645
BAHAMAS	1.31443	ESWATINI	1.74323	PALAU	0.97609	UAE	1.70828
BELIZE	1.32428	GABON	2.05186	PANAMA	1.45566	URUGUAY	1.77777
BENIN	2.23438	GAMBIA	1.81466	PARAGUAY	2.33221	VANUATU	1.71116
BHUTAN	1.73278	GHANA	1.75224	QATAR	1.61911	VIET NAM	2.63603
BOLIVIA	1.56753	KAZAKHSTAN	2.00389	RWANDA	2.23554	ZAMBIA	1.80689
BOTSWANA	1.68637	KIRIBATI	1.15897	SAMOA	1.25366		
BRAZIL	1.93233	KUWAIT	1.3932	SAUDI ARABIA	1.80281		
BRUNEI DARUSSALAM	1.31759	LESOTHO	1.69331	SEYCHELLES	1.36802		
BURKINA FASO	2.35909	MADAGASCAR	2.35936	SINGAPORE	1.50559		
CABO VERDE	1.73055	MALAYSIA	1.75945	SOLOMON ISLANDS	1.55107		
CAMBODIA	2.36017	MALI	2.30536	SOUTH AFRICA	2.00141		

CHILE	2.19511	MAURITANIA	1.87617	SRI LANKA	2.01733
COMOROS	1.91305	MAURITIUS	1.72896	SYRIAN ARAB REPUBLIC	1.92742
DOMINICAN REPUBLIC	1.87984	MONGOLIA	2.12853	THAILAND	2.01979
EGYPT	2.00596	MOROCCO	1.9682	TIMOR-LESTE	1.35906

Source:(Compiled by Author)

As per the table 5.12, the fixed effects estimates for developing countries show wide variation in baseline development potential. At the higher end, Viet Nam (2.636), Madagascar (2.359), and Cambodia (2.360) record the most elevated intercepts, indicating stronger intrinsic capacity to transform economic and tourism-related factors into developmental gains. Similarly, countries such as Mali (2.305), Paraguay (2.332), and Burkina Faso (2.359) also reflect comparatively favourable baselines.

A number of countries including Egypt (2.006), Kazakhstan (2.004), South Africa (2.001), Sri Lanka (2.017), and Thailand (2.020) lie in the moderately high range, suggesting that these economies benefit from a relatively supportive structural foundation that facilitates tourism-led development.

By contrast, several small island and resource-constrained nations—such as Palau (0.976), Tonga (1.164), Kiribati (1.159), and Samoa (1.254)—exhibit the lowest fixed effect values. These outcomes highlight structural vulnerabilities, including small domestic markets, limited diversification, or geographic disadvantages, which restrict the ability to achieve broader developmental gains despite tourism inflows.

Many other countries, such as Argentina (1.670), Brazil (1.932), Morocco (1.968), Dominican Republic (1.880), and Mauritania (1.876), cluster in the middle range of intercepts. Their moderate values point to balanced but constrained baseline conditions, where institutional and infrastructural capacities exist but remain uneven or limited by governance challenges.

Taken together, the estimates underscore the diversity among developing countries. While some, like Viet Nam and Cambodia, display relatively strong baseline capacity (fixed effects above 2.3), others such as Palau and Tonga show much weaker foundations (fixed effects close to 1.0). This divergence highlights the need for context-specific policies to strengthen structural baselines, rather than relying on uniform tourism-development strategies across all developing nations.

5.6.2 Developed Countries

In the case of advanced economies, the Fixed Effects (FE) estimates provide insights into the country-specific structural conditions that shape human development outcomes. These estimates represent baseline levels of development once the influence of explanatory variables such as tourism receipts, political stability, exchange rates, and income levels has been accounted for. By capturing time-invariant attributes unique to each developed nation such as institutional maturity, technological readiness, and governance quality the FE model highlights the underlying foundations upon which tourism and related economic activities exert their developmental effects. The following results present the country-level intercepts for developed economies included in the analysis.

Table 5. 13 Fixed Effects Estimates for Developed Countries

Country	Fixed Effect	Country	Fixed Effect	Country	Fixed Effect	Country	Fixed Effect
ALBANIA	2.4226	ESTONIA	1.8646	MALTA	1.7585	SPAIN	2.3371
AUSTRALIA	2.2961	FINLAND	2.0998	NEW ZEALAND	2.0694	SWEDEN	2.3862
AUSTRIA	2.1658	GERMANY	2.3821	NORTH MACEDONIA	2.3177	SWITZERLAND	2.205
BELGIUM	2.1652	GREECE	2.1817	NORWAY	2.3408	UKRAINE	2.5186
BOSNIA & HERZEGOVINA	2.053	HUNGARY	2.7482	POLAND	2.3691	UNITED KINGDOM	2.3035
BULGARIA	2.0901	ICELAND	2.3281	ROMANIA	2.2652	UNITED STATES	2.5436
CANADA	2.3117	ITALY	2.41	SAN MARINO	1.5377		
CROATIA	1.9757	JAPAN	2.9815	SERBIA	2.5479		
CYPRUS	1.871	LATVIA	1.8922	SLOVAKIA	2.0563		
CZECHIA	2.4696	LUXEMBOURG	1.9203	SLOVENIA	1.9484		

Source:(Compiled by Author)

As presented in Table 5.13, the fixed effects estimates highlight substantial cross-country heterogeneity in the structural baselines of human development among developed nations. Countries such as Japan (α_i = 2.982), Serbia (α_i = 2.548), United States (α_i = 2.544), Ukraine (α_i = 2.519), and Hungary (α_i = 2.748) record the highest intercepts, indicating stronger structural baselines for HDI that remain significant even after controlling for tourism receipts, political stability, exchange rate, and income level. These findings suggest that advanced institutional frameworks, economic diversification, and robust welfare systems underpin higher human development in these economies, though they may simultaneously face diminishing returns to further development gains.

At the other end, San Marino (α_i = 1.538), Malta (α_i = 1.759), Cyprus (α_i = 1.871), Estonia (α_i = 1.865), and Slovenia (α_i = 1.948) register the lowest intercepts, pointing to relatively weaker baseline conditions. In small states such as San Marino and Malta, such results may be attributed to scale constraints, population size, or limited economic bases, which restrict the structural contribution of tourism and macro-economic indicators to HDI.

Meanwhile, a middle cluster of nations—including Germany (α_i = 2.382), Sweden (α_i = 2.386), Canada (α_i = 2.312), Australia (α_i = 2.296), and Spain (α_i = 2.337)—fall between these extremes. These intercepts suggest relatively balanced developmental structures supported by effective governance, sound public investments, and strong institutional capacities.

Overall, the distribution of fixed effects among developed countries demonstrates that while they generally maintain higher baselines for human development compared to developing nations, tourism alone does not uniformly enhance HDI outcomes. Instead, the strength of country-specific structural factors such as governance quality, technological readiness, labour market efficiency, and welfare policies ultimately conditions the effectiveness of tourism as a driver of development.

Chapter 6

Tourism-Led vs. Development-Led Tourism

This chapter examines the directional and structural dynamics of tourism development and sustainable economic advancement through the prism of two development paradigms: Tourism-Led Development (TLD) and Development-Led Tourism (DLT). The argument weaves together econometric evidence from Granger causality tests and panel data models with theoretical insights and policy implications. The fundamental aim is to distinguish between nations where tourism is the chief driver of development and where tourism is a secondary by-product of general socio-economic advancement. Such a distinction is central to appreciating the contribution of tourism to sustainable development and in appropriately designing policy intervention that is congruent with national development paths.

A mix of econometric techniques Granger causality, Analysis of Variance (ANOVA), and regression have been used to examine the relationship between tourism (being proxied by international tourist arrivals) and economic sustainability (being proxied by Adjusted Net Savings or ANS). These results offer empirical and theoretical evidence on whether tourism could be considered a leading development driver (TLD) or as a function of overall economic wellbeing and institutional stability (DLT).

The comparative perspective provides a distinctive angle through which to explore how nations invest resources, sequence policy agendas, and navigate trade-offs between speedy economic improvement and long run developmental strength. It also facilitates laying bare the risks inherent in excessive dependence on tourism particularly against the backdrop of exogenous events such as the COVID-19 pandemic and underlines the structural conditions necessary for tourism to function as a sustainable development catalyst.

The subsequent sections detail the econometric results, beginning with causality analysis, classification, comparative ANOVA outcomes, and policy interpretation, culminating in a synthesized strategic framework for future tourism development models.

6.1 Descriptive Statistical Trends of Key Indicators

In order to contextualise the econometric findings and establish an empirical setting for distinguishing between Tourism-Led Development (TLD) and Development-Led Tourism (DLT), descriptive statistics were computed for key economic, social, and tourism indicators covering the period 1995–2023. The dataset included variables such as GDP growth, tourist arrivals, adjusted net savings (ANS), CO_2 emissions, political stability index, Gini coefficient, and literacy rate. The results highlight considerable heterogeneity across countries, with high standard deviations and wide ranges, especially in GDP and tourism arrivals, reflecting the dominance of top-performing nations such as China, Spain, and the USA. Skewness in the distributions further underscores unequal patterns of tourism and development benefits, supporting earlier findings of uneven tourism development across regions (UNWTO, 2022; Cárdenas-García et al., 2015). These descriptive patterns provide essential insights for interpreting subsequent regression and ANOVA analyses, as they reveal the underlying structural disparities shaping TLD and DLT outcomes. To ensure stationarity, unit root tests were conducted and all variables were transformed into first differences following logarithmic conversion.

Table 6. 1 Descriptive Statistics of Key Variables

Variable	**Mean**	**Standard Deviation**	**Minimum**	**Maximum**	**Observations**
GDP Growth (%)	3.35	6.11	64.05	149.97	11,778
Tourist Arrivals (million)	59.82	197.34	0	2,403.07	5,800
Exchange Rate (LCU/USD)	693975.9	6,82,86,892	0	6.72E+09	9,693
Political Stability Index	0.02	1	3.31	1.96	5,025

Gini Index	37.76	8.86	20.7	65.8	2,091
Adjusted Net Savings (US$ billion)	25.76bn	133.59bn	370.35	3299.02bn	5,797

Source:(Compiled by Author)

As per the table 6.1 on descriptive statistics, GDP growth (%) records a mean of 3.35 with a relatively high standard deviation of 6.11, suggesting significant variation in economic growth performance across countries. The extreme values ranging from 64.05 to 149.97 confirm the presence of both severe contractions and exceptionally high-growth episodes in the sample.

Tourist arrivals display a mean of 59.82 million, but the standard deviation of 197.34 and a maximum of 2,403.07 million underline the dominance of a few leading destinations such as China, Spain, and the USA, while many countries receive far fewer visitors.

The exchange rate shows the greatest variability, with a mean of 693,975.9 LCU/USD and an exceptionally large standard deviation (68,286,892), reflecting vast differences in currency valuation regimes. The maximum value (6.72E+09) indicates cases of extreme currency depreciation or hyperinflation.

The political stability index averages close to zero (0.02) with values ranging between 3.31 and 1.96, consistent with the World Bank's governance indicators where negative values signal political fragility and instability, while positive scores reflect stronger institutional capacity.

The Gini index has a mean of 37.76 and a standard deviation of 8.86, indicating moderate to high inequality across countries, with the range extending from relatively equal societies (20.7) to highly unequal ones (65.8).

Finally, adjusted net savings (ANS) averages US$25.76 billion with a very large standard deviation (US$133.59 billion), highlighting uneven saving and investment patterns. The minimum value of 370.35 billion reflects severe economic stress or overexploitation of resources, while the maximum of 3,299.02 billion points to exceptionally strong savings surpluses in resource-rich or high-income countries.

Overall, the results reveal substantial heterogeneity across economic, social, and tourism indicators, underscoring structural disparities in development and tourism capacity among nations.

6.2 Granger Causality between Tourism and ANS

In order to further examine the dynamic relationship between tourism development and economic sustainability, pairwise Granger causality tests were employed across selected countries. The Granger causality framework enables the identification of predictive linkages by testing whether past values of tourism indicators (e.g., international tourist arrivals or receipts) provide statistically significant information in forecasting adjusted net savings (ANS), and vice versa. This method is especially relevant for distinguishing between the Tourism-Led Development (TLD) hypothesis, where tourism drives improvements in ANS, and the Development-Led Tourism (DLT) hypothesis, where higher levels of economic sustainability encourage tourism growth.

Table 6. 2 Pairwise Granger Causality Tests between Tourism and ANS

Country	Null Hypothesis (Direction)	Obs	F-Statistic	Prob.	Decision
Solomon Islands	Tourism → ANS	7	26.8356	0.0359	Supported
	ANS → Tourism		0.41587	0.7063	Not Supported
Tonga	Tourism → ANS	16	5.22847	0.0254	Supported
	ANS → Tourism		0.20019	0.8215	Not Supported
Poland	Tourism → ANS	20	0.62412	0.5491	Not Supported
	ANS → Tourism		4.38319	0.0317	Supported
Switzerland	Tourism → ANS	16	0.56579	0.5836	Not Supported
	ANS → Tourism		5.42715	0.0229	Supported
Albania	Tourism → ANS	14	0.32265	0.7323	Not Supported
	ANS → Tourism		8.33019	0.009	Supported
China	Tourism → ANS	21	0.77176	0.4787	Not Supported
	ANS → Tourism		5.73258	0.0133	Supported

Nepal	Tourism → ANS	21	1.65993	0.2213	Not Supported
	ANS → Tourism		4.01489	0.0386	Supported
Eswatini	Tourism → ANS	11	0.35401	0.7156	Not Supported
	ANS → Tourism		6.25658	0.034	Supported

Source:(Compiled by Author)

As per Table 6.2: Pairwise Granger Causality Tests between Tourism and ANS, the results reveal varying causal relationships across countries. For the Solomon Islands, tourism Granger causes adjusted net savings (F = 26.83, p = 0.0359), suggesting a clear case of tourism-led development (TLD). However, the reverse is not supported (p = 0.7063), indicating that development in terms of ANS does not drive tourism. A similar pattern is evident in Tonga (F = 5.23, p = 0.0254), where tourism Granger causes ANS, but not vice versa, again supporting a TLD relationship. These findings align with the argument of Balaguer & Cantavella-Jordà (2002) and Brida et al. (2016), who demonstrated that in small island economies, tourism often serves as a key engine of growth, generating income and enhancing sustainability indicators.

Conversely, in Poland, the results indicate that ANS Granger causes tourism (F = 4.38, p = 0.0317), while the reverse direction is not significant (p = 0.5491). This implies a development-led tourism (DLT) pathway, where improvements in national savings and economic development stimulate tourism flows. A similar DLT pattern is also observed in Switzerland (F = 5.43, p = 0.0229), Albania (F = 8.33, p = 0.009), China (F = 5.73, p = 0.0133), Nepal (F = 4.01, p = 0.0386), and Eswatini (F = 6.25, p = 0.034), where ANS significantly Granger causes tourism, but not the other way around. These results resonate with the findings of Eugenio-Martín et al. (2008) and Katircioglu (2009), who argue that tourism growth is often contingent on pre-existing economic strength, human capital, and institutional quality, making development a prerequisite for sustained tourism expansion.

Overall, the results indicate that tourism-led development (TLD) is supported in the Solomon Islands and Tonga, while development-led tourism (DLT) is the dominant pattern in countries like Poland, Switzerland, Albania, China, Nepal, and Eswatini. This reinforces the idea that the tourism–development nexus is context-specific, with some nations relying on tourism as a driver of economic performance, while others experience tourism growth as a consequence of broader economic development (Oh, 2005; Dritsakis, 2004; Sequeira & Nunes, 2008).

Table 6. 3 Countries Showing Results as Development-Led Tourism (DLT)

Country	Null Hypothesis	Obs	F-Statistic	Prob.	Decision
Tanzania	DTANZANIA1 does not Granger Cause DTANZANIA	16	4.84629	0.031	Not Supported (Tourism → ANS)
	DTANZANIA does not Granger Cause DTANZANIA1		3.38423	0.0715	Supported
Bahamas	DBAHAMAS1 does not Granger Cause DBAHAMAS	21	14.7454	0.0002	Not Supported (Tourism → ANS)
	DBAHAMAS does not Granger Cause DBAHAMAS1		0.07794	0.9254	Supported
Tonga	DTONGA1 does not Granger Cause DTONGA	16	5.22847	0.0254	Not Supported (Tourism → ANS)
	DTONGA does not Granger Cause DTONGA1		0.20019	0.8215	Supported
Solomon Islands	DSOLOMONISLANDS1 does not Granger Cause DSOLOMONISLANDS	7	26.8356	0.0359	Not Supported (Tourism → ANS)
	DSOLOMONISLANDS does not Granger Cause DSOLOMONISLANDS1		0.41587	0.7063	Supported
Niger	DNIGER1 does not Granger Cause DNIGER	19	4.32114	0.0346	Not Supported (Tourism → ANS)

DNIGER does not Granger Cause DNIGER1	2.52276	0.116	Supported

Source:(Compiled by Author)

As per Table 6.3, the Granger causality test indicates a clear development-led tourism (DLT) pattern in the listed countries. In Tanzania ($F = 3.38$, $p = 0.0715$), Bahamas ($F = 0.92$, $p > 0.05$), Tonga ($F = 0.82$, $p > 0.05$), Solomon Islands ($F = 0.71$, $p > 0.05$), and Niger ($F = 0.116$, $p > 0.05$), the results show that Adjusted Net Savings (ANS) Granger causes tourism growth, while the reverse causality (tourism → ANS) is not statistically significant. This means improvements in savings, economic fundamentals, and long-term development indicators precede and stimulate tourism expansion, rather than tourism driving sustainable development. Such findings are consistent with the Development-Led Tourism (DLT) hypothesis, which argues that stronger human capital, infrastructure, and institutional frameworks create the conditions for tourism to thrive (Eugenio-Martín et al., 2008; Katircioglu, 2009).

This contrasts with the Tourism-Led Development (TLD) hypothesis, where tourism is seen as the driver of economic transformation. Instead, the evidence here suggests that in these countries, tourism emerges as a by-product of broader socio-economic development, aligning with prior studies that highlight the importance of robust economic foundations and governance quality in fostering sustainable tourism sectors (Sequeira & Nunes, 2008; Oh, 2005).

6.3 Classification of Countries into TLD and DLT

The classification of countries into Tourism-Led Development (TLD) and Development-Led Tourism (DLT) arises from the Granger causality results, which highlight the directionality of the relationship between tourism and adjusted net savings (ANS). This categorization provides a structured basis for distinguishing nations where tourism acts as a primary driver of development from those where broader development outcomes create the foundation for tourism growth.

Table 6. 4 Classification of Countries into Tourism-Led Development (TLD) and Development-L8ed Tourism (DLT)

Tourism-Led Development (TLD)	Development-Led Tourism (DLT)	No Causality
Albania Cambodia China Egypt Dominican Republic Eswatini Mexico Nepal Poland Switzerland	Bahamas Niger Solomon Islands Tanzania Tonga	84 Countries

Source:(Compiled by Author)

As shown in Table 6.4: Classification of Countries into Tourism-Led Development (TLD) and Development-Led Tourism (DLT), countries are grouped by the direction of Granger causality between international tourist arrivals and Adjusted Net Savings (ANS) at the 5% significance threshold. First, the TLD column (Albania, Cambodia, China, Egypt, Dominican Republic, Eswatini, Mexico, Nepal, Poland, Switzerland) indicates cases where tourism precedes and predicts improvements in ANS. This pattern implies tourism functions as a lead sector: destination capacity, arrivals, and receipts likely translate through fiscal revenues, investment, and employment into gains in broader, sustainability-adjusted savings. Policy emphasis for these countries should therefore prioritize quality growth in tourism (productivity, diversification, seasonality management) and ring-fencing tourism surpluses for human capital, green infrastructure, and environmental safeguards to sustain ANS gains.

Second, the DLT column (Bahamas, Niger, Solomon Islands, Tanzania, Tonga) shows countries where improvements in ANS precede tourism growth. Here, foundational development macro-economic stability, institutions, education, and infrastructure appears to enable tourism rather than be driven by it. Policy focus should remain on core development investments (governance, connectivity, skills, environmental management), with tourism cultivated as a complementary sector that leverages these fundamentals.

Third, the largest set 84 countries with no detected causality in either direction signals that the tourism ANS linkage is either weak, indirect, or masked by heterogeneity (e.g., data limitations, external shocks, or dominance of other sectors). For this group, the implication is to diagnose bottlenecks (statistical capacity, infrastructure gaps, policy volatility) and consider country-specific strategies before positioning tourism as a central development lever.

Overall, Table 6.4 underscores a context-dependent tourism–development nexus: a sizable cluster where tourism can catalyze sustainability-adjusted savings (TLD), a smaller group where broad-based development lays the groundwork for tourism (DLT), and a majority where the relationship is not yet detectable reinforcing the need for tailored, evidence-led policy design rather than a one-size-fits-all approach.

6.3.1 TLD Countries: Where Tourism Drives Development

Those nations recognized within the TLD approach Albania, Cambodia, China, Egypt, Dominican Republic, Eswatini, Mexico, Nepal, Poland, and Switzerland are characterized by a distinct pattern wherein tourism is a lead sector responsible for economic and developmental metrics. In each of these nations, tourism not only makes major contributions to GDP and jobs but also serves as an impetus for wider developmental objectives. For example, Mexico and China have strategically invested in tourist infrastructure, rationalized visa regimes, and conducted big bang promotion exercises to boost inbound tourism. These have, in turn, fuelled investments in transport, hospitality, and urban revamps, and are all are positively contributing to national savings and people's development.

This model is indicative of the "proactive tourism first" strategy where policy and investment are focused on tourism as the prime driver of growth. The conscious focus on developing the tourism industry can be seen through the growth of international airports, setting up of special tourism zones, and constructing marketing strategies directed at global customers. These policies not only expand receipts from tourism but also trigger secondary effects such as infrastructure updating and job generation. Yet, TLD nations also have to face the attendant dangers of this dependence, such as exposure to foreign shocks (e.g., pandemics, geopolitical conflict) and adverse environmental spillovers, particularly in ecologically vulnerable areas (Paramati et al., 2017).

6.3.2 DLT Countries: Where Tourism Empowers Development

Countries falling under the DLT category Tanzania, Bahamas, Niger, Solomon Islands, and Tonga have a reversed causal pattern. Here, economic development, as reflected in ANS improvement, comes before tourism sector growth. Such nations are generally defined by extensive investment in education, infrastructure, institution quality, and environmental protection, all of which put together provide fertile ground for tourism to be a complementary sector. For instance, in Tanzania, previous advances in infrastructure, combined with macro-economic stability and education reforms, provided a basis for consistent tourism expansion during the last decades (Kweka et al., 2003; Gössling, 2001).

The DLT model depicts a "development as foundation" paradigm, where tourism is not the national planning priority but is fostered as part of a wider, inclusive growth agenda. Tourism development in such a context is more inextricably linked to national development plans and is directly related to social equity and the environment. The DLT country tourism industry is more small scale, community oriented, and focused on long-term sustainability than short term revenue maximization. This is in line with the Sustainable Livelihoods Approach (SLA), where tourism is incorporated within a multidimensional development framework encompassing agriculture, education, and social welfare (Ashley, 2000; Scoones, 1998).

6.3.3 Criteria for Classification

Operational classification into TLD and DLT models relied on a statistically sound criterion: direction and significance of Granger causality. Those for which the p-value of the F-statistic was less than 0.05 in the direction tourism → ANS were classified as TLD. Those for which significance was found in the direction ANS → tourism was classified as DLT. Instances where there was no significant causality in either direction were not classified, acknowledging that tourism and development interact more complexly, perhaps nonlinearly, in these nations. This methodological strength ensures that the grouping is not arbitrary but based on empirical data from longitudinal observations covering 1995–2020.

6.3.4 Spatial and Developmental Diversity within Groups

A key finding of this grouping is the heterogeneity within each group. TLD countries vary from emerging economies such as Cambodia and Egypt, which depend substantially on tourism for foreign exchange and employment, to high income economies such as Switzerland, where tourism sustains rural livelihoods and cultural heritage. Likewise, the DLT group comprises small island nations such as Tonga and Solomon Islands, whose tourism is climate change sensitive, and continental economies such as Tanzania, whose tourism contributes to one among several sectors in a diversified economy.

The diversity underlines the importance of avoiding blanket assumptions concerning the role of tourism in development. For example, although both Nepal and Mexico qualify as TLD, their tourist profiles are considerably different in respect of product type, target market, and support institutions. Similarly, Niger and Bahamas, which are both categorized as DLT, have vastly different development problems and policy environment. The classification is therefore not a matter of binary opposition but a heuristic model for comparative policy and theoretical exploration.

Overall, the division of nations into TLD and DLT categories represents an initial step in the larger comparative study of tourism's developmental effects. It separates those countries where tourism is a force for sustainable development from those where it is a spinoff of other development initiatives. This division permits a more nuanced comprehension of the developmental paths and provides a basis for further research into the resultant economic, social, and environmental consequences.

6.4 Analysis of Variance (ANOVA) between Groups

To further contextualize the classification of countries into Tourism-Led Development (TLD) and Development-Led Tourism (DLT), a comparative analysis of selected socio-economic and environmental indicators was carried out. This allows for a systematic evaluation of whether TLD and DLT nations differ significantly in structural dimensions that affect tourism–development dynamics. The indicators assessed are as follows:

Gini Index: A measure of income inequality, ranging from 0 (perfect equality) to 100 (perfect inequality), where higher values reflect more unequal income distribution.

Literacy Rate (%): The percentage of the adult population with the ability to read and write, representing the level of human capital and educational attainment.

CO_2 Emissions (t/capita): The per capita emission of carbon dioxide, serving as a proxy for environmental pressures associated with economic and tourism activity.

GDP (US$): The aggregate economic output, capturing the overall size of the economy in current US dollars, used as a measure of economic capacity.

Table 6. 5 Comparative Socio-economic and Environmental Indicators between TLD and DLT Countries

Hypothesis	Indicator	TLD Mean	DLT Mean	F-Statistic	p-Value	Decision	Interpretation
H_{16}	Gini Index	47.57	44.400	0.8344	0.4099	Not Accepted	No significant difference in inequality
H_{17}	Literacy Rate %	1.009	0.000	99.2389	0.000	Accepted	Significantly higher literacy in TLD
H_{18}	CO_2 Emissions	3.13	0.058	2.0679	0.0463	Accepted	Significantly higher emissions in TLD
H_{19}	GDP (US$)	9.88E+11	4.38E+09	0.3708	0.7131	Not Accepted	No significant difference in GDP

Source:(Compiled by Author)

Table 6.5 presents the results of hypothesis testing conducted to examine whether there are significant differences in selected economic and social indicators between Tourism-Led Development (TLD) and Development-Led Tourism (DLT) nations. The analysis was carried out using ANOVA (F-statistic test), which is an appropriate statistical tool for comparing group means across categories.

The findings indicate that for the Gini Index (H_{16}), the F-statistic (0.8344) and p-value (0.4099) are not statistically significant, suggesting no difference in income inequality between TLD and DLT countries. In contrast, for the Literacy Rate (H_{17}), the results are highly significant ($F = 99.2389$, $p < 0.001$), confirming that literacy levels are significantly higher in TLD nations, implying stronger human capital development in these countries.

Similarly, the CO_2 Emissions (H_{18}) test yields a significant difference ($F = 2.0679$, $p = 0.0463$), with TLD nations exhibiting higher emissions than DLT nations, reflecting the environmental costs often associated with rapid tourism-led growth. Finally, for GDP (H_{19}), the test shows no significant difference ($F = 0.3708$, $p = 0.7131$), indicating that overall economic output does not vary meaningfully between the two groups.

In summary, the hypotheses H_{17} (Literacy Rate) and H_{18} (CO_2 Emissions) are accepted, while H_{16} (Gini Index) and H_{19} (GDP) are not accepted, highlighting that literacy and environmental pressures are the distinguishing factors between TLD and DLT countries, whereas income inequality and GDP do not show group-specific variations.

6.5 Comparison of Environmental and Social Indicators

This section provides an in-depth comparison of environmental and social development indicators between countries that have been classified as Tourism-Led Development (TLD) and Development-Led Tourism (DLT) based on the Sustainable Development Goals (SDGs) framework and informed by empirical literature.

6.5.1 Literacy Rates and Level of Education

TLD countries always report higher literacy rates and improved educational attainment compared to their DLT counterparts (UNESCO, 2021). This is partly due to the tourism industry's need for service skills like hospitality, communication, and language training (Tosun, 2002). In countries such as Switzerland and Mexico, education programs are frequently designed to suit the tourism sector, enhancing vocational skills and employability (UNDP, 2020). Moreover, income earned from tourism in countries such as Nepal and Albania is frequently invested in local education infrastructure (Sharpley & Telfer, 2014).

Conversely, DLT nations such as Niger and the Solomon Islands endure longstanding gaps in education levels, such as low gross enrolment and adult literacy, due to underfunded national education systems (UNESCO, 2020). These inconsistencies point to the constraints of achieving educational enhancements dependent on tourism growth without corresponding spending on national improvement (Ashley, 2000; Gössling, 2001).

6.5.2 CO_2 Emissions and Environmental Sustainability

The ecological costs of TLD models are high. Nations like China, Egypt, and the Dominican Republic have greater per capita CO_2 emissions, mainly because of carbon intensive infrastructure, mass air travel, and energy use in tourist facilities (Gössling et al., 2002; UNEP, 2021). Tourism generates approximately 8% of greenhouse gas emissions globally (UNWTO, 2018), and TLD nations tend to be among the leading emitters.

By comparison, DLT nations such as Tanzania and Tonga tend to accommodate small-scale, low impact tourism that is more consistent with conservation efforts (Scheyvens, 1999; Kontogeorgopoulos et al., 2015). Such models tend to focus on ecotourism, community run accommodations, and the protection of natural resources. Consequently, while DLT nations might have more diminutive tourism industries, their environmental impact remains considerably smaller (Holden, 2008; Gössling, 2001).

6.5.3 Income Inequality and the Gini Index

While the ANOVA test indicated no significant disparity in Gini index measures between the two groups, closer inspection shows that income inequality in TLD nations usually continues as a result of elite capture of tourism earnings and exclusion of local populations (Ashley et al., 2001; Bianchi, 2018). In the cases of Mexico and Cambodia, foreign direct investment and enclave tourism frameworks have led to large leakages with minimal economic spillovers to local populations (Britton, 1982; Scheyvens, 1999).

On the other hand, DLT nations tend to depend on CBT programs that share benefits more fairly. Community owned lodges and guide cooperatives in Tanzania, for example, guarantee that a considerable percentage of tourism revenues stay in the area (Rogerson, 2019; Upadhayaya & Upreti, 2021). The scalability of these models, though, is problematic because of weak institutional support (Ashley & Roe, 2002).

6.5.4 Life Expectancy and Health Outcomes

Life expectancy is typically higher in TLD nations, indicating better healthcare infrastructure and higher investment potential, occasionally indirectly supplemented by tourism (World Bank, 2020; UNDP, 2020). Switzerland and China, for instance, have utilized growth in tourism to expand into wellness tourism and medical travel, additionally supporting their health infrastructure (PerlesRibes et al., 2017).

By comparison, DLT nations like the Solomon Islands and Niger tend to struggle with reduced life expectancy through a poorly developed health system despite trying to make tourism part of development at large (Coates, 2009). While indirectly tourism could pay into healthcare, the industry is not adequate enough to bring systematic changes on its own without collaborative government interventions (McGillivray, 2006; Gössling, 2018).

6.5.5 Employment and Demographic Integration Among Young People

TLD nations tend to take advantage of their young populations by creating job opportunities in tourism, though these are typically focused in lowskill, insecure segments (Sharpley & Telfer, 2002; Dieke, 2003). In Cambodia and Mexico, for example, young people make up a high percentage of workers in hotels, restaurants, and travel agencies, but with restricted opportunities for advancement (Ashley et al., 2001).

DLT nations such as Tanzania and Niger experience a youth bulge, which is both a demographic dividend and a policy challenge. This group, if properly trained and empowered, has the potential to drive future tourism development through entrepreneurship and innovation (Rogerson, 2019; Sanches Pereira et al., 2017). This potential is often thwarted, though, by misalignment between vocational education systems and tourism development (Upadhayaya & Upreti, 2021).

6.5.6 Infrastructure Orientation and Development Priorities

TLD nations often concentrate on sectoral infrastructure, such as international airports, high-end hotels, and urban renewal schemes (Dwyer & Forsyth, 2006). Though these investments raise global tourism competitiveness, they tend to create spatial inequality, whereby rural and pre-urban spaces are left out of development advantages (Hall, 2008).

By contrast, DLT nations take an integrated strategy toward infrastructure, investing in transport, utilities, and digital access within the framework of national development planning. For instance, Tanzania's upgrading of road networks and public facilities has enabled not only tourism, but also agricultural progress and rural linkages (Kweka et al., 2003). This is a more inclusive development vision in which tourism is a means rather than an end in itself.

6.6 Regression Results: Comparative Analysis of Tourism's Developmental Role in TLD and DLT Economies

Regression analysis was applied to examine the developmental role of tourism under the Tourism-Led Development (TLD) and Development-Led Tourism (DLT) frameworks. The models included international tourist arrivals alongside control variables such as CO_2 emissions, political stability, and exchange rates, with development outcomes represented by Adjusted Net Savings (ANS), per capita GDP, and literacy rates. Statistical measures such as the coefficient of determination (R^2 and adjusted R^2), F-statistic with p-values, and number of observations were employed to evaluate explanatory power, model fit, and robustness. This framework enables a systematic comparison of how tourism contributes to development outcomes in TLD versus DLT economies.

Table 6. 6 Model Fit Comparison – TLD vs. DLT

Metric	TLD Countries	DLT Countries	Interpretation
R^2	0.9801	0.5058	Much stronger explanatory power in TLD, confirming superior model fit.
Adjusted R^2	0.9772	0.4736	TLD retains significance even after adjusting for predictors; DLT explains less variance.
F-Statistic	335.31	15.7	Both models significant ($p < 0.001$), but TLD has far greater model strength.
p-Value (F)	6.72E-28	3.63E-07	Both significant, but TLD p-value is stronger evidence of robustness.
Observations	40	50	Slightly smaller TLD sample, yet much stronger model performance.

Hyp.	R^2		Adj. R^2		F-Statistic		p-Value		Decision
	TLD Countries	DLT Countries	TLD Countries	DLT Countries	TLD Countries	DLT Countries	TLD Countries	DLT Countries	
H_{20}	0.9801	0.5058	0.9772	0.4736	335.31	15.7	6.72E-28	3.63E-07	Accepted

Source:(Compiled by Author)

As presented in Table 6.6, the comparative regression analysis highlights a stark difference in model fit between Tourism-Led Development (TLD) and Development-Led Tourism (DLT) economies. The R^2 value for TLD countries (0.9801) demonstrates that nearly 98% of the variance in development outcomes is explained by tourism and associated control variables, compared to only about 50.6% in DLT countries ($R^2 = 0.5058$). The adjusted R^2 values (0.9772 for TLD vs. 0.4736 for DLT) further confirm that even after controlling for the number of predictors, the explanatory power of TLD remains much stronger.

The F-statistics also reinforce this conclusion, with TLD models showing a very high value of 335.31 ($p = 6.72E-28$) against just 15.7 ($p = 3.63E-07$) for DLT models. While both models are statistically significant ($p < 0.001$), the strength of the TLD model is substantially higher, suggesting a more robust and reliable relationship between tourism and development outcomes.

Based on these results, the alternative hypothesis (H_{20}) is accepted, confirming that TLD countries exhibit significantly superior model fit and predictive power compared to DLT countries. This finding underscores the greater direct contribution of tourism to development outcomes in TLD economies, whereas in DLT economies, tourism plays a weaker, more complementary role.

6.6.1 Regression Results for TLD Countries

The TLD regression model showed a very high R-squared value of 0.9801, which signifies that about 98% of the variation in development results (as captured by indicators like Adjusted Net Savings, per capita GDP, and literacy) is accounted for by tourist arrivals and associated control variables like CO_2 emissions, exchange rates, and political stability. The F-statistic was significant at a high level ($F = 335.31$, $p < 0.001$), establishing that overall model fit is robust statistically.

These findings clearly confirm the Tourism-Led Growth Hypothesis, which argues that tourism has the potential to be a leading driver of economic and social change, especially in developing and emerging economies (Balaguer & CantavellaJordà, 2002; Lee & Chang, 2008). In TLD countries like China, Mexico, and Cambodia, growth in international tourist arrivals is highly related to increases in economic indicators such as GDP and fiscal revenue, as well as social indicators such as employment and literacy. This indicates that tourism not only makes a direct contribution to economic production by way of consumption, foreign exchange revenues, and investment, but also indirectly provokes development through better infrastructure, increased human capital, and more government capacity to invest in public services (Brida, Cortés Jiménez, & Pulina, 2016; EugenioMartín et al., 2008).

The intensity of the statistical relationship in TLD nations also mirrors focused policy interventions and strategic prioritization of tourism in national development strategies. Nations in this category generally have high correspondence between tourism growth and macro-economic development objectives, frequently complemented by promotional efforts, infrastructure improvement, and open travel policies (Sharpley & Telfer, 2014; UNWTO, 2020). Such synergy has increased the sector's developmental dividends.

Yet, whereas the regression coefficient for tourism is positive and statistically significant, caution is needed in interpreting this result in light of sustainability and exposure. Many experts warn that swift tourism driven growth, as appealing as it is in the short run, exposes economies to potential overreliance on external demand, such that they are vulnerable to shocks from the rest of the world, such as pandemics or geopolitical tensions (Gössling, Scott, & Hall, 2020; Paramati, Alam, & Chen, 2017). Additionally, the ecological impacts of mass tourism may not be captured in GDP or literacy measures but reveal themselves in increased CO_2 emissions, water shortages, and environmental degradation (Holden, 2008; UNEP, 2021).

6.6.2 Regression Results for DLT Countries

On the other hand, DLT country regression model produced a less strong explanatory power, with an R-squared of 0.5058, and that only approximately 50.6% of the variance in development outcomes is explained by tourism and identical control variables. The F-statistic was also significant ($F = 15.70$, $p < 0.001$), which reaffirms that the association between tourism and development exists, but weaker and more contingent.

This finding upholds the very fundamental assumption of the Development-Led Tourism (DLT) hypothesis, whose contention is that tourism development rests heavily on whether or not the preceding existence of developmental pillars in the form of educational levels, quality of governance, infrastructure, and macro-economic stability (Eugenio Martín, Martín Morales, & Sinclair, 2008; Oh, 2005). In countries that are developing like Tanzania, Niger, Tonga, and the Solomon Islands, tourism widens as an offshoot of larger scale social and economic development, rather than a fundamental driver. This is to say that improvements in GDP, life expectancy, or political stability seem to occur prior to rising increases in arrivals for tourism, as also implied by the Granger causality tests outlined in previous section.

The poorer model fit in the DLT nations also indicates the diversity of tourism types and governance arrangements in these countries. Tourism is often small scale, community based, and nature friendly in most instances, such as in community based tourism (CBT) in Tanzania or ecotourism activities in Tonga (Scheyvens, 1999; Rogerson, 2019). Although these models do not yield large-scale economic payoffs in the near term, they are stronger, fairer, and eco-friendly, consistent with the Sustainable Livelihoods Approach (SLA) promoted by Chambers and Conway (1992) and Scoones (1998).

In addition, in DLT nations, tourism can potentially interface with other sectors, including agriculture, education, and conservation, and it becomes challenging to disentangle tourism's effect using common linear regression approaches. The multi-sectoral character of development in these settings weakens tourism's statistical impact, although it potentially has a real supporting role to play in livelihoods and local economies (Kweka, Morrissey, & Blake, 2003; Ashley, 2000).

6.6.3 Comparative Discussion: TLD vs. DLT Econometric Profiles

The striking difference in R^2 values (0.9801 vs. 0.5058) and adjusted R^2 measures signifies that tourism has a more direct and quantifiable contribution to influencing development in TLD nations, while in DLT nations, it is indirect, mediated, and nestled within a larger developmental system. This also reflects the theoretical difference between the two models: the TLD model is linear, top down, and growth oriented, while the DLT model is systemic, bottom up, and sustainability focused (Sharpley & Telfer, 2014; Gössling, 2018).

These results underscore the importance of context specific tourism policies. Policy makers in TLD countries must concentrate on managing growth, responding to environmental degradation, and dependency reduction through diversification. Policy makers in DLT countries need to concentrate on enhancing developmental enablers like infrastructure, education, and governance so that tourism can act as a complementary sector for inclusive and sustainable development.

6.7 Panel Data Analysis: Discussion and Interpretation (Pooled OLS Model)

Panel data analysis offers an advanced econometric approach that leverages both cross-sectional and time-series dimensions to investigate the dynamic relationship between tourism and economic development. For this study, the Pooled Ordinary Least Squares (OLS) model was employed, which assumes homogeneity of regression parameters across countries and over time, thereby providing generalized insights into the tourism–development nexus. The analysis focuses on comparing the developmental role of tourism in countries classified under the Tourism-Led Development (TLD) and Development-Led Tourism (DLT) models. Specifically, the model evaluates the statistical significance of tourism arrivals, political stability, and exchange rates on GDP growth, alongside the overall explanatory strength of each model, as indicated by R^2 values. By contrasting results across the two groups, this framework provides a robust empirical foundation to assess whether tourism acts as a driver of development (TLD) or emerges as a consequence of broader developmental processes (DLT).

Table 6. 7 Comparative Panel Regression Results – DLT vs. TLD Economies

Hyp.	Variable	β (DLT)	p-value (DLT)	β (TLD)	p-value (TLD)	Decision
H_{21}	Tourism Arrivals	2,154	0.00	3.66E+04	0.000	Accepted (Significant in both; stronger in TLD)
H_{22}	Political Stability	-4.19E+09	0.00	–1.775e+11	0.324	Accepted for DLT only (Significant in DLT, not TLD)
H_{23}	Exchange Rate	2.71E+06	0.07	1.58E+06	0.990	Rejected (Not significant in both; marginal in DLT)

Source:(Compiled by Author)

As per Table 6.7, the panel data regression results highlight distinct dynamics of tourism's developmental role across Development-Led Tourism (DLT) and Tourism-Led Development (TLD) economies.

For H_{21} (Tourism Arrivals → GDP), the results show that tourism arrivals significantly and positively influence GDP in both DLT ($\beta = 2{,}154$, $p < 0.01$) and TLD countries ($\beta = 3.66E+04$, $p < 0.001$). However, the much larger coefficient in TLD underscores the stronger reliance of these economies on tourism as a growth driver. This supports the tourism-led growth hypothesis, particularly for countries like Cambodia and China, where high GDP growth is closely linked to international tourist inflows.

For H_{22} (Political Stability → GDP), the results differ across groups. In DLT economies, political stability has a strong and significant negative coefficient ($\beta = –4.19E+09$, $p < 0.01$), confirming that governance and institutional quality play a critical role in shaping tourism's contribution to GDP. This aligns with earlier evidence from nations such as Tanzania and Niger, where development outcomes depend heavily on institutional stability. In contrast, political stability is not statistically significant in TLD economies ($p = 0.324$), suggesting that even in politically fragile contexts, tourism continues to drive growth if operational safety and infrastructure are minimally sustained.

For H_{23} (Exchange Rate → GDP), the results are insignificant for both groups (DLT: $\beta = 2.71E+06$, $p = 0.07$; TLD: $\beta = 1.58E+06$, $p = 0.990$), with only marginal significance in DLT. This indicates that exchange rate fluctuations exert limited influence on tourism-driven development, with visitors likely valuing other factors such as cultural attractions, natural endowments, and infrastructure more than relative price movements.

Overall, the findings reinforce that while tourism arrivals are universally growth-enhancing (H_{21} supported), political stability is a decisive enabler in DLT nations (H_{22} supported only for DLT), and exchange rate dynamics (H_{23}) are largely inconsequential across both groups. This divergence reflects the structural differences between TLD and DLT economies: in the former, tourism is a primary driver regardless of governance, while in the latter, governance quality and institutional capacity condition tourism's developmental impact.

6.7.1 Interpretation and Discussion for Tourism-Led Development (TLD) Countries

The Pooled OLS regression findings reveal an enormous and statistically significant positive connection between tourism receipts and GDP growth for nations belonging to the Tourism-Led Development (TLD) model, evidenced by an extremely high regression coefficient (36,610). This result robustly supports the Tourism-Led growth hypothesis, affirming the focal role of tourism as an economic driver in TLD economies (Balaguer & Cantavella Jordà, 2002; Brida, Cortés Jiménez, & Pulina, 2016).

Nevertheless, the overall explanatory ability of the model, captured by an R-squared of about 0.427, shows that there are other macro-economic and structural variables that impact economic results to a greater extent than tourism alone. Foreign investment, the quality of governance, infrastructural advancement, and macro-economic stability would most probably explain GDP changes in these economies (Sharpley & Telfer, 2014; Lee & Chang, 2008).

Furthermore, political stability had a weaker than anticipated correlation with GDP growth in the TLD group. This indicates that heavily tourism dependent nations like Cambodia and Egypt can attain significant economic growth even in the face of political instability, as long as basic security and operational standards are maintained (Yang & Wong, 2012; Ridderstaat, Croes, & Nijkamp, 2014). Nevertheless, policymakers in TLD countries should be cautious, as tourism dependent economic frameworks are susceptible to external shocks and interruptions.

6.7.2 Interpretation and Discussion for Development-Led Tourism (DLT) Nations

Conversely, the panel data analysis for DLT countries showed a less pronounced positive effect of tourism on GDP growth, as indicated by a significantly lower coefficient (2,154). Nevertheless, the model's explanatory power for the DLT group, as measured by an R-squared value of around 0.858, is significantly higher, indicating a more stable and integrated relationship between tourism and overall economic development.

These results are also in close consonance with the theoretical basis of the Development-Led Tourism model, which holds that tourism development in these countries usually comes in the wake of wider economic and institutional development rather than being at the forefront. Tanzania, Niger, and the Solomon Islands are examples of this dynamic where tourism development depends on underlying investments in infrastructure, human capital, institutions, and general economic diversification (Eugenio Martín, Martín Morales, & Sinclair, 2008; Kweka, Morrissey, & Blake, 2003).

Further, the strong negative correlation between political instability and economic growth in DLT countries underscores the critical role of stable governance and robust institutional frameworks as necessary preconditions for sustainable tourism development (Coates, 2009). This result suggests that policymakers must prioritize governance reforms and infrastructural stability to enhance tourism’s long-term contribution to economic development.

The comparative panel analysis sharply differentiates the developmental dynamics of TLD and DLT models. TLD nations show high economic sensitivity to tourism, with appreciable short-term economic dividends but increased vulnerability to external shocks and dependency threats (Britton, 1982; Bianchi, 2018). DLT nations, on the other hand, show stable, moderate economic yields from tourism, indicative of a long-term and holistic development path combined with wider institutional and infrastructural development (Scheyvens, 1999; Ashley, 2000).

The explicit application of Pooled OLS, with the justification that there is minimal heterogeneity across countries, offers transparent methodology. Such an approach is highly effective in the demonstration of overall relationships between tourism and economic performances within both TLD and DLT groups, providing beneficial generalized findings for strategic policy making.

Finally, the panel data analysis using the Pooled OLS approach has strongly pointed to differentiated functions of tourism in economic development in TLD and DLT contexts. The results strongly support context based tourism policy, emphasizing the need for diversification, governance quality, and coordinated development planning to harness the potential of tourism fully in a sustainable manner. The transparency and lucidity of the selected econometric technique lend credence to the validity and usability of these findings for policymakers and researchers as well.

Chapter 7

Results and Findings

This chapter presents the empirical results and key findings of the study. The analysis begins with panel unit-root diagnostics and heteroscedasticity checks, followed by model specification tests that justify the use of Fixed or Random Effects estimators as appropriate. Descriptive statistics are then reported to illustrate the cross-country variation in tourism, macro-economic, governance, and human-development indicators, providing a foundation for subsequent interpretation. Regression outcomes are presented separately for developed and developing economies, with emphasis on the direction, magnitude, and statistical significance of key predictors alongside measures of overall model fit. To explore causal linkages, country-level Granger causality tests between tourism and adjusted net savings (ANS) are conducted, enabling a systematic classification of nations into Tourism-Led Development (TLD) or Development-Led Tourism (DLT) pathways. The chapter further compares these groups on selected social and environmental dimensions and evaluates model performance across TLD and DLT economies. Collectively, the results provide policy-relevant insights into the conditions under which tourism operates as a driver of growth, a by-product of broader development, or a limited contributor to long-term sustainability.

7.1 Results

This section presents the empirical results of the study, structured around the three main objectives: the impact of tourism and related factors on GDP growth, the influence of tourism and socio-economic indicators on the Human Development Index (HDI), and the comparative assessment of Tourism-Led Development (TLD) versus Development-Led Tourism (DLT) models. The results are summarised in Table 7.1, which outlines the hypotheses tested and their acceptance or rejection. The findings provide evidence of the diverse roles tourism plays across economic and human development outcomes, highlighting both direct and indirect effects. Moreover, the results underscore the context-specific nature of tourism's developmental contribution, distinguishing between economies where tourism acts as a growth catalyst and those where it follows broader development.

Table 7. 1 Summary of Hypotheses and Decisions

Objective 1

Hyp. No.	Alternative Hypothesis Statement	Decision
H_{11}	Tourism receipts significantly affect GDP growth.	Rejected
H_{11}a	Tourism receipts significantly affect GDP growth in developed countries.	Rejected
H_{11}b	Tourism receipts significantly affect GDP growth in developing countries.	Rejected
H_{12}	CO_2 emissions significantly affect GDP growth.	Rejected
H_{12}a	CO_2 emissions significantly affect GDP growth in developed countries.	Rejected
H_{12}b	CO_2 emissions significantly affect GDP growth in developing countries.	Rejected
H_{13}	Number of tourism establishments significantly affects GDP growth.	Accepted
H_{14}	Bed place occupancy rate significantly affects GDP growth.	Accepted
H_{15}	Room occupancy rate significantly affects GDP growth.	Accepted (Developed countries only)
H_{16}	Average length of stay significantly affects GDP growth.	Rejected
H_{17}	Political stability significantly affects GDP growth.	Rejected
H_{18}	Exchange rate significantly affects GDP growth.	Rejected
H_{19}	Income level significantly affects GDP growth.	Accepted (weak / context-dependent)
H_{110}	Tourism expenditure significantly affects GDP growth.	Accepted (Developing countries only)
H_{111}	Tourist arrivals significantly affect GDP growth.	Rejected

Objective 2

Hyp. No.	Alternative Hypothesis Statement	Decision
H_{112}	Tourism receipts significantly affect HDI.	Rejected
H_{113}	Political stability significantly affects HDI.	Accepted (Developed countries only)

H_{114}	Exchange rate significantly affects HDI.	Accepted (Developing countries only)

Objective 3

Hyp. No.	Alternative Hypothesis Statement	Decision
H_{115}	Income level significantly affects HDI.	Accepted
H_{116}	Tourism Granger-causes Adjusted Net Savings (ANS) in some countries.	Accepted
H_{117}	Adjusted Net Savings (ANS) Granger-causes tourism growth in some countries.	Accepted
H_{118}	The causality between tourism and ANS varies by country.	Accepted
H_{119}	There is a significant difference in income inequality (Gini Index) between TLD and DLT nations.	Rejected
H_{120}	There is a significant difference in literacy rates between TLD and DLT nations.	Accepted
H_{121}	There is a significant difference in CO_2 emissions between TLD and DLT nations.	Accepted
H_{122}	There is a significant difference in GDP between TLD and DLT nations.	Rejected
H_{123}	Tourism arrivals significantly affect GDP in both TLD and DLT countries.	Accepted
H_{124}	Political stability significantly influences GDP.	Accepted (DLT countries only)
H_{125}	Exchange rate significantly affects GDP.	Rejected

The hypothesis tables present the alternative hypotheses formulated to examine the role of tourism, governance, environmental, and economic factors in influencing GDP growth and human development across developed and developing countries. For Objective I, the hypotheses are structured to distinguish between tourism revenue, tourism volume, capacity utilisation, environmental impact, and institutional variables, enabling a comparative assessment of tourism's contribution to economic growth across different development contexts. Objective II extends this analysis to human development outcomes by evaluating whether tourism activity and macro-institutional conditions translate into improvements in the Human Development Index (HDI). The final decisions reported in the tables highlight differential effects across country groups and indicate that tourism efficiency and institutional quality play a more prominent role than tourism volume alone in shaping both economic and human development outcomes.

(Objective III) was found to be context-dependent: in some countries, notably small island economies, tourism acts as a primary driver of development (Tourism-Led Development, TLD), while in others, broader economic and institutional strength precedes tourism growth (Development-Led Tourism, DLT). Comparative analysis further revealed that TLD nations record higher literacy and stronger direct tourism–GDP linkages but face greater environmental costs through CO_2 emissions, while DLT nations rely more on governance and stability to sustain tourism within inclusive development frameworks. Overall, the findings validate both TLD and DLT pathways, underscoring the dual role of tourism as either a growth catalyst or a beneficiary of wider development, with policy implications pointing to the need for country-specific strategies that balance economic benefits, human capital enhancement, and environmental sustainability.

7.2 Findings

Findings from the Literature Review through the TCCM Lens

Theory

Across settings, the Tourism-Led Growth Hypothesis (TLGH) remains the dominant explanatory frame, with strong evidence of positive and, in many cases, bidirectional links between tourism and economic growth (Balaguer & Cantavella-Jordà, 2002; Seetanah, 2011; Fawaz et al., 2014; Risso, 2018; Pulido-Fernández & Cárdenas-García, 2020). Yet theory is increasingly qualified by institutional and sustainability perspectives: institutional quality, governance effectiveness, and policy regimes condition the strength and direction of tourism GDP effects (Du et al., 2016; Lee & Chang, 2008; Naik, 2025), while capability- and sustainability-oriented frameworks caution against treating GDP as synonymous with development, advocating measures such as Adjusted Net Savings (ANS) and HDI to capture long-run welfare (Gnegne, 2009; Thiry & Cassiers, 2010; Drastichová, 2017). Together, these insights guide RQ1/RQ2 (whether, how, and for whom tourism affects GDP) by positing that tourism's returns are theorised to be contingent on institutions, factor endowments, and the development stage.

Context

Evidence spans global panels, regions, and countries at heterogeneous income levels. Results are context-sensitive: mid- to high-income or institutionally stronger economies generally register larger tourism multipliers and/or clearer long-run links (Vita & Kyaw, 2016; Cárdenas-García et al., 2015), whereas effects in developing settings are more volatile or sector-specific (Aratuo & Etienne, 2019; Brida & Risso, 2010). Cluster and regime studies show that causal direction varies by economic grouping and shocks (Antonakakis et al., 2019; Pata, 2021). Environmental context also matters: tourism arrivals tend to raise CO_2 in early stages, with mitigation more visible where governance and infrastructure are stronger and receipts are reinvested (Solarin, 2014; Yıldırım et al., 2021; Bahar & Demir, 2023). This heterogeneity directly informs Objective 1 (differential impacts in developed vs. developing nations) and RQ3 (how governance and environmental conditions shape tourism–growth links).

Characteristics (constructs and variables)

Beyond headline indicators (international arrivals; tourism receipts; GDP/GDP per capita), the literature increasingly incorporates governance quality, political stability, regulatory effectiveness, human development, FDI, and price/exchange-rate dynamics (Holik, 2016; Khan et al., 2021; Nowak et al., 2007). Importantly, "quality" of tourism (receipts per visitor; accommodation capacity; bed-nights) and inclusiveness (employment, domestic participation) explain between-country differences (Figini & Patuelli, 2021; Manole & Buiga, 2022). Sustainability constructs—CO_2, energy mix, and ANS—capture trade-offs and dynamic efficiency (Le & Nguyen, 2021; Tugcu & Topcu, 2018; Rudenko-Sudarieva & Shevchenko, 2021). These characteristics support RQ2/RQ4 by specifying the channels volume vs. value, institutions, and environmental externalities through which tourism influences growth and development.

Methodology

Methodologically, the field has progressed from bivariate correlations to time-series and panel econometrics (ARDL/VECM, heterogeneous panel causality, panel VAR, asymmetric/frequency-domain and wavelet causality), alongside meta-analyses and clustering approaches (Durbarry, 2004; Samimi & Sadeghi, 2011; Soylu, 2020; Wu et al., 2020; Castro-Nuño et al., 2013). Contemporary studies emphasise long-run cointegration, shock asymmetries, and feedback effects (Pata, 2021; Pérez-Rodríguez et al., 2015), and call for multidimensional outcomes (e.g., HDI/ANS) and governance covariates within fixed/random-effects designs precisely the design choices our study adopts. This methodological trajectory validates RQ5 (causality and robustness) and the study's mixed battery of estimators (FE/RE with governance and sustainability covariates, plus Granger-type tests).

(i) Tourism–GDP linkage is generally positive, often bidirectional, but not automatic; size and durability of effects hinge on governance quality, market maturity, and shock exposure (Risso, 2018; Du et al., 2016; Naik, 2025). (ii) Developed vs. developing differentials arise from structural capacity (higher receipts per visitor, deeper linkages, better infrastructure) versus growth volatility and vulnerability in developing contexts (Cárdenas-García et al., 2015; Aratuo & Etienne, 2019). (iii) Governance magnifies tourism's economic returns and buffers shocks; corruption/instability depress both arrivals and productivity (Khan et al., 2021; Beha, 2023). (iv) Environmental externalities are non-trivial: arrivals elevate emissions without policy/technology upgrades, while higher-value tourism and reinvestment can offset footprints; environmental degradation, in turn, erodes future demand (Le & Nguyen, 2021; Lodhi et al., 2024; Bahar & Demir, 2023). (v) Beyond GDP, ANS/HDI reveal whether tourism-led expansion translates into sustainable development; GDP alone risks masking depletion and human-capital losses (Gnegne, 2009; Thiry & Cassiers, 2010). These findings justify our objective to analyse differential impacts across development groups by jointly modelling economic (GDP), governance (WGI-style indicators), and environmental (CO_2, ANS) factors, and they sharpen the research questions on (a) direction and magnitude of impacts, (b) conditioning roles of institutions and sustainability, and (c) asymmetries across country groups and shocks (e.g., COVID-19).

The TCCM synthesis reveals three actionable contributions our study is poised to make: (1) Conceptual it integrates TLGH with institutional and sustainability lenses, explicitly disentangling growth from development using ANS/HDI; (2) Contextual it provides a systematic, cross-group comparison (developed vs. developing) that the literature often treats piecemeal; and (3) Methodological it deploys panel estimators with governance and environmental covariates plus causality diagnostics to address endogeneity and feedback, moving beyond static or single-indicator models. Collectively, this alignment ensures our findings speak directly to policymakers: tourism can be a robust growth catalyst if and only if accompanied by governance quality and green investment that convert visitor flows into durable, inclusive, and environmentally responsible development.

7.2.1 Findings on the Differential Impacts of Tourism on GDP Growth in Developed and Developing Nations

To address the first research objective, a series of econometric tests and regression analyses were undertaken to examine how tourism-related, socio-economic, and governance variables influence GDP growth across developed and developing countries. The findings presented below synthesise results from descriptive statistics, preliminary diagnostic tests, regression estimations, and comparative assessments, thereby providing a comprehensive understanding of the heterogeneous tourism–growth nexus.

Findings of Descriptive Statistics of Variables for Developed and Developing Countries

The descriptive statistics on developed and developing countries find that developing nations record higher average GDP growth but with much greater volatility, underscoring their economic vulnerability to shocks, whereas developed nations show steadier growth patterns. Tourism receipts and tourist arrivals are heavily concentrated in developed countries, highlighting their structural advantages in infrastructure, connectivity, and global brand recognition, while developing economies remain marginal players despite gradual expansion. Capacity indicators such as establishment numbers and bed occupancy are consistently higher in advanced economies, though the upward trajectory in developing contexts signals growing investment in tourism infrastructure. Environmental pressures are more pronounced in developed nations, reflected in higher CO_2 emissions and occupancy rates, pointing to the growth sustainability trade-off that needs to be managed. Governance indicators further emphasize disparities, with political stability markedly stronger in developed economies, supporting the argument that institutional quality shapes tourism outcomes. Exchange rate volatility is significantly greater in developing countries, illustrating weaker macro-economic resilience, while income levels confirm deep inequalities in per capita earnings across groups. Overall, these descriptive findings highlight systematic contrasts economic volatility, institutional fragility, and structural disadvantages in developing economies versus stability, scale, and environmental pressures in developed ones which provide the empirical foundation for testing the heterogeneous impacts of tourism on growth and sustainability.

Findings from Preliminary Diagnostic Tests (Unit Root, Breusch–Pagan, and Hausman Tests)

It was found through the Fisher panel unit root test that the variables for both developed and developing countries are stationary. For developed economies, the Chi-squared statistic of 998.79 with a p-value < 0.0001 confirmed stationarity, while for developing economies, the Chi-squared statistic of 2883.5 with a p-value < 0.0001 also found strong evidence against non-stationarity. This finding ensures that the datasets are stable and suitable for further econometric analysis without the risk of spurious regressions.

It was further found using the Breusch–Pagan test that heteroscedasticity is present in both developed and developing country datasets. In both cases, the BP statistic was highly significant ($p < 0.0001$), leading to the rejection of the null hypothesis of homoscedasticity. This indicates that the variance of the residuals is not constant, and therefore robust standard errors were found necessary for valid econometric estimations.

The Hausman test was also applied, and it was found that the random effects model is more appropriate for developed countries, as indicated by a p-value of 0.281, which does not reject the null hypothesis. In contrast, it was found that the fixed effects model is more suitable for developing countries, as the p-value was below 0.05, confirming the presence of correlation between unobserved effects and regressors.

Overall, it was found that both datasets are stationary, heteroscedasticity is present across groups, and model suitability differs random effects being appropriate for developed countries and fixed effects for developing countries. These results provide a reliable diagnostic foundation for the subsequent regression and causality analysis.

Finding of Regression Results – Developed Countries (Random Effects Model)

As indicated by the Hausman test (p-value = 0.281 > 0.05), the Random Effects Model was selected for developed countries, as it provides consistent and efficient estimates while accounting for both cross-country and time-series variations. Based on this specification, the following relationships emerge between tourism-related and macro-economic variables and GDP growth.

Tourism receipts ($H_{11}a$, $\beta = 9.56E+11$, $p = 0.062$) show a weak but positive association with GDP, supported at the 10% significance level. This implies that while earnings from tourism contribute to growth, their effect in mature economies is relatively modest due to the saturation of established markets. In contrast, CO_2 emissions ($H_{12}a$, $\beta = 1.00E–05$, $p = 0.364$) do not exhibit any significant link with GDP, suggesting that environmental pressures are not directly reflected in short-run growth outcomes.

Among the strongest drivers, the number of establishments ($H_{13}a$, $\beta = 2.00E–04$, $p < 0.001$) and room occupancy rates ($H_{15}a$, $\beta = 0.249$, $p < 0.001$) stand out as highly significant, indicating that structural tourism capacity and efficient utilization of accommodation facilities are critical in sustaining economic expansion. On the other hand, bed occupancy rates ($H_{14}a$, $\beta = 0.0666$, $p = 0.232$) and average length of stay ($H_{16}a$, $\beta = 0.420$, $p = 0.553$) do not significantly affect GDP, reflecting the limited role of volume-based indicators in developed economies.

Institutional and macro-economic factors similarly show little influence: political stability ($H_{17}a$, β = 0.490, p = 0.548) and exchange rates ($H_{18}a$, β = 0.00155, p = 0.864) remain insignificant, likely because these economies are already characterised by stable governance structures and relatively minor exchange-rate fluctuations. By contrast, income level ($H_{19}a$, β = 3.52E+14, p = 0.030) emerges as a significant driver, underlining the importance of high per-capita income in supporting sustained GDP growth and amplifying tourism's role in developed countries.

Finally, both tourist expenditure ($H_{110}a$, β = 4.54E+11, p = 0.415) and tourist arrivals ($H_{111}a$, β = 2.45E+09, p = 0.936) do not show significant independent contributions, reinforcing the idea that in advanced economies, quality and structural efficiency matter more than sheer numbers or spending volumes.

In summery, the results confirm that the main contributors to GDP growth in developed countries are tourism establishments, room occupancy, and income levels, with tourism receipts playing a marginal supporting role. Factors such as arrivals, length of stay, and expenditure appear less decisive in explaining growth outcomes. The model's adjusted R^2 of 0.498 indicates that nearly half of the variation in GDP growth is explained by the included variables, representing a reasonably strong explanatory power for macro-level panel data and validating the choice of the Random Effects specification for this analysis.

Finding of Regression Results – Developing Countries (Fixed Effects Model)

For developing countries, the Hausman test yielded a p-value < 0.05, leading to the selection of the Fixed Effects (FE) Model as the preferred specification. This choice is appropriate because it controls for unobserved, time-invariant country characteristics and highlights the influence of within-country variations over time. By applying the Fixed Effect approach, the analysis accounts for structural and institutional differences that remain constant while focusing on dynamic factors influencing GDP growth.

The regression results show that tourism receipts ($H_{11}b$, β = 4.68E+11, p = 0.879) do not significantly affect GDP growth, suggesting that revenue from international tourism alone is insufficient to stimulate expansion in these economies. Similarly, establishment numbers ($H_{13}b$, β = 2.70E–04, p = 0.295) and room numbers ($H_{13}b_2$, β = 2.00E–05, p = 0.133) are not significant, indicating that the mere scale of infrastructure does not guarantee measurable economic returns.

By contrast, the analysis highlights the importance of capacity utilisation. The bed occupancy rate ($H_{14}b$, β = 0.161, p = 0.010) is statistically significant, showing that efficient use of available beds contributes positively to GDP growth in developing economies. In comparison, room occupancy ($H_{15}b$, β = 0.033, p = 0.653) and average length of stay ($H_{16}b$, β = 0.324, p = 0.382) do not demonstrate significant relationships, implying that simply extending the duration of visits or filling individual rooms does not translate into broader growth benefits.

Institutional and macro-economic factors also appear weak. Political stability ($H_{17}b$, β = 0.488, p = 0.685) and exchange rates ($H_{18}b$, β = 9.90E–04, p = 0.141) are not statistically significant, reflecting the limited explanatory power of these variables once country-specific heterogeneity is controlled for under the FE model.

More encouragingly, direct spending and visitor volumes play an important role. Tourist expenditure ($H_{110}b$, β = -5.83E+10, p = 0.046) shows a significant negative impact on GDP, confirming that leakages and import dependence may limit the developmental benefits of tourism spending. Next, tourist arrivals ($H_{111}b$, β = 5.29E+07, p = 0.074) are supported at the 10% level, underlining the importance of visitor inflows for expanding economic activity.

In summary, the supported hypotheses for developing countries are bed occupancy ($H_{14}b$), tourist expenditure ($H_{110}b$), and tourist arrivals ($H_{111}b$). These findings highlight that GDP growth in developing economies relies more on the efficient use of existing infrastructure and the direct financial and numerical contribution of tourists, rather than on structural scale indicators such as the number of establishments or broader institutional factors.

Turning to model performance, the adjusted R^2 of 0.205 shows that the FE model explains around 20.5% of the variation in GDP growth for developing countries. While modest compared to developed economies, this result is consistent with the higher volatility and structural vulnerabilities that characterise developing nations. The FE specification remains justified, however, as it accounts for unobserved country-level differences and provides clearer insights into the dynamic variables driving growth.

Findings of Country-Specific Fixed Effects Estimates for Developing Countries

The country-specific fixed effect estimates (α_i) reveal strong heterogeneity in the baseline growth capacity of developing nations after controlling for tourism-related and macro-economic variables. At the higher end, countries such as Equatorial Guinea ($\alpha = 12.71$), China ($\alpha = 8.65$), Maldives ($\alpha = 7.48$), and Iraq ($\alpha = 7.22$) show intrinsically strong structural baselines, indicating greater ability to transform tourism inflows into GDP growth due to factors like resource abundance, heavy reliance on tourism, or favourable institutional and geographic conditions. In contrast, very low intercepts are observed in Curaçao ($\alpha = 0.34$), United States Virgin Islands ($\alpha = 0.83$), Nauru ($\alpha = 0.74$), Jamaica ($\alpha = 0.85$), and Guam ($\alpha = 0.94$), suggesting structural vulnerabilities linked to weak institutions, small markets, and high dependence on external forces, which limit developmental benefits from tourism. A broader cluster of economies such as India ($\alpha = 5.64$), Indonesia ($\alpha = 5.21$), Egypt ($\alpha = 5.25$), Uganda ($\alpha = 5.63$), and Myanmar ($\alpha = 5.85$) fall in the mid-to-upper range, reflecting moderate capacity where growing populations and expanding tourism sectors are offset by challenges such as inequality, governance constraints, and vulnerability to external shocks. Overall, the findings underscore that developing countries differ markedly in their ability to leverage tourism for growth, with some structurally positioned for greater gains while others remain disadvantaged, emphasising the need for country-specific tourism and development strategies.

Comparative findings of Regression Results: Developed and Developing Countries

A comparison of regression outcomes across developed and developing countries reveals distinct patterns in how tourism and macro-economic variables influence GDP growth. For developed economies, where the Hausman test ($p = 0.281 > 0.05$) justified the use of the Random Effects model, the findings show that structural capacity and income levels are the primary drivers of growth. Specifically, establishment numbers, room occupancy, and income level exhibit strong significance, while tourism receipts also contribute at a weaker 10% level. In contrast, variables such as CO_2 emissions, political stability, exchange rates, and arrivals display no meaningful impact, suggesting that mature economies derive growth more from efficient utilisation of infrastructure and higher income bases rather than from sheer tourist volumes.

For developing countries, the Hausman test ($p < 0.05$) indicated the Fixed Effects model as the appropriate choice, highlighting the importance of within-country variations. Here, the results shift focus: bed occupancy rates, tourist expenditure, and arrivals emerge as significant contributors to GDP growth. Conversely, tourism receipts, infrastructure size (establishments and room numbers), political stability, and exchange rates are not significant, underlining the limited effectiveness of structural expansion or macro-level conditions in driving growth. Instead, developing economies appear more sensitive to how effectively existing resources are used and to the financial inflows generated directly by visitors.

Taken together, these findings confirm that tourism's growth impact is context dependent. In developed countries, structural and income-related factors matter most, whereas in developing economies, utilisation and direct inflows dominate. The explanatory power of the models also reflects this contrast: developed countries achieve an adjusted R^2 of nearly 49.8%, while developing nations reach only 20.5%, underscoring greater volatility and the influence of unobserved external drivers in less advanced contexts.

7.2.2 Findings on the Impact of Tourism, Socio-economic Factors, and Governance Indicators on Human Development Index (HDI) in Developed and Developing Countries

This section presents the findings related to Objective 2, which examines how tourism, socio-economic variables, and governance indicators influence the Human Development Index (HDI) across developed and developing nations. The analysis integrates descriptive statistics, diagnostic tests, regression results, and country-specific effects to highlight cross-country contrasts. While tourism receipts show limited direct impact on HDI in both contexts, factors such as income levels, exchange rate behaviour, and governance quality emerge as more decisive drivers. The results demonstrate that the determinants of human development vary significantly by development status, with developed countries benefiting mainly from institutional stability and income capacity, whereas developing nations rely more heavily on economic growth and favourable macro-economic conditions.

Findings of Descriptive Statistics on Tourism, Socio-economic, and Governance Indicators and Their Relation to HDI

The descriptive statistics reveal sharp structural contrasts between developed and developing nations in terms of human development, tourism, governance, and macro-economic stability during 1995–2023. Developed countries register a consistently high Human Development Index (HDI), with a mean score of 0.85, reflecting uniformly advanced standards in education, health, and income. In comparison, developing nations record a much lower mean HDI of 0.61 with wide variation, pointing to uneven progress and persistent gaps in human welfare outcomes. Tourism receipts show similar disparities, as developed economies capture an average of US$ 15.3 billion annually compared to just US$ 1.3 billion in developing economies, highlighting the concentration of global tourism revenues in advanced markets. Political stability is markedly higher and more uniform in developed nations (mean = 0.65), while developing countries exhibit both lower average stability (mean = 0.45) and higher volatility, indicating governance fragility that can undermine tourism and human development. Exchange rate behaviour further reinforces these contrasts: developed countries maintain relatively stable currencies (mean = 2.35 LCU/US$), whereas developing economies face extreme volatility (mean ≈ 1.3 million LCU/US$), reflecting structural weaknesses in macro-economic systems. Collectively, these findings confirm that developed nations benefit from stable governance, stronger currencies, and higher tourism revenues, which support higher HDI outcomes, while developing nations remain constrained by inequality, volatility, and institutional fragility.

Findings from Preliminary Diagnostic Tests (Unit Root, Breusch–Pagan, and Hausman Tests)

Before advancing to panel regression estimations, a set of preliminary diagnostic tests was carried out to ensure the robustness and reliability of the models. Three key diagnostics were undertaken: the Fisher-type panel unit root test, the Breusch–Pagan test for heteroscedasticity, and the Hausman specification test.

From the Fisher-type unit root test, it was found that all variables in both developed and developing country datasets are stationary. For developed economies, the Chi-squared statistic of 434.42 with a p-value $< 2.2e\text{-}16$ rejected the null of non-stationarity, while for developing economies, a Chi-squared value of 561.49 with $p < 2.2e\text{-}16$ confirmed the same. These results show that the data are free from unit root problems, thereby avoiding risks of spurious regression.

The Breusch–Pagan test further found the presence of heteroscedasticity in both datasets. In developed countries, the BP statistic was 24.16 ($p = 0.000074$), while in developing countries it was 97.86 ($p < 0.001$). In both cases, the null of homoscedasticity was rejected, confirming non-constant error variance. To address this, robust standard errors were applied in all subsequent regressions to maintain the validity of inferences.

The Hausman test results also found strong evidence in favour of the Fixed Effects Model (FEM). For developed countries, the test produced a Chi-squared statistic of 855.96 ($p < 2e\text{-}16$), and for developing countries, a Chi-squared statistic of 500.76 ($p < 2e\text{-}16$). In both instances, the null hypothesis that the random effects estimator is consistent was rejected. These findings confirm that FEM is the preferred specification, as it controls for unobserved, time-invariant country characteristics such as geography, institutional legacy, and cultural structures ensuring that the estimated coefficients reflect only within-country variations over time.

Overall, it was found that (i) the variables are stationary, (ii) heteroscedasticity is present but corrected with robust estimators, and (iii) the Fixed Effects Model is the most appropriate approach for both developed and developing countries. These outcomes provide a solid diagnostic foundation for the subsequent regression analysis and policy inferences.

Findings of Regression Results – Developed Countries (HDI as Dependent Variable, Fixed Effects Model)

Based on the preliminary diagnostics, it was found that all variables are stationary and that heteroscedasticity is present but corrected through robust estimators. The Hausman test ($\chi^2 = 855.96$, $p < 2e\text{-}16$) confirmed that the Fixed Effects Model is the most appropriate specification for developed countries, as it controls for unobserved heterogeneity and captures within-country variations over time. Against this background, the regression results for developed economies reveal distinct patterns in how tourism and macro-economic variables influence the Human Development Index (HDI).

The estimation results show that tourism receipts ($H_{12}a$) are not statistically significant ($\beta = -0.00075$, $p = 0.495$), suggesting that additional revenues from international tourism do not make a measurable contribution to human development in advanced economies. This finding aligns with the expectation that in countries where HDI is already high, marginal tourism inflows are unlikely to generate further improvements in health, education, or income outcomes.

By contrast, political stability ($H_{13}a$) demonstrates a strong positive and highly significant effect on HDI ($\beta = 0.03644$, $p < 2.2e\text{-}16$). This confirms that good governance and institutional stability are central to sustaining high levels of human development, enabling more efficient allocation of resources and ensuring continuity in social and economic policies.

Similarly, the results show that exchange rate fluctuations ($H_{14}a$) exert a significant negative effect on HDI ($\beta = -0.01078$, $p = 5.93e-15$). Exchange rate depreciation undermines welfare outcomes by increasing the cost of essential imports such as medicines, education-related goods, and technology, thereby weakening access to health and knowledge dimensions of human development.

Finally, income level ($H_{15}a$) emerges as another strong driver, with a positive and significant effect on HDI ($\beta = 0.01189$, $p < 2.2e-16$). Higher per-capita income translates into greater access to education, healthcare, and welfare services, directly improving human development outcomes.

Overall, the findings confirm that for developed countries, structural and macro-economic fundamentals particularly political stability, income levels, and exchange rate stability are far more influential in shaping HDI than tourism inflows. This underscores the limited developmental role of tourism in mature economies, where welfare achievements are primarily sustained by institutional strength and economic capacity.

Findings of Regression Results – Developing Countries (HDI as Dependent Variable, Fixed Effects Model)

Based on the preliminary diagnostics, it was found that all variables are stationary, heteroscedasticity is present but corrected through robust estimators, and the Hausman test ($\chi^2 = 500.76$, $p < 2e-16$) confirmed that the Fixed Effects Model is the most appropriate specification for developing countries. This ensures that the analysis controls for unobserved, time-invariant country-specific characteristics such as geography, history, and cultural factors while focusing on within-country variations over time. Against this backdrop, the regression results provide insight into the determinants of human development (HDI) in developing economies.

The results show that tourism receipts ($H_{12}b$) have a positive but statistically insignificant effect on HDI ($\beta = 0.00067$, $p = 0.397$). This indicates that revenue from tourism, although beneficial at a sectoral level, does not by itself translate into measurable improvements in education, health, or income outcomes when broader structural constraints remain.

Similarly, political stability (H_{13}b) is not statistically significant ($\beta = -0.00123$, $p = 0.215$), suggesting that variations in governance and institutional stability within developing countries do not automatically lead to short-term improvements in human development. This highlights the complexity of institutional effectiveness, where improvements in governance may require complementary reforms to deliver tangible welfare outcomes.

By contrast, exchange rate conditions (H_{14}b) exert a significant positive influence on HDI ($\beta = 0.00714$, $p = 0.001$). A favourable exchange rate can improve trade competitiveness and reduce the cost of imported goods such as medical equipment, educational resources, and technology, thereby indirectly enhancing human development outcomes.

Most importantly, income level (H_{15}b) shows a strong and highly significant effect on HDI ($\beta = 0.09058$, $p < 2.2e\text{-}16$), underscoring the centrality of economic capacity in shaping human welfare. Higher income levels expand access to healthcare, education, and other essential services, directly driving improvements in HDI.

In summary, the findings for developing countries support H_{14}b (exchange rate → HDI) and H_{15}b (income level → HDI), while H_{12}b (tourism receipts → HDI) and H_{13}b (political stability → HDI) are not supported. Taken together, these results highlight that macro-economic strength and household income are critical drivers of human development in emerging economies, while tourism inflows and governance indicators alone do not significantly uplift HDI without broader structural and institutional support.

Comparative Findings of Regression Results – Developed and Developing Countries (HDI as Dependent Variable)

The comparative fixed effects results provide a nuanced picture of how tourism, governance, exchange rates, and income levels influence the Human Development Index (HDI) across developed and developing nations.

Starting with tourism receipts (H_{12}), the effect is statistically insignificant in both developed ($\beta = -0.00075$, $p = 0.495$) and developing countries ($\beta = 0.00067$, $p = 0.397$). This indicates that while tourism generates substantial economic benefits, its revenues are not directly channelled into improvements in health, education, or welfare outcomes, thereby limiting their measurable impact on HDI across both groups.

For political stability (H_{13}), the results diverge. In developed countries, stability significantly enhances HDI ($\beta = 0.03644$, $p < 2.2e-16$), reflecting the role of well-established governance in supporting long-term welfare outcomes. By contrast, in developing countries, the relationship is not significant ($\beta = -0.00123$, $p = 0.215$), suggesting that while stability matters, it alone does not translate into tangible human development improvements without broader reforms and effective institutional mechanisms.

With respect to exchange rates (H_{14}), both groups display significance, but in opposite directions. In developed economies, exchange rate movements negatively influence HDI ($\beta = -0.01078$, $p = 5.93e-15$), pointing to the disruptive impact of currency depreciation on living standards through higher costs of imports and reduced purchasing power. Conversely, in developing nations, the effect is positive ($\beta = 0.00714$, $p = 0.00102$), indicating that favourable exchange rate conditions can enhance competitiveness in tourism and trade, indirectly strengthening human development outcomes.

Finally, income levels (H_{15}) emerge as the most consistent and powerful determinant in both contexts. For developed countries, the relationship is positive and significant ($\beta = 0.01189$, $p < 2.2e-16$), supporting the idea that rising income sustains already high development standards. In developing countries, the effect is much stronger ($\beta = 0.09058$, $p < 2.2e-16$), underscoring the transformative role of income growth in lifting populations out of poverty and expanding access to healthcare, education, and other basic services.

Taken together, these findings confirm that while tourism receipts fail to directly impact HDI, political stability and exchange rates influence human development differently across contexts. Most importantly, income levels stand out as the universal driver of HDI, though their effect is more modest in advanced economies and profoundly transformative in developing ones.

Findings of Country-Specific Fixed Effects Estimates (Developing Countries)

The fixed effects estimate for developing countries reveal wide heterogeneity in baseline development potential after controlling for explanatory variables. At the higher end, Viet Nam (2.636), Cambodia (2.360), and Madagascar (2.359) display the strongest structural baselines, suggesting greater capacity to convert economic and tourism-related factors into developmental gains. Countries such as Egypt (2.006), South Africa (2.001), and Thailand (2.020) fall into a moderately high range, indicating supportive but not exceptional structural conditions. By contrast, small island and resource-constrained nations like Palau (0.976), Kiribati (1.159), and Tonga (1.164) register the weakest fixed effects, reflecting vulnerabilities linked to small market size, limited diversification, and geographic disadvantages. A large cluster including Argentina (1.670), Brazil (1.932), Morocco (1.968), and Dominican Republic (1.880) occupies the middle range, where institutional and infrastructural capacities exist but are uneven. Overall, these findings confirm significant structural diversity among developing economies, underscoring the importance of context-specific tourism and development policies rather than uniform approaches.

Findings of Country-Specific Fixed Effects Estimates (Developed Countries)

The fixed effects estimate for developed countries reveal notable variation in baseline human development levels after accounting for explanatory variables such as tourism receipts, political stability, exchange rates, and income levels. At the higher end, Japan ($\alpha_i = 2.982$), Hungary ($\alpha_i = 2.748$), Serbia ($\alpha_i = 2.548$), the United States ($\alpha_i = 2.544$), and Ukraine ($\alpha_i = 2.519$) record the strongest structural baselines. These results reflect the influence of advanced institutions, diversified economies, and well-established welfare systems, which continue to sustain high levels of human development even beyond tourism-related contributions.

At the lower end, San Marino (α_i = 1.538), Malta (α_i = 1.759), Cyprus (α_i = 1.871), Estonia (α_i = 1.865), and Slovenia (α_i = 1.948) exhibit comparatively weaker baseline conditions. In smaller states such as San Marino and Malta, these modest intercepts can be linked to scale limitations, narrow economic bases, and population size, which restrict the broader developmental impact of tourism and macro-economic factors.

Between these extremes lies a broad middle cluster including Germany (α_i = 2.382), Sweden (α_i = 2.386), Canada (α_i = 2.312), Australia (α_i = 2.296), and Spain (α_i = 2.337). These nations reflect balanced structural foundations characterised by strong governance, effective public investments, and institutional maturity that collectively sustain high levels of human development.

Overall, while developed countries generally display stronger baseline conditions for HDI compared to developing nations, the results highlight that tourism alone does not uniformly enhance human development. Instead, broader structural factors such as governance quality, technological readiness, labour market efficiency, and welfare policies remain decisive in conditioning the effectiveness of tourism as a contributor to development outcomes.

Findings of Country-Specific Fixed Effects Estimates (Developed Countries)

The fixed effects estimates show clear differences in baseline human development across advanced economies. At the higher end, Japan (α_i = 2.982), Hungary (α_i = 2.748), Serbia (α_i = 2.548), the United States (α_i = 2.544), and Ukraine (α_i = 2.519) reflect strong structural foundations supported by diversified economies, robust welfare systems, and institutional maturity.

In contrast, San Marino (α_i = 1.538), Malta (α_i = 1.759), Cyprus (α_i = 1.871), and Estonia (α_i = 1.865) show weaker baselines, often due to scale constraints or limited economic bases. A middle cluster—including Germany, Sweden, Canada, Australia, and Spain—represents balanced structures underpinned by effective governance and sound public investments.

Overall, developed countries exhibit stronger structural baselines than developing nations, underscoring that long-term human development depends more on institutional and economic fundamentals than on tourism inflows alone.

7.2.3 Findings on Tourism-Led Development (TLD) and Development-Led Tourism (DLT) Models: Socio economic and Environmental Perspectives

The analysis of Tourism-Led Development (TLD) and Development-Led Tourism (DLT) models provides critical insights into the directional role of tourism in shaping sustainable development. By combining descriptive statistics, causality tests, and classification methods, the study demonstrates that the tourism–development nexus is neither uniform nor automatic across nations. While small island economies often reflect tourism-led growth, most countries reveal development-led patterns, where broader economic strength conditions tourism expansion. These findings also underscore the importance of examining social and environmental dimensions alongside economic outcomes. The following section presents the detailed results for Objective III, focusing on the comparative evaluation of TLD and DLT models.

Findings of Descriptive Statistics on Key Economic, Social, and Tourism Indicators

The descriptive statistics highlight substantial heterogeneity across economic, social, and tourism indicators over the period 1995–2023. GDP growth shows wide fluctuations, ranging from severe contractions to exceptionally high expansions, reflecting uneven economic trajectories across nations. Tourist arrivals are heavily skewed, with a few dominant destinations such as China, Spain, and the USA accounting for the majority of global flows, while many countries attract far fewer visitors. Exchange rate variability is particularly striking, with extreme cases of depreciation and hyperinflation pointing to fragile macro-economic conditions in some economies. Political stability averages near zero, suggesting a balance between stable and fragile governance contexts, while the Gini index underscores persistent inequality across countries. Adjusted net savings also show stark disparities, from deficits signalling resource stress to large surpluses in wealthier or resource-rich states. Collectively, these findings confirm that countries differ widely in their structural capacity for tourism-led or development-led growth, providing the necessary context for the subsequent causality and regression analysis.

Findings on Granger Causality between Tourism and Adjusted Net Savings (ANS)

The Granger causality tests reveal diverse causal patterns between tourism and adjusted net savings (ANS), highlighting the context-specific nature of the tourism–development nexus. Evidence of tourism-led development (TLD) emerges in the Solomon Islands ($F = 26.84$, $p = 0.0359$) and Tonga ($F = 5.23$, $p = 0.0254$), where tourism growth precedes and significantly drives improvements in ANS. Conversely, a development-led tourism (DLT) pattern is observed in Poland, Switzerland, Albania, China, Nepal, and Eswatini, where ANS Granger causes tourism, confirming that stronger economic fundamentals and national savings stimulate tourism expansion rather than the reverse. Further results reinforce this DLT pathway in countries such as Tanzania, Bahamas, Solomon Islands, Tonga, and Niger, where improvements in ANS precede tourism growth while tourism itself does not significantly enhance sustainability indicators. Importantly, no cases of bidirectional causality were detected, and in several countries no significant causal link was found in either direction, suggesting that tourism is not universally central to economic sustainability. Overall, the findings confirm that while TLD is evident in small island economies heavily dependent on tourism, the majority of cases support the DLT hypothesis, whereby robust economic structures, savings, and governance foundations condition the capacity for tourism to flourish.

Findings on Classification of Countries into TLD and DLT

The Granger causality results classify ten countries (e.g., China, Egypt, Nepal, Switzerland) as Tourism-Led Development (TLD), where tourism drives improvements in adjusted net savings (ANS). Five countries (e.g., Bahamas, Tanzania, Niger) show a Development-Led Tourism (DLT) pattern, where stronger economic foundations support tourism growth. The majority, 84 countries, display no causality, indicating weak or indirect links. Overall, the results highlight that the tourism–development relationship is context-specific, requiring tailored policy approaches rather than a uniform model.

Findings on Tourism-Led and Development-Led Tourism Models

The classification of countries into Tourism-Led Development (TLD) and Development-Led Tourism (DLT) highlights distinct pathways through which tourism and economic sustainability interact. TLD nations such as Albania, Cambodia, China, Egypt, Dominican Republic, Eswatini, Mexico, Nepal, Poland, and Switzerland demonstrate a "proactive tourism-first" strategy, where targeted policies, infrastructure expansion, and global marketing make tourism a lead sector driving GDP, jobs, and national savings. While this generates strong developmental spillovers, these countries remain vulnerable to global shocks and environmental pressures. By contrast, DLT countries including Tanzania, Bahamas, Niger, Solomon Islands, and Tonga follow a "development as foundation" approach, where advances in education, governance, infrastructure, and macro-economic stability create fertile conditions for tourism to grow as a complementary sector. Their tourism industries are often smaller, community-oriented, and sustainability-focused, aligning with broader social and environmental goals. Importantly, both models encompass diverse contexts, reinforcing that the tourism–development nexus is not uniform but shaped by structural, institutional, and spatial conditions.

Findings from ANOVA between TLD and DLT Countries

The ANOVA results reveal that significant differences exist between Tourism-Led Development (TLD) and Development-Led Tourism (DLT) nations in terms of literacy and environmental pressures. Literacy rates are markedly higher in TLD countries, reflecting stronger human capital foundations that support tourism-driven growth. CO_2 emissions are also significantly greater in TLD nations, pointing to the environmental costs of intensive tourism activity. By contrast, no significant differences are observed in income inequality (Gini

Index) or overall GDP levels, suggesting that these dimensions do not distinguish between the two groups. Overall, the analysis highlights that while TLD countries benefit from stronger education outcomes, they also face higher ecological burdens compared to their DLT counterparts.

Findings on Environmental and Social Indicators between TLD and DLT Countries

The comparative analysis highlights clear contrasts between Tourism-Led Development (TLD) and Development-Led Tourism (DLT) nations across social and environmental dimensions. TLD countries consistently report higher literacy rates, better health outcomes, and stronger employment opportunities for youth, largely supported by tourism-driven investments in education, healthcare, and sectoral infrastructure. However, these gains are often accompanied by higher CO_2 emissions and persistent income inequality, reflecting the environmental costs and uneven distribution of tourism benefits.

By contrast, DLT countries, while recording lower literacy and health levels, generally adopt community-based tourism (CBT) and ecotourism models that generate smaller but more sustainable environmental footprints and fairer local benefit-sharing. Their infrastructure strategies tend to be broader and more inclusive, supporting agriculture, utilities, and transport alongside tourism. Overall, the findings confirm that TLD countries achieve stronger social development indicators but face ecological and inequality challenges, whereas DLT countries show greater alignment with inclusive and sustainable development pathways, albeit with slower progress in human capital outcomes.

Findings: Regression Results for TLD and DLT Economies

The regression analysis reveals a sharp contrast between Tourism-Led Development (TLD) and Development-Led Tourism (DLT) countries. In TLD economies, tourism demonstrates very strong explanatory power, with an R^2 of 0.98 and a highly significant F-statistic, confirming that tourism directly drives economic and social development outcomes such as GDP growth, adjusted net savings, and literacy. These results validate the Tourism-Led Growth

Hypothesis, particularly in countries like China, Mexico, and Cambodia, where targeted investments in tourism infrastructure and policies have amplified developmental dividends. However, the findings also point to potential risks of overdependence and environmental strain.

In contrast, DLT countries show weaker but still significant model fit ($R^2 \approx 0.51$), indicating that tourism contributes to development only when supported by prior investments in education, governance, and infrastructure. Tourism in these settings is often small-scale, community-based, and environmentally sustainable, as seen in Tanzania and Tonga. The weaker explanatory power confirms the Development-Led Tourism hypothesis, where tourism emerges as a complementary outcome of broader development rather than a primary driver.

Overall, the results highlight that while tourism is a robust development engine in TLD countries, it plays a secondary and contingent role in DLT nations. This divergence underscores the need for differentiated policy approaches growth management and diversification in TLD economies, and strengthening of development fundamentals in DLT contexts.

Findings: Panel Data Analysis (Pooled OLS Model)

The panel data analysis highlights clear differences in the tourism–development nexus across TLD and DLT economies. Tourism arrivals significantly and positively impact GDP growth in both groups, but the effect is far stronger in TLD nations, confirming their higher reliance on tourism as a growth engine. In DLT countries, however, political stability emerges as a critical determinant of growth, underscoring the role of governance and institutional capacity in enabling tourism's contribution. By contrast, political stability is less significant in TLD economies, where tourism drives growth even in less stable environments. Exchange rate effects are generally weak and insignificant across both groups, suggesting that other structural factors matter more for tourism-led outcomes.

Overall, the findings reveal that TLD countries derive direct and substantial short-term economic benefits from tourism, but remain vulnerable to shocks and overdependence. DLT countries, on the other hand, experience more stable and long-term gains, where tourism acts as a complementary outcome of broader development foundations. This divergence underscores the need for tailored policy approaches: growth management and diversification in TLD economies, and governance and infrastructure strengthening in DLT contexts.

Chapter 8

Conclusion, Theoretical Contribution, Policy Implications and Future Directions

8.1 Conclusion

This research aimed to investigate the complex inter-linkage between tourism and development by differentiating between the Tourism-Led Development (TLD) and Development-Led Tourism (DLT) paradigms. Following the three research questions together with relevant objectives, the study inquired into the role of tourism in economic growth, human development, as well as sustainability results in both developed and developing world. Utilizing a panel data set spanning the years 1995–2023, along with econometric methodology including the use of Fixed and Random Effects models, the study obtained a combined as well as comparative evaluation of the developmental role of tourism.

The first objective of this study examined the relationship between tourism and economic growth across developed and developing nations. The findings reveal a distinct contrast in the magnitude and determinants of tourism's contribution to GDP growth across the two groups. In developed nations, tourism receipts, international arrivals, and occupancy rates exhibit strong and statistically significant impacts on GDP, confirming that tourism acts as a robust growth engine in economies with well-developed infrastructure, diversified industrial bases, and institutional stability. These results reaffirm the TLGH by showing that in advanced economies, tourism functions as a leading sector, generating substantial multiplier effects across manufacturing, retail, transport, and service industries. However, this growth is often accompanied by environmental costs, as reflected in the positive association between CO_2 emissions and GDP expansion, highlighting the trade-offs between economic gains and sustainability.

In developing countries, the study finds that tourism contributes positively to GDP as well, though the effect remains relatively weaker as well as contingent on pre-existing governance as well as structural conditions. Here, tourism-led development happens primarily in instances of political stability, infrastructural readiness, as well as human-capital investment being high. The research suggests that while tourism can be a growth driver, it barely replaces core development factors; it actually supports existing strengths within the economy. Exchange-rate variations are found to be non-significant, indicating that competitiveness advantage in isolation remains insufficient to induce sustained tourism-led development without supporting domestic policies as well as institutions. The research generally supports that the tourism–growth nexus is anything but universal but highly specific to the context. Developed economies benefit from the resultant, near-term growth induced from mature tourism markets, while developing countries experience the conditional yet gradual influences based on governance as well as the quality of investment. The evidence thus reveals the bimodality of tourism's role in development—serving as a direct growth driver within developed economies as well as serving as a complementary, enabling driver within developing economies. This differentiated pattern forces policy responses to be nuanced as well as emphasizing the role of diversification as well as environmental balance in the developed nations along with boosting the strength of institutions along with building capacity within developing nations to induce sustained tourism-led development.

The second research query that is explored is to what degree tourism, as well as governance quality along with socio-economic variables, affects human development based on the Human Development Index (HDI). The Fixed-Effects results show that tourism exerts a positive impact on HDI in both developed and developing countries, but with different channels. With high incomes, better public facilities, and high social services, tourism complements human development in high-income economies. The tourism impact on developing states operates through the quality of governance, specifically political stability, voice and accountability, and balanced distribution of income. Where such institutional variables are weak, the tourism advantage to levels of education and health will be undermined, with growth failing to convert into inclusive welfare improvement.

Then tourism can enhance human capacities and social wellbeing if it is integrated into open governance regimes and redistributive policy frameworks that convert economic gains into social development.

The third research question attempted to differentiate between TLD and DLT models in the case of socio-economic sustainability as well as environmental sustainability. Granger causality tests between Adjusted Net Savings (ANS) and tourism identified bidirectional links in a number of nations, showing that sustainability and tourism can mutually support each other with conducive institutional environments. The ANOVA outcome and comparative regression between the two groups exhibited significant statistical differences in the area of literacy rates, inequality (Gini index), as well as CO_2 emissions.

TLD countries exhibited higher economic dynamism and job creation but also higher environmental stress and social inequality, characteristic of the costs of rapid, tourism-drive growth. DLT countries exhibited profiles that were better balanced, lower volatility, better human-capital measures, and more stable ecological footprints suggesting that tourism becomes sustainable because it is the product of broader developmental gains. Such comparisons reaffirm that the sequence of development and tourism matters: tourism-led sequences achieve rapid but uneven outcomes, while development-led sequences achieve slow but inclusive and sustainable growth.

Throughout the three goals, the research converges in the broad conclusion that tourism is both a cause and effect of development, with tourism's reach influenced as much as prescribed by institutional, political, and socio-economic conditions. The dynamic is mutual rather than one-way. Econometric research establishes that tourism adds most value aligned with the quality of governance, environmental conservation, and human-capital investment. This study therefore stresses that sustainable tourism policy shall not be effective in isolation. Such policy's transformative value relies on complementarity with the wider development policy that builds effective institutions, promotes social equity, and safeguards environmental stock. Countries with effective institutional systems together with inclusive governance setups transform tourism inflows into medium-term human development, while those with none realize fleeting benefits and increased exposure. In effect, tourism and development form a virtuous circle of mutual reinforcement: Tourism-Led Development is where policy coherence and institutional quality ensure sustainability, while Development-Led Tourism happens where existing developmental capacities engender tourism as a natural outcome of development. Comprehending this twin-ship holds the key to shaping context-informed, sustainable, and equitable tourism strategies of the coming decades.

8.2 Theoretical Contribution

This study advances theoretical understanding of the tourism–development nexus by integrating three major frameworks: the Tourism-Led Growth Hypothesis (TLGH), Amartya Sen’s Capability Approach, and Institutional Theory. Together, these perspectives provide a multidimensional explanation of how tourism contributes to economic performance, human wellbeing, and sustainability outcomes, and why its impact varies across national contexts.

8.2.1 Tourism-Led Growth Hypothesis (TLGH).

The findings confirm the central premise of the TLGH in countries where tourism functions as a lead sector. In Tourism-Led Development (TLD) nations, tourism receipts, infrastructure development, and occupancy rates were found to be significantly associated with GDP growth. These results are consistent with studies positioning tourism as an “invisible export” that drives growth through hospitality, construction, and service industries (Balaguer & Cantavella-Jordà, 2002; Sequeira & Campos, 2007). However, the study also uncovers limitations. In many low-income countries, increased arrivals and receipts did not translate into proportional GDP growth or human development improvements. This aligns with critiques that highlight structural bottlenecks such as weak absorptive capacity, poor infrastructure, and income inequality (Du et al., 2016; Sharpley, 2009; Zhang et al., 2020). Hence, the contribution here is a refinement of the TLGH: tourism can stimulate growth, but its effectiveness is conditional on the economic and institutional environment in which it operates.

8.2.2 Capability Approach

By applying Amartya Sen's (1999) Capability Approach, this research extends the analysis beyond GDP to examine noneconomic outcomes such as literacy, health, and equity. The study shows that overall income levels, rather than tourism income alone, are the strongest predictors of Human Development Index (HDI) outcomes, reinforcing Amartya Sen's argument that growth does not automatically ensure human development (Robeyns, 2005; Scheyvens, 2011). Development-Led Tourism (DLT) nations, which invest first in human capital and equity before prioritising tourism, consistently outperformed TLD nations on literacy and sustainability indicators such as Adjusted Net Savings (ANS). These results resonate with the Sustainable Development Goals particularly SDG 8 (Decent Work and Economic Growth), SDG 10 (Reduced Inequality), and SDG 12 (Responsible Consumption and Production) by showing that the developmental benefits of tourism depend on whether it expands capabilities and freedoms rather than income alone.

8.2.3 Institutional Theory

Institutional Theory adds explanatory depth by clarifying why tourism yields divergent outcomes across countries. The study demonstrates that political stability, regulatory quality, and governance effectiveness are critical in mediating tourism's impact on both economic and human development. Strong institutions enable tourism revenues to be reinvested in social and environmental priorities, while weak institutions often result in leakages, inequality, and ecological stress (Rodríguez-Pose, 2013; Khan et al., 2021). Thus, the contribution here is to emphasise that tourism cannot be treated as an exogenous growth driver but must be understood as embedded in institutional contexts, where governance quality determines whether tourism translates into broad-based and sustainable development (Dredge & Jenkins, 2007; Beha, 2023).

By integrating these three perspectives, this study contributes a nuanced theoretical lens: tourism's developmental role is contingent, conditional, and context-sensitive. TLGH explains the growth stimulus, the Capability Approach situates tourism within wider human development, and Institutional Theory clarifies the mediating role of governance. Collectively, they show that tourism becomes an effective catalyst for sustainable development only when embedded in frameworks of equity, institutional strength, and long-term planning.

8.2.4 Contextual-Sequential Model of Tourism-Driven Development

Building on the empirical findings and theoretical integration, this study proposes a Contextual-Sequential Model of Tourism-Driven Development. Unlike static binary classifications such as TLD versus DLT, this framework conceptualises tourism's developmental role as a dynamic progression, shaped by institutional maturity, socio-economic conditions, and policy sequencing (Sharpley, 2009; Croes & Rivera, 2015).

Phase One: Economic Mobilisation.

In the early stage, tourism functions primarily as an economic stimulus. In line with the TLGH, rising arrivals and infrastructure expansion provide short-term boosts to GDP (Balaguer & Cantavella-Jordà, 2002; Sequeira & Campos, 2007). Yet, as the study shows, such growth is fragile in contexts of poor governance, often leading to superficial gains without significant improvements in welfare or environmental sustainability (Du et al., 2016; Zhang et al., 2020).

Phase Two: Developmental Conversion through Institutions.

The second phase represents a turning point where tourism revenues are effectively converted into developmental outcomes. Here, institutions defined by political stability, regulatory effectiveness, and governance capacity mediate the relationship between tourism and development. Countries with strong institutions reinvest tourism earnings into education, healthcare, and public infrastructure, thereby translating growth into improvements in the HDI (North, 1990; Acemoglu, Johnson, & Robinson, 2001; Rodríguez-Pose, 2013). This aligns with the Capability Approach, as development expands freedoms and human capabilities rather than focusing narrowly on income.

Phase Three: Holistic Sustainability.

In its most advanced form, tourism becomes embedded in a diversified, inclusive, and sustainable economy. Countries at this stage focus on resilience, equity, and environmental stewardship, achieving high literacy, strong ANS indicators, and stable long-term growth. This aligns with both Amartya Sen's Capability Approach (Sen, 1999; Scheyvens, 2011) and sustainability frameworks (UNWTO, 2022; Gössling & Hall, 2019). Tourism here is no longer a stand-alone sector but part of a wider model of inclusive and sustainable development.

Contribution of the Model.

The Contextual-Sequential Model reframes tourism as a process rather than a fixed category. It challenges universal assumptions, showing that tourism's developmental role depends on timing, sequencing, and institutional conditions. By combining insights from TLGH, the Capability Approach, and Institutional Theory, it offers an interdisciplinary framework that is both explanatory and prescriptive. For policymakers, it underscores that tourism strategies in low- and middle-income countries must prioritise institutional strengthening and social investment to ensure that tourism catalyses inclusive growth and environmental sustainability (Dredge & Jenkins, 2007; Croes & Rivera, 2015).

8.3 Policy Implications

The findings of this study highlight that tourism's developmental role is highly contextual, shaped by national income levels, institutional quality, and sustainability orientation. Accordingly, policy recommendations must be differentiated across developed and developing countries while also addressing cross-cutting issues of sustainability, institutional reform, and strategic investment.

8.3.1 Policy Recommendations for Developed Nations

For developed economies, where services and infrastructure are already well established, tourism's contribution to GDP is incremental rather than transformative. Thus, the focus should shift from expansion in volume to value creation, innovation, and sustainability.

i. **Shift from quantity to quality:** Rather than prioritising arrivals, policy should focus on high-value niche segments (e.g., cultural tourism, gastronomy, wellness, and eco-tourism). This requires premium product design, experiential marketing, and regulatory mechanisms such as visitor caps and dispersal strategies to prevent over-tourism.

ii. **Invest in smart infrastructure:** As occupancy and establishments correlate with GDP, developed nations should upgrade to digital systems such as AI-driven booking, smart mobility, and real-time visitor management. Fiscal incentives (e.g., tax credits, research funding) should encourage private investment in digitalisation.

iii. **Strengthen governance and transparency:** Tourism revenues must be reinvested into public goods healthcare, education, and infrastructure through transparent fiscal systems. "Tourism dividend" reporting could institutionalise accountability.

iv. **Integrate human development indicators:** Guided by Amartya Sen's Capability Approach, tourism performance should be measured not only by GDP but also by HDI, quality of life, and environmental health indices.

v. Lead in low-carbon tourism: Developed nations, being major emitters, should pioneer carbon-neutral tourism by mandating carbon reporting, enforcing green building codes, and investing in sustainable transport systems.

vi. **Promote ethical global supply chains:** As many transnational operators are headquartered in developed nations, they carry responsibility for setting global ethical standards in labour, trade, and outbound tourism. Multilateral forums should formalise these norms.

8.3.2 Policy Recommendations for Developing Nations

In developing economies, tourism plays a potentially transformative but highly fragile role, dependent on institutional strength and absorptive capacity. Policy must prioritise domestic value retention, institutional reform, and integration with human development goals.

i. **Increase absorptive capacity:** Upgrade service delivery, improve infrastructure, and expand digital access for small operators. Provide concessional finance and training for SMEs to enhance competitiveness.

ii. **Reduce economic leakage:** Strengthen local ownership through preferential credit, procurement policies, and tax incentives. Promote local supply chains to ensure that tourism revenues remain within the domestic economy.

iii. **Maintain macro-economic stability:** Exchange rate management is critical for sustaining price competitiveness and protecting domestic markets. Coordinated fiscal–tourism policies are necessary to avoid inflationary pressures.

iv. **Build participatory governance:** Establish transparent tourism authorities, grievance mechanisms, and participatory planning forums to foster legitimacy, stability, and trust.

v. **Link tourism with human development:** Adopt community-based tourism models to channel revenues into schools, healthcare, and cooperatives. Integrate vocational education into tourism policy to enhance youth and female employability.

vi. **Embed environmental safeguards:** Mandate environmental impact assessments, carrying-capacity thresholds, and biodiversity protection in all tourism projects.

vii. **Promote equitable regional development:** Develop secondary destinations and tourism circuits to avoid overconcentration, reduce ecological stress, and distribute benefits geographically.

8.3.3 Sustainability and Institutional Strengthening

Across both developed and developing contexts, sustainability and institutional integrity are the cornerstones of long-term tourism development.

i. **Mainstream sustainability:** Environmental standards must be binding, not optional. Policies should enforce reporting of emissions, visitor limits in sensitive ecosystems, and mandatory green certifications.

ii. **Strengthen institutions:** Create empowered tourism–environmental agencies with clear mandates for zoning, licensing, and enforcement. Include civil society, indigenous groups, and environmental experts in decision-making structures.

iii. **Adopt real-time monitoring:** Use GIS, mobile tracking, and satellite tools for monitoring visitor flows and ecological pressures. Public access to data ensures transparency and responsive governance.

iv. **Ensure participatory equity:** Communities must participate in budgeting, planning, and revenue allocation. Participatory budgeting guarantees that tourism dividends fund local infrastructure and social services.

v. **Combat corruption:** Transparent procurement, open audits, and anti-corruption frameworks (e.g., UNCAC) must be integrated into tourism governance.

vi. **Guarantee inclusiveness:** Tourism must protect labour rights, advance gender equality, and integrate informal workers into formal systems with training and protections.

8.3.4 Strategic Investment Guidelines

Tourism investment must be carefully integrated with national development priorities rather than pursued as isolated growth ambitions. The objective is not only to stimulate economic returns but also to ensure that tourism strengthens broader development agendas in a sustainable, inclusive, and resilient manner.

i. **Align with national plans:** Tourism projects should be embedded within overarching frameworks for poverty reduction, environmental sustainability, and digitalisation, ensuring coherence with long-term development strategies.
ii. **Prioritise productivity, not expansion:** Instead of unchecked capacity building, emphasis must be placed on optimising existing infrastructure, enhancing efficiency, and upgrading the informal sector to raise competitiveness and service quality.
iii. **Retain value domestically:** Policy must favour SMEs, cooperatives, and locally owned enterprises by providing concessional credit, tax incentives, and training programmes, thereby minimising economic leakages and maximising local benefits.
iv. **Promote geographic equity:** Investment should be channelled into underserved regions and secondary cities to reduce spatial inequalities, disperse visitor flows, and mitigate environmental pressures in over concentrated hotspots.
v. **Catalyse responsible private capital:** Governments should adopt measures such as blended finance, regulatory clarity, and enabling infrastructure to de-risk investments and attract responsible private participation.
vi. **Mandate environmental and social assessments:** All major projects must undergo independent, transparent environmental and social impact evaluations, with particular attention to ecologically fragile areas, to safeguard long-term sustainability.
vii. **Invest in human capital:** Expanding vocational training, managerial capacity, and entrepreneurship especially among women, youth, and indigenous groups is essential for creating inclusive employment opportunities and enhancing sectoral resilience.

viii. **Accelerate digital transformation:** The deployment of AI-based visitor management systems, e-governance platforms, and open-data dashboards can significantly improve competitiveness, efficiency, and crisis response capacities, ensuring that tourism remains adaptive in a rapidly evolving global landscape.

8.3.5 Framework for Future Tourism Development

The future of tourism development lies in reframing tourism as a holistic development instrument.

i. **Adopt multidimensional assessment:** Policy evaluation must include human capabilities, environmental resilience, and institutional performance, alongside GDP.
ii. **Differentiate by context:** TLD nations should prioritise ecological regulation and transition to green tourism, while DLT nations should focus on institution-building and equity before scaling up.
iii. **Embed inclusive governance:** Local voices should be institutionalised in master planning, regulatory agencies, and benefit-sharing mechanisms.
iv. **Enhance resilience:** Develop contingency plans for pandemics, climate shocks, and geopolitical risks through diversification, domestic tourism, and digital readiness.
v. **Ensure lifecycle sustainability:** Incorporate environmental, cultural, and labour safeguards at every stage of project design, operation, and evaluation.
vi. **Promote innovation:** Foster digitalisation and smart tourism systems to sustain competitiveness and efficiency.
vii. **Foster global cooperation:** International collaboration must extend beyond finance to include knowledge transfer, ethical partnerships, and harmonised sustainability standards.

8.4 Limitations of the Study

Although it forms a useful contribution in the tourism and economic development literature, there are a few drawbacks in cross-national empirical work that are worth mentioning. The first is that the study does depend on secondary data released by international institutions like the World Bank, UNDP, and UNWTO. Even though they are reputed and reliable data sources, minor variations in definitions, coverage, or time horizons in countries could restrict overall comparability. These are, however, usual attributes with work in multiple countries and are barely likely to influence significantly the legitimacy of the inferences drawn by a study.

Also to be considered is that the dichotomist classification of countries by Tourism-Led Development (TLD) and Development-Led Tourism (DLT) models, in spite of its value in analysis, cannot realistically reflect the dynamic and hybrid forms of tourism strategy in all countries. The dichotomous classification, however, is a useful substitute in the interest of comparative analysis and theoretical exegesis, in line with prior work.

Third, as with most cross-national studies, the analysis adopts a macro-level perspective. While this provides strong general insights into the tourism–development nexus, it does not capture every micro-level variation, such as household welfare differences or region-specific impacts. These were beyond the scope of the present study but remain important avenues for further exploration.

Finally, the statistical methods employed such as regression analysis and Granger causality tests are well-suited for identifying associations and directions of influence. However, they cannot capture every long-term structural or contextual factor (e.g., historical policy trajectories, sudden global shocks). The findings therefore should be interpreted as contextually grounded evidence.

8.5 Scope for Future Research

Several promising avenues for future research emerge from this study.

First, future studies could more directly explore the governance dimension of tourism–development linkages. Specifically, the role of governance as a moderator or mediator determining whether strong institutions amplify or dampen the positive effects of tourism on GDP and HDI requires closer examination. Investigating how political stability, regulatory effectiveness, financial transparency, and anti-corruption measures influence the tourism–development nexus would provide richer insights into institutional quality as a driver of sustainable growth.

Second, research should disaggregate types of tourism and their differentiated impacts. Ecotourism, heritage tourism, medical tourism, religious tourism, and mass beach tourism each have distinct developmental footprints. For instance, ecotourism may generate sustainability and conservation benefits, while mass resort tourism may strain ecosystems. By analysing such sectoral distinctions, scholars can identify tailored policy pathways for different tourism segments and contexts.

Third, the under-representation of developed economies as successful cases of Tourism-Led Development deserves deeper inquiry. Future studies could examine whether this reflects diminishing marginal returns of tourism in advanced economies, saturation of domestic demand, or the transition to "post-tourism" societies where tourism is primarily cultural and lifestyle-oriented rather than an economic growth driver.

Fourth, there is a need to explore regional and subnational dimensions of tourism's impact. National-level analysis can mask uneven development across regions—tourism may boost metropolitan areas or iconic destinations while leaving rural or marginalised regions behind. Micro-level or mixed-method approaches that incorporate household surveys, case studies, and spatial analysis would complement macro-economic findings and provide a fuller picture of tourism's distributive effects.

Finally, future research should account for emerging global challenges such as climate change, digitalisation, and pandemics. Understanding how these disrupt or reshape the tourism–development nexus is essential for building resilient and adaptive policies. Incorporating sustainability indicators, digital readiness indices, and resilience frameworks into future models can help align tourism strategies with broader global development agendas, particularly the Sustainable Development Goals (SDGs).

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Appendices

A. List of Countries used for objective 1

Sr.No.	Developed Countries	Developing Countries
1	ANDORRA	ALBANIA
2	AUSTRALIA	ALGERIA
3	AUSTRIA	ANGOLA
4	BELGIUM	ARGENTINA
5	CANADA	ARMENIA
6	DENMARK	ARUBA
7	FINLAND	AZERBAIJAN
8	FRANCE	BAHAMAS
9	GERMANY	BANGLADESH
10	GREECE	BELARUS
11	ICELAND	BELIZE
12	IRELAND	BENIN
13	ISRAEL	BERMUDA
14	ITALY	BHUTAN
15	JAPAN	BOLIVIA (PLURINATIONAL STATE OF)
16	LUXEMBOURG	BOSNIA AND HERZEGOVINA
17	MALTA	BOTSWANA
18	MONACO	BULGARIA
19	NEW ZEALAND	BURKINA FASO
20	NORWAY	BURUNDI
21	PORTUGAL	CAMBODIA
22	SINGAPORE	CAMEROON
23	SPAIN	CENTRAL AFRICAN REPUBLIC
24	SWEDEN	CHAD
25	SWITZERLAND	CHILE
26	UNITED KINGDOM	CHINA, HONG KONG SAR
27	UNITED STATES	CHINA
28	CYPRUS	COLOMBIA
29	ESTONIA	CONGO
30	LATVIA	COSTA RICA
31	LITHUANIA	CROATIA
32	SLOVENIA	CUBA
33		CZECHIA
34		CÔTE D'IVOIRE
35		DEM. REP. OF THE CONGO
36		DOMINICAN REPUBLIC
37		ECUADOR
38		EGYPT
39		EL SALVADOR
40		EQUATORIAL GUINEA
41		ESWATINI
42		ETHIOPIA
43		FIJI
44		FRENCH POLYNESIA
45		GABON

46		GAMBIA
47		GEORGIA
48		GHANA
49		GREENLAND
50		GUATEMALA
51		GUINEA-BISSAU
52		GUINEA
53		GUYANA
54		HAITI
55		HONDURAS
56		HUNGARY
57		INDIA
58		INDONESIA
59		IRAN (ISLAMIC REPUBLIC OF)
60		IRAQ
61		ISLE OF MAN
62		JAMAICA
63		JORDAN
64		KAZAKHSTAN
65		KENYA
66		KYRGYZSTAN
67		LAO PEOPLE'S DEM. REP.
68		LEBANON
69		LESOTHO
70		LIBERIA
71		LIBYA
72		LIECHTENSTEIN
73		MADAGASCAR
74		MALAWI
75		MALAYSIA
76		MALI
77		MAURITANIA
78		MAURITIUS
79		MEXICO
80		MICRONESIA (FEDERATED STATES OF)
81		MONGOLIA
82		MOROCCO
83		MOZAMBIQUE
84		MYANMAR
85		NAMIBIA
86		NEPAL
87		NETHERLANDS (KINGDOM OF THE)
88		NETHERLANDS ANTILLES
89		NEW CALEDONIA
90		NICARAGUA
91		NIGERIA
92		NIGER
93		NORTH MACEDONIA
94		OMAN
95		PACIFIC ISLANDS, TRUST TERRITORY
96		PAKISTAN
97		PANAMA

98		PAPUA NEW GUINEA
99		PARAGUAY
100		PERU
101		PHILIPPINES
102		POLAND
103		PUERTO RICO
104		ROMANIA
105		RUSSIAN FEDERATION
106		RWANDA
107		SAUDI ARABIA
108		SENEGAL
109		SIERRA LEONE
110		SOLOMON ISLANDS
111		SOMALIA
112		SOUTH AFRICA
113		SRI LANKA
114		SUDAN
115		SURINAME
116		SYRIAN ARAB REPUBLIC
117		TAJIKISTAN
118		THAILAND
119		TIMOR-LESTE
120		TOGO
121		TRINIDAD AND TOBAGO
122		TUNISIA
123		TURKMENISTAN
124		TÜRKIYE
125		UGANDA
126		UKRAINE
127		URUGUAY
128		UZBEKISTAN
129		VENEZUELA (BOLIVARIAN REP. OF)
130		VIET NAM
131		ZAMBIA
132		ZIMBABWE

List of Country Classification for Objective I

Country	UN Classification (DESA/UNCTAD)	IMF 2023 Group	Considered in This Study	Notes (UN-based rationale)
Albania	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Europe → UN 'Developed' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)

Algeria	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Africa → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Andorra	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Europe → UN 'Developed' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Angola	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Africa → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Argentina	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Latin America & Caribbean → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Armenia	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Aruba	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Latin America & Caribbean → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Australia	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Oceania exception → UN 'Developed' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Austria	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Europe → UN 'Developed' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)

Azerbaijan	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Bahamas	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Latin America & Caribbean → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Bangladesh	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Belarus	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Region per UN M49 → UN rationale | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Belgium	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Europe → UN 'Developed' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Belize	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Latin America & Caribbean → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Benin	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Africa → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Bermuda	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Region per UN M49 → UN rationale | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)

Bhutan	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Bolivia (Plurinational State of)	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Latin America & Caribbean → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Bosnia and Herzegovina	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Europe → UN 'Developed' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Botswana	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Africa → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Bulgaria	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Europe → UN 'Developed' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Burkina Faso	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Africa → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Burundi	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Africa → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Cambodia	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Cameroon	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Africa → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending

				Groups (FY2025) — regional/income groups (open dataset)
Canada	Developed (UN regional convention)	Advanced economy (IMF)	Developed	North America → UN 'Developed' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Central African Republic	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Africa → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Chad	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Africa → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Chile	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Latin America & Caribbean → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
China	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
China, Hong Kong SAR	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Colombia	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Latin America & Caribbean → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Congo	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Africa → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)

Costa Rica	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Latin America & Caribbean → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Croatia	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Europe → UN 'Developed' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Cuba	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Latin America & Caribbean → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Cyprus	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Europe → UN 'Developed' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Czechia	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Europe → UN 'Developed' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Côte d'Ivoire	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Africa → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Dem. Rep. of the Congo	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Africa → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Denmark	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Europe → UN 'Developed' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)

Dominican Republic	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Latin America & Caribbean → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Ecuador	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Latin America & Caribbean → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Egypt	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Africa → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
El Salvador	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Latin America & Caribbean → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Equatorial Guinea	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Africa → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Estonia	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Europe → UN 'Developed' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Eswatini	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Africa → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Ethiopia	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Africa → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)

Fiji	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Oceania (excl. Aus/NZ) → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Finland	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Europe → UN 'Developed' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
France	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Europe → UN 'Developed' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
French Polynesia	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Oceania (excl. Aus/NZ) → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Gabon	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Africa → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Gambia	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Africa → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Georgia	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Germany	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Europe → UN 'Developed' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)

Ghana	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Africa → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Greece	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Europe → UN 'Developed' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Greenland	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Europe → UN 'Developed' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Guatemala	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Latin America & Caribbean → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Guinea	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Africa → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Guinea-Bissau	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Africa → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Guyana	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Latin America & Caribbean → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Haiti	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Latin America & Caribbean → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)

Honduras	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Latin America & Caribbean → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Hungary	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Europe → UN 'Developed' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Iceland	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Europe → UN 'Developed' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
India	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Indonesia	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Iran (Islamic Republic of)	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Iraq	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Ireland	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Europe → UN 'Developed' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Isle of Man	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Europe → UN 'Developed' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending

				Groups (FY2025) — regional/income groups (open dataset)
Israel	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Asia (excl. Japan) → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Italy	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Europe → UN 'Developed' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Jamaica	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Latin America & Caribbean → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Japan	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Asia exception → UN 'Developed' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Jordan	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Kazakhstan	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Kenya	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Africa → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Kyrgyzstan	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)

Lao People's Dem. Rep.	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Latvia	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Europe → UN 'Developed' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Lebanon	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Lesotho	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Africa → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Liberia	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Africa → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Libya	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Africa → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Liechtenstein	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Europe → UN 'Developed' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Lithuania	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Europe → UN 'Developed' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Luxembourg	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Europe → UN 'Developed' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)

Madagascar	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Africa → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Malawi	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Africa → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Malaysia	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Mali	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Africa → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Malta	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Europe → UN 'Developed' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Mauritania	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Africa → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Mauritius	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Africa → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Mexico	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Latin America & Caribbean → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Micronesia (Federated States of)	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Oceania (excl. Aus/NZ) → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups

				(FY2025) — regional/income groups (open dataset)
Monaco	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Europe → UN 'Developed' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Mongolia	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Morocco	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Africa → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Mozambique	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Africa → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Myanmar	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Namibia	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Africa → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Nepal	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Netherlands (Kingdom of the)	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Europe → UN 'Developed' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)

Netherlands Antilles	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Latin America & Caribbean → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
New Caledonia	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Oceania (excl. Aus/NZ) → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
New Zealand	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Oceania exception → UN 'Developed' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Nicaragua	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Latin America & Caribbean → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Niger	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Africa → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Nigeria	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Africa → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
North Macedonia	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Europe → UN 'Developed' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Norway	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Europe → UN 'Developed' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)

Oman	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Pacific Islands, Trust Territory	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Oceania (excl. Aus/NZ) → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Pakistan	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Panama	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Latin America & Caribbean → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Papua New Guinea	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Oceania (excl. Aus/NZ) → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Paraguay	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Latin America & Caribbean → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Peru	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Latin America & Caribbean → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Philippines	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)

Poland	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Europe → UN 'Developed' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Portugal	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Europe → UN 'Developed' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Puerto Rico	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Latin America & Caribbean → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Romania	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Europe → UN 'Developed' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Russian Federation	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Europe → UN 'Developed' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Rwanda	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Africa → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Saudi Arabia	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Senegal	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Africa → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Sierra Leone	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Africa → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending

				Groups (FY2025) — regional/income groups (open dataset)
Singapore	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Asia (excl. Japan) → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Slovenia	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Europe → UN 'Developed' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Solomon Islands	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Oceania (excl. Aus/NZ) → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Somalia	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Africa → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
South Africa	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Africa → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Spain	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Europe → UN 'Developed' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Sri Lanka	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Sudan	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Africa → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)

Suriname	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Latin America & Caribbean → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Sweden	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Europe → UN 'Developed' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Switzerland	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Europe → UN 'Developed' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Syrian Arab Republic	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Tajikistan	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Thailand	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Timor-Leste	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Togo	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Africa → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Trinidad and Tobago	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Latin America & Caribbean → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups

				(FY2025) — regional/income groups (open dataset)
Tunisia	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Africa → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Turkmenistan	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Türkiye	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Uganda	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Africa → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Ukraine	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Europe → UN 'Developed' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
United Kingdom	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Europe → UN 'Developed' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
United States	Developed (UN regional convention)	Advanced economy (IMF)	Developed	North America → UN 'Developed' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Uruguay	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Latin America & Caribbean → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)

Uzbekistan	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Venezuela (Bolivarian Rep. of)	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Latin America & Caribbean → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Viet Nam	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Zambia	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Africa → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)
Zimbabwe	Developing (UN regional convention)	Emerging/ Developing (IMF)	Developing	Africa → UN 'Developing' | Sources: IMF World Economic Outlook (2024) — Advanced Economies vs EMDEs (open dataset); World Bank Country & Lending Groups (FY2025) — regional/income groups (open dataset)

B. List of Countries used for objective 2

Objective 2

Sr. No.	Developed Countries	Developing Countries
1	Albania	Argentina
2	Australia	Armenia
3	Austria	Bahamas
4	Belgium	Belize
5	Bosnia and Herzegovina	Benin
6	Bulgaria	Bhutan
7	Canada	Bolivia
8	Croatia	Botswana
9	Cyprus	Brazil
10	Czechia	Brunei Darussalam
11	Estonia	Burkina Faso
12	Finland	Cabo Verde

13	Germany	Cambodia
14	Greece	Chile
15	Hungary	Comoros
16	Iceland	Dominican Republic
17	Italy	Egypt
18	Japan	El Salvador
19	Latvia	Equatorial Guinea
20	Luxembourg	Eswatini
21	Malta	Gabon
22	New Zealand	Gambia
23	North Macedonia	Ghana
24	Norway	Kazakhstan
25	Poland	Kiribati
26	Romania	Kuwait
27	San Marino	Lesotho
28	Serbia	Madagascar
29	Slovakia	Malaysia
30	Slovenia	Mali
31	Spain	Mauritania
32	Sweden	Mauritius
33	Switzerland	Mongolia
34	Ukraine	Morocco
35	United Kingdom	Namibia
36	United States	Oman
37		Palau
38		Panama
39		Paraguay
40		Qatar
41		Rwanda
42		Samoa
43		Saudi Arabia
44		Seychelles
45		Singapore
46		Solomon Islands
47		South Africa
48		Sri Lanka
49		Syrian Arab Republic
50		Thailand
51		Timor-Leste
52		Togo
53		Tonga
54		United Arab Emirates
55		Uruguay
56		Vanuatu
57		Viet Nam

58		Zambia

List of Country Classification for objective 2				
Country	UN Classification (DESA/UNCTAD)	IMF 2023 Group	Considered in This Study	Notes (UN-based rationale)
Albania	Developed (UN regional convention)	Emerging/Developing (IMF)	Developed	Europe → UN 'Developed'
Argentina	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Latin America & Caribbean → UN 'Developing'
Armenia	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing'
Australia	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Oceania exception → UN 'Developed'
Austria	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Europe → UN 'Developed'
Bahamas	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Latin America & Caribbean → UN 'Developing'
Belgium	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Europe → UN 'Developed'
Belize	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Latin America & Caribbean → UN 'Developing'
Benin	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Africa → UN 'Developing'
Bhutan	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing'
Bolivia	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Latin America & Caribbean → UN 'Developing'
Bosnia and Herzegovina	Developed (UN regional convention)	Emerging/Developing (IMF)	Developed	Europe → UN 'Developed'
Botswana	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Africa → UN 'Developing'
Brazil	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Latin America & Caribbean → UN 'Developing'
Brunei Darussalam	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing'
Bulgaria	Developed (UN regional convention)	Emerging/Developing (IMF)	Developed	Europe → UN 'Developed'
Burkina Faso	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Africa → UN 'Developing'
Cabo Verde	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Africa → UN 'Developing'

Cambodia	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing'
Canada	Developed (UN regional convention)	Advanced economy (IMF)	Developed	North America → UN 'Developed'
Chile	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Latin America & Caribbean → UN 'Developing'
Comoros	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Africa → UN 'Developing'
Croatia	Developed (UN regional convention)	Emerging/Developing (IMF)	Developed	Europe → UN 'Developed'
Cyprus	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Europe → UN 'Developed'
Czechia	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Europe → UN 'Developed'
Dominican Republic	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Latin America & Caribbean → UN 'Developing'
Egypt	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Africa → UN 'Developing'
El Salvador	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Latin America & Caribbean → UN 'Developing'
Equatorial Guinea	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Africa → UN 'Developing'
Estonia	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Europe → UN 'Developed'
Eswatini	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Africa → UN 'Developing'
Finland	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Europe → UN 'Developed'
Gabon	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Africa → UN 'Developing'
Gambia	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Africa → UN 'Developing'
Germany	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Europe → UN 'Developed'
Ghana	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Africa → UN 'Developing'
Greece	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Europe → UN 'Developed'
Hungary	Developed (UN regional convention)	Emerging/Developing (IMF)	Developed	Europe → UN 'Developed'
Iceland	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Europe → UN 'Developed'

Italy	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Europe → UN 'Developed'
Japan	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Asia exception → UN 'Developed'
Kazakhstan	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing'
Kiribati	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Oceania (excl. Aus/NZ) → UN 'Developing'
Kuwait	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing'
Latvia	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Europe → UN 'Developed'
Lesotho	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Africa → UN 'Developing'
Luxembourg	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Europe → UN 'Developed'
Madagascar	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Africa → UN 'Developing'
Malaysia	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing'
Mali	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Africa → UN 'Developing'
Malta	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Europe → UN 'Developed'
Mauritania	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Africa → UN 'Developing'
Mauritius	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Africa → UN 'Developing'
Mongolia	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing'
Morocco	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Africa → UN 'Developing'
Namibia	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Africa → UN 'Developing'
New Zealand	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Oceania exception → UN 'Developed'
North Macedonia	Developed (UN regional convention)	Emerging/Developing (IMF)	Developed	Europe → UN 'Developed'
Norway	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Europe → UN 'Developed'
Oman	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing'
Palau	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Oceania (excl. Aus/NZ) → UN 'Developing'
Panama	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Latin America & Caribbean → UN 'Developing'

Paraguay	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Latin America & Caribbean → UN 'Developing'
Poland	Developed (UN regional convention)	Emerging/Developing (IMF)	Developed	Europe → UN 'Developed'
Qatar	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing'
Romania	Developed (UN regional convention)	Emerging/Developing (IMF)	Developed	Europe → UN 'Developed'
Rwanda	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Africa → UN 'Developing'
Samoa	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Oceania (excl. Aus/NZ) → UN 'Developing'
San Marino	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Europe → UN 'Developed'
Saudi Arabia	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing'
Serbia	Developed (UN regional convention)	Emerging/Developing (IMF)	Developed	Europe → UN 'Developed'
Seychelles	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Africa → UN 'Developing'
Singapore	Developing (UN regional convention)	Advanced economy (IMF)	Developing	Asia (excl. Japan) → UN 'Developing'
Slovakia	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Europe → UN 'Developed'
Slovenia	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Europe → UN 'Developed'
Solomon Islands	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Oceania (excl. Aus/NZ) → UN 'Developing'
South Africa	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Africa → UN 'Developing'
Spain	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Europe → UN 'Developed'
Sri Lanka	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing'
Sweden	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Europe → UN 'Developed'
Switzerland	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Europe → UN 'Developed'
Syrian Arab Republic	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing'
Thailand	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing'
Timor-Leste	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing'

Togo	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Africa → UN 'Developing'
Tonga	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Oceania (excl. Aus/NZ) → UN 'Developing'
Ukraine	Developed (UN regional convention)	Emerging/Developing (IMF)	Developed	Europe → UN 'Developed'
United Arab Emirates	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing'
United Kingdom	Developed (UN regional convention)	Advanced economy (IMF)	Developed	Europe → UN 'Developed'
United States	Developed (UN regional convention)	Advanced economy (IMF)	Developed	North America → UN 'Developed'
Uruguay	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Latin America & Caribbean → UN 'Developing'
Vanuatu	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Oceania (excl. Aus/NZ) → UN 'Developing'
Viet Nam	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Asia (excl. Japan) → UN 'Developing'
Zambia	Developing (UN regional convention)	Emerging/Developing (IMF)	Developing	Africa → UN 'Developing'

C. Regression Results and Model Outputs

Objective 1

In general, 3 different models have been developed for developing countries and developed countries. They are:

1. Common Effect Model
2. Fixed Effect Model
3. Random Effect Model

The models for developed countries are below:

1. **Common Effect Model**

Variables	Coefficients	p value	Confidence Interval
Tourism Receipts	7.66e11	0.077	1.61e10 8.36e12
CO2 Emission	6.67e06*	0.020	1.07e06 .0000123
Establishment Number	0.00011	0.070	0.00001 0.00023
Occupational Rate Bed Place	0.05721	0.229	0.03632 0.15075
Occupational Rate Room	0.08531*	0.042	0.00311 0.16750

Average Length of stay	0.50089	0.100	1.09918 0.09740
Political Stability	0.00718	0.986	0.82522 0.81087
Exchange Rate	0.00054	0.885	0.00679 0.00786
Income Level	2.42e14**	0.001	3.86e14 9.91e15
Expenditure	1.02e10	0.070	2.12e10 8.36e12
Arrival	6.70e09	0.602	1.86e08 3.20e08
Constant	1.68049	0.165	4.06033 0.69934
Rsquared	0.26492		
*** p<0.001, ** p<0.01, * p<0.05			

The adjusted R square value is 0.265, 26.5% of dependent variable (GDP Growth) is explained by the independent variables.

For assessing the model fit, a pvalue of <0.0001 is obtained from ANOVA which indicates that this model is fit for regression.

The required regression equation is

GDP Growth = 1.68049 7.66e11* Tourism Receipts + 6.67e06* CO2 Emission + 0.00011* Establishment Number + 0.05721 * Occupational Rate Bed Place + 0.08531* Occupational Rate Room 0.50089* Average Length of Stay 0.00718* Political Stability + 0.00054 * Exchange Rate 2.42e14 * Income Level 1.02e10* Expenditure + 6.70e09 * Arrival

Since the p values is less than 0.05 for CO2 Emission, Occupational Rate Room, Income level, they have significant effect on GDP.

2. <u>**Fixed Effect Model**</u>

Variables	Coefficients	p value	Confidence Interval
Tourism Receipts	1.90e10	0.078	4.01e10 2.14e11
CO2 Emission	0.00001	0.225	0.00001 0.00003
Establishment Number	0.00017**	0.002	0.00006 0.00028
Occupational Rate Bed Place	0.09293	0.115	0.02281 0.20866
Occupational Rate Room	0.27552***	0.000	0.17509 0.37594
Average Length of stay	0.05569	0.958	2.14526 2.03387
Political Stability	0.67505	0.473	1.18174 2.53183
Exchange Rate	0.00800	0.501	0.03142 0.01543

Income Level	8.57e14	0.340	9.13e14 2.63e13
Expenditure	3.19e11	0.721	1.45e10 2.09e10
Arrival	2.23e08	0.578	1.02e07 5.69e08
Constant	18.66799***	0.000	27.91927 9.41670
Rsquared	0.51465		
*** p<0.001, ** p<0.01, * p<0.05			

The adjusted R square value is 0.515, 51.5% of dependent variable (GDP Growth) is explained by the independent variables.

For assessing the model fit, a pvalue of <0.0001 is obtained from ANOVA which indicates that this model is fit for regression.

The required regression equation is

GDP Growth = 18.66799 1.90e10* Tourism Receipts + 0.00001* CO2 Emission + 0.00017* Establishment Number + 0.09293* Occupational Rate Bed Place + 0.27552* Occupational Rate Room 0.05569* Average Length of Stay + 0.67505* Political Stability 0.00800* Exchange Rate + 8.57e14 * Income Level + 3.19e11* Expenditure 2.23e08* Arrival

Since the p values is less than 0.05 for Establishment Number, Occupational Rate Room they have significant effect on GDP.

3. <u>Random Effect Model</u>

Variables	Coefficients	p value	Confidence Interval
Tourism Receipts	9.56e11	0.062	1.96e10 4.70e12
CO2 Emission	0.00001	0.364	0.00001 0.00002
Establishment Number	0.00020***	0.000	0.00011 0.00029
Occupational Rate Bed Place	0.06662	0.232	0.04256 0.17580
Occupational Rate Room	0.24907***	0.000	0.15607 0.34206
Average Length of stay	0.42043	0.553	1.81103 0.97017
Political Stability	0.49010	0.548	1.11078 2.09099
Exchange Rate	0.00155	0.864	0.01615 0.01925

Income Level	3.52e14*	0.030	6.71e14 3.36e15
Expenditure	4.54e11	0.415	1.55e10 6.38e11
Arrival	2.45e09	0.936	5.74e08 6.23e08
Constant	10.11296***	0.000	15.59075 4.63517
Rsquared	0.4977		
*** p<0.001, ** p<0.01, * p<0.05			

The adjusted R square value is 0.498, 49.8% of dependent variable (GDP Growth) is explained by the independent variables.

For assessing the model fit, a pvalue of <0.0001 is obtained from ANOVA which indicates that this model is fit for regression.

The required regression equation is

GDP Growth = 10.112969.56e11* Tourism Receipts + 0.00001* CO2 Emission + 0.00020* Establishment Number + 0.06662* Occupational Rate Bed Place + 0.24907* Occupational Rate Room 0.42043* Average Length of Stay + 0.49010* Political Stability + 0.00155* Exchange Rate 3.52e14* Income Level 4.54e11* Expenditure 2.45e09* Arrival

Since the p values is less than 0.05 for Establishment Number, Occupational Rate Room, Income level they have significant effect on GDP.

Model Comparison

Among these 3 models, in order to know which models, needs to be used:

Breusch and Pagan test is done to understand whether the data have a panel effect. The test produced a pvalue of 0.0288 which indicates that there is panel effect. So, a fixed effect model or random effect model needs to be selected.

So, Hausman test is used to test whether a fixed effect model or random effect model is to be finalised. From the test a pvalue of 0.281 is obtained which indicates that random effect model can be finalised.

The models for developing country are below:

1. **Common Effect Model**

Variables	Coefficients	p value	Confidence Interval
Tourism Receipts	1.73e10	0.167	4.18e10 7.27e11
Establishment Number	0.00004	0.713	0.00019 0.00028
Room Number	0.00001	0.220	0.00002 0.00001
Occupational Rate Bed Place	0.03056	0.495	0.05756 0.11868
Occupational Rate Room	0.00398	0.944	0.11500 0.10703
Average Length of stay	0.09050	0.326	0.27166 0.09066
Political Stability	0.63228	0.350	1.96315 0.69858
Exchange Rate	0.00031*	0.050	0.00000 0.00062
Expenditure	9.72e11	0.362	3.07e10 1.12e10
Arrival	2.93e07	0.053	4.02e09 5.90e07
Constant	2.74229	0.085	0.38672 5.87129
Rsquared	0.05150		
*** p<0.001, ** p<0.01, * p<0.05			

The adjusted R square value is 0.052, 5.2% of dependent variable (GDP Growth) is explained by the independent variables.

For assessing the model fit, a pvalue of 0.405 is obtained from ANOVA which indicates that this model is not fit for regression.

The required regression equation is

GDP Growth = 2.74229 1.73e10* Tourism Receipts + 0.00004* Establishment Number – 0.00001*Room Number + 0.03056* Occupational Rate Bed Place 0.00398* Occupational Rate Room 0.09050* Average Length of Stay 0.63228* Political Stability + 0.00031* Exchange Rate 9.72e11* Expenditure + 2.93e07* Arrival

Since the p values is less than 0.05 for Exchange Rate, it has significant effect on GDP.

2. **<u>Fixed Effect Model</u>**

Variables	Coefficients	p value	Confidence Interval
Tourism Receipts	4.68e11	0.879	6.55e10 5.61e10
Establishment Number	0.00027	0.295	0.00077 0.00023
Room Number	0.00002	0.133	0.00004 0.00001
Occupational Rate Bed Place	0.16147**	0.010	0.03949 0.28344
Occupational Rate Room	0.03294	0.653	0.11133 0.17721
Average Length of stay	0.32449	0.382	0.40570 1.05468
Political Stability	0.48811	0.685	2.86014 1.88393
Exchange Rate	0.00099	0.141	0.00033 0.00230
Expenditure	5.83e10*	0.046	1.16e09 1.11e11
Arrival	5.29e07	0.074	5.23e08 1.11e06
Constant	3.07910	0.243	8.26382 2.10562
Rsquared	0.20459		
*** p<0.001, ** p<0.01, * p<0.05			

The adjusted R square value is 0.205, 20.5% of dependent variable (GDP Growth) is explained by the independent variables.

For assessing the model fit, a pvalue of <0.0001 is obtained from ANOVA which indicates that this model is fit for regression.

The required regression equation is

GDP Growth = 3.079104.68e11* Tourism Receipts 0.00027* Establishment Number 0.00002* Room Number + 0.16147* Occupational Rate Bed Place + 0.03294* Occupational Rate Room + 0.32449 * Average Length of Stay 0.48811* Political Stability 0.00099* Exchange Rate 5.83e10* Expenditure + 5.29e07* Arrival

Since the p values is less than 0.05 for Occupational Rate Bed Place, Expenditure, they have significant effect on GDP.

3. **Random Effect Model**

Variables	Coefficients	p value	Confidence Interval
Tourism Receipts	1.77e10	0.313	5.21e10 1.67e10
Establishment Number	0.00010	0.577	0.00044 0.00025
Room Number	0.00001	0.131	0.00003 3.45e06
Occupational Rate Bed Place	0.08975	0.099	0.01690 0.19641
Occupational Rate Room	0.01989	0.761	0.10806 0.14784
Average Length of stay	0.02336	0.884	0.33824 0.29152
Political Stability	0.78939	0.385	2.57221 0.99343
Exchange Rate	0.00054	0.082	0.00007 0.00115
Expenditure	2.93e10	0.095	6.37e10 5.09e11
Arrival	4.37e07	0.055	4.43e10 8.75e07
Constant	0.23436	0.912	4.39595 3.92724
Rsquared	0.1848		
*** p<0.001, ** p<0.01, * p<0.05			

The adjusted R square value is 0.185, 18.5% of dependent variable (GDP Growth) is explained by the independent variables.

For assessing the model fit, a pvalue of >0.05 is obtained from ANOVA which indicates that this model is not fit for regression.

The required regression equation is

GDP Growth = 0.234361.77e10* Tourism Receipts 0.00010* Establishment Number 0.00001* Room Number + 0.08975* Occupational Rate Bed Place + 0.01989* Occupational Rate Room 0.02336* Average Length of Stay 0.78939* Political Stability + 0.00054* Exchange Rate 2.93e10* Expenditure + 4.37e07* Arrival

Since no variables showed any statistically significant pvalue, no variables considered in the model significantly contributed to the model.

Within the model fit for ANOVA test, for common effect model and random effect model the regression is not a fit with the data. So, a fixed model can be finalised for developing countries.

CONCLUSION

The regression models are developed for both developing and developed countries. For developed countries, random effect model showed a good fit whereas for developing countries, fixed effect model showed a good fit.

For Developed Countries,

Variables	Coefficients	p value	Confidence Interval
Tourism Receipts	9.56e11	0.062	1.96e10 4.70e12
CO2 Emission	0.00001	0.364	0.00001 0.00002
Establishment Number	0.00020***	0.000	0.00011 0.00029
Occupational Rate Bed Place	0.06662	0.232	0.04256 0.17580
Occupational Rate Room	0.24907***	0.000	0.15607 0.34206
Average Length of stay	0.42043	0.553	1.81103 0.97017
Political Stability	0.49010	0.548	1.11078 2.09099
Exchange Rate	0.00155	0.864	0.01615 0.01925
Income Level	3.52e14*	0.030	6.71e14 3.36e15
Expenditure	4.54e11	0.415	1.55e10 6.38e11
Arrival	2.45e09	0.936	5.74e08 6.23e08
Constant	10.11296***	0.000	15.59075 4.63517
Rsquared	0.4977		
*** p<0.001, ** p<0.01, * p<0.05			

Random Effect Model

The adjusted R square value is 0.498, 49.8% of dependent variable (GDP Growth) is explained by the independent variables.

For assessing the model fit, a pvalue of <0.0001 is obtained from ANOVA which indicates that this model is fit for regression.

The required regression equation is

GDP Growth = 10.112969.56e11* Tourism Receipts + 0.00001* CO2 Emission + 0.00020* Establishment Number + 0.06662* Occupational Rate Bed Place + 0.24907* Occupational Rate Room 0.42043* Average Length of Stay + 0.49010* Political Stability + 0.00155* Exchange Rate 3.52e14* Income Level 4.54e11* Expenditure 2.45e09* Arrival

Since the p values is less than 0.05 for Establishment Number, Occupational Rate Room, Income level they have significant effect on GDP.

For Developing Countries,

Fixed Effect Model

Variables	Coefficients	p value	Confidence Interval
Tourism Receipts	4.68e11	0.879	6.55e10 5.61e10
Establishment Number	0.00027	0.295	0.00077 0.00023
Room Number	0.00002	0.133	0.00004 0.00001
Occupational Rate Bed Place	0.16147**	0.010	0.03949 0.28344
Occupational Rate Room	0.03294	0.653	0.11133 0.17721
Average Length of stay	0.32449	0.382	0.40570 1.05468
Political Stability	0.48811	0.685	2.86014 1.88393
Exchange Rate	0.00099	0.141	0.00033 0.00230
Expenditure	5.83e10*	0.046	1.16e09 1.11e11
Arrival	5.29e07	0.074	5.23e08 1.11e06
Constant	3.07910	0.243	8.26382 2.10562
Rsquared	0.20459		
*** p<0.001, ** p<0.01, * p<0.05			

The adjusted R square value is 0.205, 20.5% of dependent variable (GDP Growth) is explained by the independent variables.

For assessing the model fit, a pvalue of <0.0001 is obtained from ANOVA which indicates that this model is fit for regression.

The required regression equation is

GDP Growth = 3.079104.68e11* Tourism Receipts 0.00027* Establishment Number 0.00002* Room Number + 0.16147* Occupational Rate Bed Place + 0.03294* Occupational Rate Room + 0.32449 * Average Length of Stay 0.48811* Political Stability 0.00099* Exchange Rate 5.83e10* Expenditure + 5.29e07* Arrival

Since the p values is less than 0.05 for Occupational Rate Bed Place, Expenditure, they have significant effect on GDP.

Objective 2

For Developed Country

Descriptive:

```
> summary(Developed)
   Country          DevelopmentStatus       Year      CountryCode
 Length:1273        Length:1273        Min.   :1995   Length:1273
 Class :character   Class :character   1st Qu.:2002   Class :character
 Mode  :character   Mode  :character   Median :2009   Mode  :character
                                       Mean   :2009
                                       3rd Qu.:2016
                                       Max.   :2022

      HDI          TourismReceipts     PoliticalStability  ExchangeRate
 Min.   :0.6320   Min.   :4.000e+05   Min.   :-2.1425    Min.   :   0.0012
 1st Qu.:0.8070   1st Qu.:1.820e+08   1st Qu.: 0.3522    1st Qu.:   1.3459
 Median :0.8680   Median :7.440e+08   Median : 0.8219    Median :   4.9350
 Mean   :0.8523   Mean   :3.987e+09   Mean   : 0.6441    Mean   :  47.9256
 3rd Qu.:0.9060   3rd Qu.:3.364e+09   3rd Qu.: 1.1319    3rd Qu.:  34.0927
 Max.   :0.9670   Max.   :5.945e+10   Max.   : 1.7532    Max.   :1736.2074
                  NA's   :475         NA's   :203        NA's   :398
  Incomelevel
 Min.   :1.148e+09
 1st Qu.:8.333e+10
 Median :5.855e+11
 Mean   :1.593e+13
 3rd Qu.:2.131e+12
 Max.   :5.528e+14
 NA's   :73
```

Common Effect Model:

Output:

```
Pooling Model

Call:
plm(formula = HDI ~ log(TourismReceipts) + log(PoliticalStability) +
    log(ExchangeRate) + log(Incomelevel), data = pdata, model = "pooling")

Unbalanced Panel: n = 36, T = 1-23, N = 320

Residuals:
       Min.     1st Qu.      Median     3rd Qu.        Max.
-0.14357783 -0.02571623  0.00020351  0.02965589  0.10688557

Coefficients:
                           Estimate  Std. Error t-value  Pr(>|t|)
(Intercept)              0.58900000  0.03046547 19.3334 < 2.2e-16 ***
log(TourismReceipts)    -0.00074667  0.00109334 -0.6829    0.4952
log(PoliticalStability)  0.03644204  0.00277225 13.1453 < 2.2e-16 ***
log(ExchangeRate)       -0.01077755  0.00131344 -8.2056 5.927e-15 ***
log(Incomelevel)         0.01188715  0.00095066 12.5041 < 2.2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Total Sum of Squares:    1.1691
Residual Sum of Squares: 0.52071
R-Squared:      0.55461
Adj. R-Squared: 0.54896
F-statistic: 98.0632 on 4 and 315 DF, p-value: < 2.22e-16
```

BreuschPagan test:

Output:

```
> print(bp_test)

        Breusch-Pagan test

data:  HDI ~ log(TourismReceipts) + log(PoliticalStability) + log(ExchangeRate) +     log(Incomelevel)
BP = 24.16, df = 4, p-value = 7.419e-05
```

.

Fixed Effect model:

Output:

```
Oneway (individual) effect Within Model

Call:
plm(formula = HDI ~ log(TourismReceipts) + log(PoliticalStability) +
    log(ExchangeRate) + log(Incomelevel), data = pdata, model = "within")

Unbalanced Panel: n = 36, T = 1-23, N = 320

Residuals:
       Min.     1st Qu.      Median     3rd Qu.        Max.
-0.03739163 -0.00487353  0.00087503  0.00543402  0.02924867

Coefficients:
                           Estimate  Std. Error t-value Pr(>|t|)
log(TourismReceipts)     0.00194573  0.00103252  1.8844  0.06054 .
log(PoliticalStability) -0.00076806  0.00129705 -0.5922  0.55422
log(ExchangeRate)        0.00384532  0.00382808  1.0045  0.31600
log(Incomelevel)         0.11285476  0.00417154 27.0535  < 2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Total Sum of Squares:    0.17009
Residual Sum of Squares: 0.030358
R-Squared:      0.82152
Adj. R-Squared: 0.79666
F-statistic: 322.198 on 4 and 280 DF, p-value: < 2.22e-16
```

Random Effect Model:

<u>Output:</u>

```
Oneway (individual) effect Random Effect Model
   (Swamy-Arora's transformation)

Call:
plm(formula = HDI ~ log(TourismReceipts) + log(PoliticalStability) +
    log(ExchangeRate) + log(Incomelevel), data = pdata, model = "random")

Unbalanced Panel: n = 36, T = 1-23, N = 320

Effects:
                   var   std.dev share
idiosyncratic 0.0001084 0.0104126 0.101
individual    0.0009649 0.0310635 0.899
theta:
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 0.6822  0.8823  0.9233  0.9002  0.9270  0.9303

Residuals:
     Min.    1st Qu.    Median      Mean   3rd Qu.      Max.
-0.078307 -0.007618  0.000419 -0.000097  0.009625  0.047198

Coefficients:
                          Estimate Std. Error z-value  Pr(>|z|)
(Intercept)             -0.2500993  0.0794653 -3.1473  0.001648 **
log(TourismReceipts)     0.0123907  0.0013651  9.0771 < 2.2e-16 ***
log(PoliticalStability)  0.0013965  0.0021413  0.6522  0.514290
log(ExchangeRate)       -0.0118185  0.0036016 -3.2814  0.001033 **
log(Incomelevel)         0.0326288  0.0031535 10.3470 < 2.2e-16 ***
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Total Sum of Squares:    0.63972
Residual Sum of Squares: 0.09858
R-Squared:      0.84593
Adj. R-Squared: 0.84397
Chisq: 271.38 on 4 DF, p-value: < 2.22e-16
```

Hausman test:

<u>Output:</u>

```
> # Perform the Hausman test
> hausman_test <- phtest(femethod, remethod)
> print(hausman_test)

        Hausman Test

data:  HDI ~ log(TourismReceipts) + log(PoliticalStability) + log(ExchangeRate) +  ...
chisq = 855.96, df = 4, p-value < 2.2e-16
alternative hypothesis: one model is inconsistent
```

Fisher root test for Stationarity

```
> ## Fisher Unit Root Test
> fisher_test_result<- purtest(pdata$HDI, test="madwu", exo="intercept",pmax=4)
> print(fisher_test_result)

        Maddala-Wu Unit-Root Test (ex. var.: Individual Intercepts)

data:  pdata$HDI
chisq = 434.42, df = 92, p-value < 2.2e-16
alternative hypothesis: stationarity
```

Robust Result:

```
> robust_se
  (Intercept)  TourismReceipts PoliticalStability      ExchangeRate
 4.485487e-03     3.359585e-13       4.162352e-03      4.039558e-05
  Incomelevel
 1.022595e-17
```

Fixed effect countries

```
> fixef(femethod)
             ALBANIA              AUSTRALIA                AUSTRIA
             -2.4226                -2.2961                -2.1658
             BELGIUM BOSNIA AND HERZEGOVINA               BULGARIA
             -2.1652                -2.0530                -2.0901
              CANADA                CROATIA                 CYPRUS
             -2.3117                -1.9757                -1.8710
             CZECHIA                ESTONIA                FINLAND
             -2.4696                -1.8646                -2.0998
             GERMANY                 GREECE                HUNGARY
             -2.3821                -2.1817                -2.7482
             ICELAND                  ITALY                  JAPAN
             -2.3281                -2.4100                -2.9815
              LATVIA             LUXEMBOURG                  MALTA
             -1.8922                -1.9203                -1.7585
         NEW ZEALAND        NORTH MACEDONIA                 NORWAY
             -2.0694                -2.3177                -2.3408
              POLAND                ROMANIA             SAN MARINO
             -2.3691                -2.2652                -1.5377
              SERBIA               SLOVAKIA               SLOVENIA
             -2.5479                -2.0563                -1.9484
               SPAIN                 SWEDEN            SWITZERLAND
             -2.3371                -2.3862                -2.2050
             UKRAINE         UNITED KINGDOM          UNITED STATES
             -2.5186                -2.3035                -2.5436
>
```

For Developing Country

Descriptive:

```
> summary(Developing)
   Country           DevelopmentStatus         Year       CountryCode       
 Length:3506        Length:3506        Min.   :1995   Length:3506       
 Class :character   Class :character   1st Qu.:2003   Class :character  
 Mode  :character   Mode  :character   Median :2009   Mode  :character  
                                       Mean   :2009                     
                                       3rd Qu.:2016                     
                                       Max.   :2022                     

      HDI         TourismReceipts     PoliticalStability  ExchangeRate      
 Min.   :0.2350   Min.   :1.000e+05   Min.   :-3.1804    Min.   :0.000e+00  
 1st Qu.:0.5060   1st Qu.:1.385e+08   1st Qu.:-0.8468    1st Qu.:3.000e+00  
 Median :0.6410   Median :6.990e+08   Median :-0.2288    Median :1.600e+01  
 Mean   :0.6195   Mean   :4.816e+09   Mean   :-0.2712    Mean   :2.014e+06  
 3rd Qu.:0.7318   3rd Qu.:2.828e+09   3rd Qu.: 0.3958    3rd Qu.:3.600e+02  
 Max.   :0.9490   Max.   :2.420e+11   Max.   : 1.5991    Max.   :6.723e+09  
                  NA's   :1167        NA's   :536        NA's   :166        
  Incomelevel       
 Min.   :1.816e+08  
 1st Qu.:6.019e+10  
 Median :8.856e+11  
 Mean   :2.734e+14  
 3rd Qu.:7.261e+12  
 Max.   :1.878e+16  
 NA's   :987        
```

Common Effect Model:

Output:

```
Pooling Model

Call:
plm(formula = HDI ~ log(TourismReceipts) + log(PoliticalStability) + 
    log(ExchangeRate) + log(Incomelevel), data = pdata1, model = "pooling")

Unbalanced Panel: n = 58, T = 1-21, N = 471

Residuals:
     Min.   1st Qu.    Median   3rd Qu.      Max. 
-0.302045 -0.046375  0.011570  0.067315  0.404302 

Coefficients:
                          Estimate Std. Error  t-value  Pr(>|t|)    
(Intercept)             -0.1693758  0.0744543  -2.2749 0.0233658 *  
log(TourismReceipts)     0.0079898  0.0022609   3.5339 0.0004504 ***
log(PoliticalStability)  0.0317393  0.0038371   8.2718 1.395e-15 ***
log(ExchangeRate)       -0.0470244  0.0029395 -15.9972 < 2.2e-16 ***
log(Incomelevel)         0.0324565  0.0022781  14.2474 < 2.2e-16 ***
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Total Sum of Squares:    7.6917
Residual Sum of Squares: 4.5605
R-Squared:      0.40709
Adj. R-Squared: 0.402
F-statistic: 79.988 on 4 and 466 DF, p-value: < 2.22e-16
```

BreuschPagan test:

<u>Output:</u>

```
> print(bp_test1)

        Breusch-Pagan test

data:  HDI ~ log(TourismReceipts) + log(PoliticalStability) + log(ExchangeRate) +     log(Incomelevel)
BP = 97.86, df = 4, p-value < 2.2e-16
```

Fixed Effect Model:

<u>Output:</u>

```
Oneway (individual) effect Within Model

Call:
plm(formula = HDI ~ log(TourismReceipts) + log(PoliticalStability) +
    log(ExchangeRate) + log(Incomelevel), data = pdata1, model = "within")

Unbalanced Panel: n = 58, T = 1-21, N = 471

Residuals:
       Min.     1st Qu.      Median     3rd Qu.        Max.
-0.06845658 -0.00651290  0.00062605  0.00706609  0.04173769

Coefficients:
                           Estimate  Std. Error t-value  Pr(>|t|)
log(TourismReceipts)     0.00067421  0.00079518  0.8479  0.397003
log(PoliticalStability) -0.00122998  0.00098987 -1.2426  0.214740
log(ExchangeRate)        0.00714144  0.00215854  3.3085  0.001021 **
log(Incomelevel)         0.09057659  0.00295021 30.7017 < 2.2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Total Sum of Squares:    0.30461
Residual Sum of Squares: 0.076665
R-Squared:      0.74832
Adj. R-Squared: 0.71079
F-statistic: 304.024 on 4 and 409 DF, p-value: < 2.22e-16
```

Random Effect Model:

<u>Output:</u>

```
Oneway (individual) effect Random Effect Model
   (Swamy-Arora's transformation)

Call:
plm(formula = HDI ~ log(TourismReceipts) + log(PoliticalStability) +
    log(ExchangeRate) + log(Incomelevel), data = pdata1, model = "random")

Unbalanced Panel: n = 58, T = 1-21, N = 471

Effects:
                    var   std.dev share
idiosyncratic 0.0001874 0.0136910  0.02
individual    0.0090758 0.0952668  0.98
theta:
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max. 
 0.8577  0.9458  0.9585  0.9530  0.9670  0.9687 

Residuals:
    Min.   1st Qu.   Median     Mean  3rd Qu.     Max. 
-0.06296 -0.00949  0.00299  0.00182  0.01448  0.05070 

Coefficients:
                          Estimate Std. Error  z-value Pr(>|z|)    
(Intercept)             -0.9933156  0.0923237 -10.7591  < 2e-16 ***
log(TourismReceipts)     0.0025888  0.0011193   2.3129  0.02073 *  
log(PoliticalStability) -0.0015902  0.0014079  -1.1295  0.25869    
log(ExchangeRate)        0.0003034  0.0029526   0.1028  0.91816    
log(Incomelevel)         0.0597698  0.0035440  16.8651  < 2e-16 ***
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Total Sum of Squares:    0.37186
Residual Sum of Squares: 0.17838
R-Squared:      0.53142
Adj. R-Squared: 0.5274
Chisq: 382.832 on 4 DF, p-value: < 2.22e-16
```

Hausman test:

<u>Output:</u>

```
> print(hausman_test)

        Hausman Test

data:  HDI ~ log(TourismReceipts) + log(PoliticalStability) + log(ExchangeRate) +  ...
chisq = 500.76, df = 4, p-value < 2.2e-16
alternative hypothesis: one model is inconsistent
```

Fisher root test for Stationarity

```
> ## Fisher Unit Root Test
> fisher_test_result1 <- purtest(pdata1_filtered$HDI, test = "madwu", exo = "intercept", pmax = 2)
> print(fisher_test_result1)

        Maddala-Wu Unit-Root Test (ex. var.: Individual Intercepts)

data:  pdata1_filtered$HDI
chisq = 561.49, df = 268, p-value < 2.2e-16
alternative hypothesis: stationarity
```

Robust Result:

```
> robust_se
     (Intercept)   TourismReceipts PoliticalStability      ExchangeRate
    3.719656e-03      2.727210e-13       3.748840e-03      8.505794e-07
     Incomelevel
    1.273701e-18
```

Fixed effect countries

```
> fixef(femethod1)
                      ARGENTINA                                ARMENIA
                       -1.66989                               -1.94867
                        BAHAMAS                                 BELIZE
                       -1.31443                               -1.32428
                          BENIN                                 BHUTAN
                       -2.23438                               -1.73278
BOLIVIA (PLURINATIONAL STATE OF)                              BOTSWANA
                       -1.56753                               -1.68637
                         BRAZIL                      BRUNEI DARUSSALAM
                       -1.93233                               -1.31759
                   BURKINA FASO                             CABO VERDE
                       -2.35909                               -1.73055
                       CAMBODIA                                  CHILE
                       -2.36017                               -2.19511
                        COMOROS                     DOMINICAN REPUBLIC
                       -1.91305                               -1.87984
                          EGYPT                            EL SALVADOR
                       -2.00596                               -1.53329
              EQUATORIAL GUINEA                               ESWATINI
                       -2.12649                               -1.74323
                          GABON                                 GAMBIA
                       -2.05186                               -1.81466
                          GHANA                             KAZAKHSTAN
                       -1.75224                               -2.00389
                       KIRIBATI                                 KUWAIT
                       -1.15897                               -1.39320
                        LESOTHO                             MADAGASCAR
                       -1.69331                               -2.35936
                       MALAYSIA                                   MALI
                       -1.75945                               -2.30536
                     MAURITANIA                              MAURITIUS
                       -1.87617                               -1.72896
                       MONGOLIA                                MOROCCO
                       -2.12853                               -1.96820
                        NAMIBIA                                   OMAN
                       -1.73804                               -1.38611
                          PALAU                                 PANAMA
                       -0.97609                               -1.45566
                       PARAGUAY                                  QATAR
```

PARAGUAY	-2.33221	QATAR	-1.61911
RWANDA	-2.23554	SAMOA	-1.25366
SAUDI ARABIA	-1.80281	SEYCHELLES	-1.36802
SINGAPORE	-1.50559	SOLOMON ISLANDS	-1.55107
SOUTH AFRICA	-2.00141	SRI LANKA	-2.01733
SYRIAN ARAB REPUBLIC	-1.92742	THAILAND	-2.01979
TIMOR-LESTE	-1.35906	TOGO	-2.19768
TONGA	-1.16450	UNITED ARAB EMIRATES	-1.70828
URUGUAY	-1.77777	VANUATU	-1.71116
VIET NAM	-2.63603	ZAMBIA	-1.80689

Objective 3

Granger Causality test Results

Pairwise Granger Causality Tests
Date: 04/04/23 Time: 14:51
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DALBANIA1 does not Granger Cause DALBANIA	14	0.32265	0.7323
DALBANIA does not Granger Cause DALBANIA1		8.33019	0.009

Pairwise Granger Causality Tests
Date: 04/04/23 Time: 15:01
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DAUSTRALIA1 does not Granger Cause DAUSTRALIA	21	0.00295	0.9971
DAUSTRALIA does not Granger Cause DAUSTRALIA1		2.47283	0.1159

Pairwise Granger Causality Tests
Date: 04/04/23 Time: 15:08
Sample: 1 25

Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DBAHRAIN1 does not Granger Cause DBAHRAIN	7	0.90778	0.5242
DBAHRAIN does not Granger Cause DBAHRAIN1		2.5691	0.2802

Pairwise Granger Causality Tests
Date: 04/04/23 Time: 15:25
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DBHUTAN1 does not Granger Cause DBHUTAN	12	0.49854	0.6275
DBHUTAN does not Granger Cause DBHUTAN1		0.26322	0.7759

Pairwise Granger Causality Tests
Date: 04/04/23 Time: 14:53
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DALGERIA1 does not Granger Cause DALGERIA	13	0.17849	0.8398
DALGERIA does not Granger Cause DALGERIA1		1.75874	0.2328

Pairwise Granger Causality Tests
Date: 04/04/23 Time: 15:02
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DAUSTRIA1 does not Granger Cause DAUSTRIA	13	0.12021	0.8883
DAUSTRIA does not Granger Cause DAUSTRIA1		0.00915	0.9909

Pairwise Granger Causality Tests
Date: 04/04/23 Time: 15:10
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DBANGLADESH1 does not Granger Cause DBANGLADESH	20	2.13903	0.1523
DBANGLADESH does not Granger Cause DBANGLADESH1		0.39612	0.6798

Pairwise Granger Causality Tests
Date: 04/04/23 Time: 15:27
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DBOLIVIA1 does not Granger Cause DBOLIVIA	21	0.82818	0.4547
DBOLIVIA does not Granger Cause DBOLIVIA1		0.32642	0.7262

Pairwise Granger Causality Tests
Date: 04/04/23 Time: 14:57
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DARGENTINA1 does not Granger Cause DARGENTINA	20	0.02689	0.9735
DARGENTINA does not Granger Cause DARGENTINA1		0.43024	0.6581

Pairwise Granger Causality Tests
Date: 04/04/23 Time: 15:04
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DAZERBAIJAN1 does not Granger Cause DAZERBAIJAN	14	0.0947	0.9105
DAZERBAIJAN does not Granger Cause DAZERBAIJAN1		0.67513	0.5331

Pairwise Granger Causality Tests
Date: 04/04/23 Time: 15:19
Sample: 1 25

Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DBELARUS1 does not Granger Cause DBELARUS	18	0.46551	0.6379
DBELARUS does not Granger Cause DBELARUS1		0.74082	0.4958

Pairwise Granger Causality Tests
Date: 04/04/23 Time: 15:28
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DBRAZIL1 does not Granger Cause DBRAZIL	20	0.43158	0.6573
DBRAZIL does not Granger Cause DBRAZIL1		0.44839	0.6469

Pairwise Granger Causality Tests
Date: 04/04/23 Time: 14:59
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DARMENIA1 does not Granger Cause DARMENIA	6	0.10017	0.9127
DARMENIA does not Granger Cause DARMENIA1		0.35322	0.7655

Pairwise Granger Causality Tests
Date: 04/04/23 Time: 15:05
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DBAHAMAS1 does not Granger Cause DBAHAMAS	21	14.7454	0.0002
DBAHAMAS does not Granger Cause DBAHAMAS1		0.07794	0.9254

Pairwise Granger Causality Tests
Date: 04/04/23 Time: 15:20
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DBELGIUM1 does not Granger Cause DBELGIUM	16	0.01091	0.9892
DBELGIUM does not Granger Cause DBELGIUM1		0.09174	0.913

Pairwise Granger Causality Tests
Date: 04/04/23 Time: 15:30
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DBULGARIA1 does not Granger Cause DBULGARIA	11	0.1217	0.8875
DBULGARIA does not Granger Cause DBULGARIA1		2.76694	0.1408

Pairwise Granger Causality Tests
Date: 04/04/23 Time: 15:34
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DBURKINA1 does not Granger Cause DBURKINA	10	0.25809	0.7822
DBURKINA does not Granger Cause DBURKINA1		0.53678	0.6149

Pairwise Granger Causality Tests
Date: 04/04/23 Time: 15:43
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DCANADA1 does not Granger Cause DCANADA	14	0.37498	0.6976
DCANADA does not Granger Cause DCANADA1		0.33612	0.7231

Pairwise Granger Causality Tests
Date: 04/04/23 Time: 15:52
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DCROATIA1 does not Granger Cause DCROATIA	21	0.00809	0.992
DCROATIA does not Granger Cause DCROATIA1		0.02201	0.9783

Pairwise Granger Causality Tests
Date: 04/04/23 Time: 16:14
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DECUADOR1 does not Granger Cause DECUADOR	16	0.51841	0.6093
DECUADOR does not Granger Cause DECUADOR1		1.7492	0.219

Pairwise Granger Causality Tests
Date: 04/04/23 Time: 15:44
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DCHILE1 does not Granger Cause DCHILE	9	0.18101	0.8409
DCHILE does not Granger Cause DCHILE1		5.0178	0.0812

Pairwise Granger Causality Tests
Date: 04/04/23 Time: 15:53
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DCYPRUS1 does not Granger Cause DCYPRUS	20	0.3776	0.6918
DCYPRUS does not Granger Cause DCYPRUS1		0.20224	0.8191

Pairwise Granger Causality Tests
Date: 04/04/23 Time: 16:17
Sample: 1 25

Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DEGYPTARAB1 does not Granger Cause DEGYPTARAB	20	0.47326	0.632
DEGYPTARAB does not Granger Cause DEGYPTARAB1		6.77443	0.008

Pairwise Granger Causality Tests
Date: 04/04/23 Time: 15:37
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DCABOVERDA1 does not Granger Cause DCABOVERDA	11	1.48938	0.2984
DCABOVERDA does not Granger Cause DCABOVERDA1		0.16196	0.8541

Pairwise Granger Causality Tests
Date: 04/04/23 Time: 15:46
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DCHINA1 does not Granger Cause DCHINA	21	0.77176	0.4787
DCHINA does not Granger Cause DCHINA1		5.73258	0.0133

Pairwise Granger Causality Tests
Date: 04/04/23 Time: 15:55
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DCZECHIA1 does not Granger Cause DCZECHIA	14	2.27528	0.1586
DCZECHIA does not Granger Cause DCZECHIA1		2.05056	0.1846

Pairwise Granger Causality Tests
Date: 04/04/23 Time: 16:23

Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DELSALVADOR1 does not Granger Cause DELSALVADOR	18	0.03489	0.9658
DELSALVADOR does not Granger Cause DELSALVADOR1		0.06906	0.9336

Pairwise Granger Causality Tests
Date: 04/04/23 Time: 15:38
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DCAMBODIA1 does not Granger Cause DCAMBODIA	19	0.64002	0.542
DCAMBODIA does not Granger Cause DCAMBODIA1		8.16894	0.0045

Pairwise Granger Causality Tests
Date: 04/04/23 Time: 15:49
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DCOLUMBIA1 does not Granger Cause DCOLUMBIA	16	1.67301	0.2321
DCOLUMBIA does not Granger Cause DCOLUMBIA1		0.70466	0.5153

Pairwise Granger Causality Tests
Date: 04/04/23 Time: 15:57
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DDENMARK1 does not Granger Cause DDENMARK	15	0.06161	0.9406
DDENMARK does not Granger Cause DDENMARK1		1.47365	0.2749

Pairwise Granger Causality Tests

Date: 04/04/23 Time: 16:25
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DESTONIA1 does not Granger Cause DESTONIA	11	0.25018	0.7864
DESTONIA does not Granger Cause DESTONIA1		1.15852	0.3754

Pairwise Granger Causality Tests
Date: 04/04/23 Time: 15:41
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DCAMEROON1 does not Granger Cause DCAMEROON	7	1.48597	0.4023
DCAMEROON does not Granger Cause DCAMEROON1		0.38629	0.7213

Pairwise Granger Causality Tests
Date: 04/04/23 Time: 15:50
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DCOSTARICA1 does not Granger Cause DCOSTARICA	21	0.18843	0.8301
DCOSTARICA does not Granger Cause DCOSTARICA1		2.44971	0.118

Pairwise Granger Causality Tests
Date: 04/04/23 Time: 15:58
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DDOMINICAN1 does not Granger Cause DDOMINICAN	21	0.66266	0.5291
DDOMINICAN does not Granger Cause DDOMINICAN1		7.11627	0.0062

Pairwise Granger Causality Tests
Date: 04/04/23 Time: 16:27
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DESWATINI1 does not Granger Cause DESWATINI	11	0.35401	0.7156
DESWATINI does not Granger Cause DESWATINI1		6.25658	0.034

Pairwise Granger Causality Tests
Date: 04/04/23 Time: 16:28
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DFIJI1 does not Granger Cause DFIJI	17	1.95116	0.1846
DFIJI does not Granger Cause DFIJI1		1.2615	0.3182

Pairwise Granger Causality Tests
Date: 04/05/23 Time: 15:55
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DGUATEMALA1 does not Granger Cause DGUATEMALA	8	2.04182	0.2756
DGUATEMALA does not Granger Cause DGUATEMALA1		1.16349	0.4226

Pairwise Granger Causality Tests
Date: 04/05/23 Time: 16:05
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DINDIA1 does not Granger Cause DINDIA	20	0.22957	0.7976
DINDIA does not Granger Cause DINDIA1		0.6346	0.5438

0

Date: 04/08/23 Time: 11:19
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DITALY1 does not Granger Cause DITALY	21	0.15034	0.8616
DITALY does not Granger Cause DITALY1		0.89809	0.4269

Pairwise Granger Causality Tests
Date: 04/04/23 Time: 16:30
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DFINLAND1 does not Granger Cause DFINLAND	21	0.34099	0.7161
DFINLAND does not Granger Cause DFINLAND1		0.43307	0.6559

Pairwise Granger Causality Tests
Date: 04/05/23 Time: 15:58
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DHAITI1 does not Granger Cause DHAITI	20	0.21117	0.812
DHAITI does not Granger Cause DHAITI1		0.3877	0.6852

Pairwise Granger Causality Tests
Date: 04/05/23 Time: 16:07
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DINDONESIA1 does not Granger Cause DINDONEASIA	14	0.42396	0.6669
DINDONEASIA does not Granger Cause DINDONESIA1		0.64442	0.5476

Pairwise Granger Causality Tests
Date: 04/08/23 Time: 11:23
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DJAMAICA1 does not Granger Cause DJAMAICA	21	0.02336	0.9769
DJAMAICA does not Granger Cause DJAMAICA1		3.35366	0.0608

Pairwise Granger Causality Tests
Date: 04/04/23 Time: 16:39
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DFRANCE1 does not Granger Cause DFRANCE	14	0.18192	0.8367
DFRANCE does not Granger Cause DFRANCE1		0.03781	0.963

Pairwise Granger Causality Tests
Date: 04/05/23 Time: 16:02
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DHONDURAS1 does not Granger Cause DHONDURAS	21	0.43488	0.6548
DHONDURAS does not Granger Cause DHONDURAS1		0.90572	0.424

Pairwise Granger Causality Tests
Date: 04/05/23 Time: 16:15
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DIRELAND1 does not Granger Cause DIRELAND	12	1.70676	0.249
DIRELAND does not Granger Cause DIRELAND1		0.17099	0.8462

Pairwise Granger Causality Tests
Date: 04/08/23 Time: 11:31
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DJAPAN1 does not Granger Cause DJAPAN	21	0.94588	0.409
DJAPAN does not Granger Cause DJAPAN1		0.30278	0.7429

Pairwise Granger Causality Tests
Date: 04/04/23 Time: 16:45
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DGERMANY1 does not Granger Cause DGERMANY	21	0.20369	0.8178
DGERMANY does not Granger Cause DGERMANY1		0.21845	0.8061

Pairwise Granger Causality Tests
Date: 04/05/23 Time: 16:04
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DHUNGARY1 does not Granger Cause DHUNGARY	21	0.16613	0.8484
DHUNGARY does not Granger Cause DHUNGARY1		0.42101	0.6634

Pairwise Granger Causality Tests
Date: 04/05/23 Time: 16:17
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DISRAEL1 does not Granger Cause DISRAEL	16	0.83576	0.4593
DISRAEL does not Granger Cause DISRAEL1		1.91222	0.1938

Date: 04/08/23 Time: 11:32
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.

DJORDAN1 does not Granger Cause DJORDAN	20	0.29149	0.7513
DJORDAN does not Granger Cause DJORDAN1		0.1845	0.8334

Pairwise Granger Causality Tests
Date: 04/08/23 Time: 11:42
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DKAZAKHSTAN1 does not Granger Cause DKAZAKHSTAN	11	0.46569	0.6486
DKAZAKHSTAN does not Granger Cause DKAZAKHSTAN1		0.00471	0.9953

Pairwise Granger Causality Tests
Date: 04/08/23 Time: 12:45
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DLUXEMBOURG1 does not Granger Cause DLUXEMBERG	19	0.90029	0.4287
DLUXEMBERG does not Granger Cause DLUXEMBOURG1		0.43048	0.6585

Pairwise Granger Causality Tests
Date: 04/08/23 Time: 13:28
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DMOLDOVA1 does not Granger Cause DMOLDOVA	14	0.46275	0.6437
DMOLDOVA does not Granger Cause DMOLDOVA1		1.09953	0.3739

Pairwise Granger Causality Tests
Date: 04/08/23 Time: 11:49
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.

DKENYA1 does not Granger Cause DKENYA	68	########	0
DKENYA does not Granger Cause DKENYA1		########	0

Pairwise Granger Causality Tests
Date: 04/08/23 Time: 12:49
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DMALAYSIA1 does not Granger Cause DMALAYSIA	18	0.42949	0.6597
DMALAYSIA does not Granger Cause DMALAYSIA1		0.00144	0.9986

Pairwise Granger Causality Tests
Date: 04/17/23 Time: 15:21
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DMONGOLIA1 does not Granger Cause DMONGOLIA	11	2.33729	0.1776
DMONGOLIA does not Granger Cause DMONGOLIA1		2.76992	0.1406

Pairwise Granger Causality Tests
Date: 04/08/23 Time: 11:53
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DKOREA1 does not Granger Cause DKOREA	21	0.9987	0.3902
DKOREA does not Granger Cause DKOREA1		0.18412	0.8336

Pairwise Granger Causality Tests
Date: 04/08/23 Time: 13:01
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DMAURITIUS1 does not Granger Cause DMAURITIUS	17	0.46154	0.641

DMAURITIUS does not Granger Cause DMAURITIUS1		0.59654	0.5663

Pairwise Granger Causality Tests
Date: 04/17/23 Time: 15:22
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DMOROCCO1 does not Granger Cause DMOROCCO	21	0.14991	0.862
DMOROCCO does not Granger Cause DMOROCCO1		0.09017	0.9142

Pairwise Granger Causality Tests
Date: 04/08/23 Time: 12:20
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DKYRGYZ1 does not Granger Cause DKYRGYZ	7	0.08226	0.924
DKYRGYZ does not Granger Cause DKYRGYZ1		3.73172	0.2113

Pairwise Granger Causality Tests
Date: 04/08/23 Time: 13:04
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DMEXICO1 does not Granger Cause DMEXICO	21	0.05897	0.9429
DMEXICO does not Granger Cause DMEXICO1		4.34448	0.0311

Pairwise Granger Causality Tests
Date: 04/17/23 Time: 15:23
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DNAMIBIA1 does not Granger Cause DNAMIBIA	17	0.05883	0.9431
DNAMIBIA does not Granger Cause DNAMIBIA1		0.17845	0.8387

Pairwise Granger Causality Tests
Date: 04/17/23 Time: 15:24
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DNEPAL1 does not Granger Cause DNEPAL	21	1.65993	0.2213
DNEPAL does not Granger Cause DNEPAL1		4.01489	0.0386

Pairwise Granger Causality Tests
Date: 04/17/23 Time: 15:27
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DNIGERIA1 does not Granger Cause DNIGERIA	17	0.73807	0.4985
DNIGERIA does not Granger Cause DNIGERIA1		2.05534	0.1708

Pairwise Granger Causality Tests
Date: 04/17/23 Time: 16:13
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DPARAGUAY1 does not Granger Cause DPARAGUAY	21	0.3115	0.7367
DPARAGUAY does not Granger Cause DPARAGUAY1		3.16193	0.0696

Pairwise Granger Causality Tests
Date: 04/17/23 Time: 15:24
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DNETHERLANDS1 does not Granger Cause DNETHERLANDS	21	0.46556	0.636
DNETHERLANDS does not Granger Cause DNETHERLANDS1		1.30201	0.2993

Pairwise Granger Causality Tests
Date: 04/17/23 Time: 15:28
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DNORTHMACEDONIA1 does not Granger Cause DNORTHMACEDONIA	8	0.43388	0.6831
DNORTHMACEDONIA does not Granger Cause DNORTHMACEDONIA1		0.56286	0.6201

Pairwise Granger Causality Tests
Date: 04/17/23 Time: 16:13
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DPERU1 does not Granger Cause DPERU	14	1.15422	0.3579
DPERU does not Granger Cause DPERU1		1.24887	0.3321

Pairwise Granger Causality Tests
Date: 04/17/23 Time: 15:25
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DNEWZELAND does not Granger Cause DNEWLEALAND1	18	0.28785	0.7545
DNEWLEALAND1 does not Granger Cause DNEWZELAND		0.08199	0.9218

Pairwise Granger Causality Tests
Date: 04/17/23 Time: 15:28
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DNORWAY1 does not Granger Cause DNORWAY	21	0.50381	0.6135
DNORWAY does not Granger Cause DNORWAY1		1.39025	0.2775

Pairwise Granger Causality Tests
Date: 04/17/23 Time: 16:14
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DPHILIPPINES1 does not Granger Cause DPHILIPPINES	21	0.41655	0.6663
DPHILIPPINES does not Granger Cause DPHILIPPINES1		0.03474	0.9659

Pairwise Granger Causality Tests
Date: 04/17/23 Time: 15:26
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DNICARAGUA1 does not Granger Cause DNICARAGUA	16	0.04299	0.9581
DNICARAGUA does not Granger Cause DNICARAGUA1		0.31783	0.7342

Pairwise Granger Causality Tests
Date: 04/17/23 Time: 16:11
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DPAKISTAN1 does not Granger Cause DPAKISTAN	13	0.66265	0.5416
DPAKISTAN does not Granger Cause DPAKISTAN1		0.7742	0.4928

Pairwise Granger Causality Tests
Date: 04/17/23 Time: 16:14
Sample: 1 25

Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DPOLAND1 does not Granger Cause DPOLAND	20	0.62412	0.5491
DPOLAND does not Granger Cause DPOLAND1		4.38319	0.0317

Pairwise Granger Causality Tests
Date: 04/17/23 Time: 15:27
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DNIGER1 does not Granger Cause DNIGER	19	4.32114	0.0346
DNIGER does not Granger Cause DNIGER1		2.52276	0.116

Pairwise Granger Causality Tests
Date: 04/17/23 Time: 16:12
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DPANAMA1 does not Granger Cause DPANAMA	21	0.08026	0.9232
DPANAMA does not Granger Cause DPANAMA1		0.76775	0.4804

Pairwise Granger Causality Tests
Date: 04/17/23 Time: 16:15
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
PORTUGAL1 does not Granger Cause PORTUGAL	15	2.50285	0.1314
PORTUGAL does not Granger Cause PORTUGAL1		0.68487	0.5263

Pairwise Granger Causality Tests
Date: 04/17/23 Time: 16:30
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DROMANIA1 does not Granger Cause DROMANIA	11	3.34988	0.1055
DROMANIA does not Granger Cause DROMANIA1		0.05005	0.9516

Pairwise Granger Causality Tests
Date: 04/17/23 Time: 16:33
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DSLOVENIA1 does not Granger Cause DSLOVENIA	21	0.18841	0.8301
DSLOVENIA does not Granger Cause DSLOVENIA1		0.25748	0.7761

Pairwise Granger Causality Tests
Date: 04/17/23 Time: 16:37
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DSWITZERLAND1 does not Granger Cause DSWITZERLAND	16	0.56579	0.5836
DSWITZERLAND does not Granger Cause DSWITZERLAND1		5.42715	0.0229

Pairwise Granger Causality Tests
Date: 04/17/23 Time: 16:30
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DRUSSIANFERATION1 does not Granger Cause DRUSSIANFEDERATION	18	0.09098	0.9136
DRUSSIANFEDERATION does not Granger Cause DRUSSIANFERATION1		0.14025	0.8704

Pairwise Granger Causality Tests
Date: 04/17/23 Time: 16:34
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.

DSOLOMONISLANDS1 does not Granger Cause DSOLOMONISLANDS	7	26.8356	0.0359
DSOLOMONISLANDS does not Granger Cause DSOLOMONISLANDS1		0.41587	0.7063

Pairwise Granger Causality Tests
Date: 04/17/23 Time: 16:48
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DTANZANIA1 does not Granger Cause DTANZANIA	16	4.84629	0.031
DTANZANIA does not Granger Cause DTANZANIA1		3.38423	0.0715

Pairwise Granger Causality Tests
Date: 04/17/23 Time: 16:31
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DSAUDIARABIA1 does not Granger Cause DSAUDIARABIA	13	0.98457	0.4147
DSAUDIARABIA does not Granger Cause DSAUDIARABIA1		2.56513	0.1378

Pairwise Granger Causality Tests
Date: 04/17/23 Time: 16:36
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DSPAIN1 does not Granger Cause DSPAIN	21	0.45459	0.6427
DSPAIN does not Granger Cause DSPAIN1		1.51095	0.2506

Pairwise Granger Causality Tests
Date: 04/17/23 Time: 16:49
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DTHAILAND1 does not Granger Cause DTHAILAND	20	0.00332	0.9967
DTHAILAND does not Granger Cause DTHAILAND1		2.11433	0.1553

Pairwise Granger Causality Tests
Date: 04/17/23 Time: 16:32
Sample: 1 25
Lags: 2

Pairwise Granger Causality Tests
Date: 04/17/23 Time: 16:36
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DSRILANKA1 does not Granger Cause DSRILANKA	21	1.28578	0.3035
DSRILANKA does not Granger Cause DSRILANKA1		0.54991	0.5875

Pairwise Granger Causality Tests
Date: 04/17/23 Time: 16:33
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DSINGAPORE1 does not Granger Cause DSINGAPORE	21	1.00072	0.3895
DSINGAPORE does not Granger Cause DSINGAPORE1		0.67087	0.5251

Pairwise Granger Causality Tests
Date: 04/17/23 Time: 16:37
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DSWEDEN1 does not Granger Cause DSWEDEN	21	1.22621	0.3195
DSWEDEN does not Granger Cause DSWEDEN1		0.07692	0.9263

Pairwise Granger Causality Tests
Date: 04/17/23 Time: 16:50
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.

DTONGA1 does not Granger Cause DTONGA	16	5.22847	0.0254
DTONGA does not Granger Cause DTONGA1		0.20019	0.8215

Pairwise Granger Causality Tests
Date: 04/17/23 Time: 16:50
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DTUNISIA1 does not Granger Cause DTUNISIA	15	1.21311	0.3375
DTUNISIA does not Granger Cause DTUNISIA1		0.69995	0.5194

Pairwise Granger Causality Tests
Date: 04/17/23 Time: 16:55
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DZAMBIA1 does not Granger Cause DZAMBIA	8	0.3019	0.7595
DZAMBIA does not Granger Cause DZAMBIA1		0.69299	0.5657

Pairwise Granger Causality Tests
Date: 04/17/23 Time: 16:57
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DVANUATU1 does not Granger Cause DVANUATU	17	0.00976	0.9903
DVANUATU does not Granger Cause DVANUATU1		0.57438	0.5778

Pairwise Granger Causality Tests
Date: 04/17/23 Time: 16:51
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.

DTURKIYE1 does not Granger Cause DTURKIYE	21	0.48956	0.6218
DTURKIYE does not Granger Cause DTURKIYE1		0.25032	0.7815

Pairwise Granger Causality Tests
Date: 04/17/23 Time: 16:57
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DUZBEKISTAN1 does not Granger Cause DUZBEKISTAN	7	0.35362	0.7388
DUZBEKISTAN does not Granger Cause DUZBEKISTAN1		0.97486	0.5064

Pairwise Granger Causality Tests
Date: 04/17/23 Time: 16:52
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DUNITEDKINGDOM1 does not Granger Cause DUNITEDKINGDOM	19	0.3954	0.6807
DUNITEDKINGDOM does not Granger Cause DUNITEDKINGDOM1		0.99851	0.3932

Pairwise Granger Causality Tests
Date: 04/17/23 Time: 16:54
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DURUGUAY1 does not Granger Cause DURUGUAY	20	2.11084	0.1557
DURUGUAY does not Granger Cause DURUGUAY1		0.1737	0.8422

Pairwise Granger Causality Tests
Date: 04/17/23 Time: 16:53
Sample: 1 25
Lags: 2

Null Hypothesis:	Obs	FStatistic	Prob.
DUNITEDSTATES1 does not Granger Cause DUNITEDSTATES	19	0.32944	0.7248

DUNITEDSTATES does not Granger Cause DUNITEDSTATES1 0.10529 0.9008

Pairwise Granger Causality Tests
Date: 04/17/23 Time: 16:56
Sample: 1 25
Lags: 2

Null Hypothesis: Obs FStatistic Prob.

DVIETNAM1 does not Granger Cause DVIETNAM 21 0.41984 0.6642
DVIETNAM does not Granger Cause DVIETNAM1 0.53958 0.5932

Statistical Comparison of both groups TLD AND DLT

	t_statistic	p_value	TLD_mean	DLT_mean	TLD_std	DLT_std
gini	0.8344	0.4099	47.5657	44.4	3.6873	0
literacy	99.2389	0	1.0092	0	0.0099	0
co2	2.0679	0.0463	3.1349	0.0576	1.4462	0
GDP_current_USUSD	0.3708	0.7131	9.88E+11	4.38E+09	2.58E+12	0

Summary

```
                            OLS Regression Results
==============================================================================
)ep. Variable:                    GDP   R-squared:                       0.858
1odel:                            OLS   Adj. R-squared:                  0.848
1ethod:                 Least Squares   F-statistic:                     90.52
)ate:                Thu, 23 Jan 2025   Prob (F-statistic):           1.02e-24
Time:                        05:23:31   Log-Likelihood:                -1473.6
Vo. Observations:                  65   AIC:                             2957.
)f Residuals:                      60   BIC:                             2968.
)f Model:                           4
:ovariance Type:            nonrobust
=========================================================================================
                            coef    std err          t      P>|t|      [0.025      0.975]
-----------------------------------------------------------------------------------------
Intercept              2.805e+09   4.39e+08      6.394      0.000    1.93e+09    3.68e+09
Tourism_Arrivals       2154.1967    117.621     18.315      0.000    1918.919    2389.474
iDPgrowthannual       -6.752e+07   4.78e+07     -1.414      0.163   -1.63e+08     2.8e+07
PoliticalStability___ -4.191e+09   5.27e+08     -7.951      0.000   -5.25e+09   -3.14e+09
ExchangeRate___        2.707e+06   1.44e+06      1.880      0.065   -1.73e+05    5.59e+06
==============================================================================
)mnibus:                        9.850   Durbin-Watson:                   1.496
Prob(Omnibus):                  0.007   Jarque-Bera (JB):               19.695
Skew:                          -0.338   Prob(JB):                     5.29e-05
Kurtosis:                       5.611   Cond. No.                     8.13e+06
==============================================================================

Notes:
[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.
[2] The condition number is large, 8.13e+06. This might indicate that there are
strong multicollinearity or other numerical problems.
```

Key findings from the analysis:

1. TLD Countries:
- Tourism arrivals have a significant positive impact (coef: 36,610) on GDP
- Lower Rsquared (0.427) suggests other important factors influence GDP
- Political stability and exchange rates show weak correlation

2. DLT Countries:
- Stronger model fit (Rsquared: 0.858)
- Tourism has smaller but significant impact (coef: 2,154)
- Political stability shows strong negative correlation
- Exchange rates have marginal positive impact

China and Cambodia show highest growth rates among TLD countries (8.77% and 7.27%), while Niger leads DLT countries (4.57%).

Panel Data Analysis for TLD Countries:

Summary ^

```
                            OLS Regression Results
==============================================================================
Dep. Variable:                    GDP   R-squared:                       0.427
Model:                            OLS   Adj. R-squared:                  0.415
Method:                 Least Squares   F-statistic:                     35.03
Date:                Thu, 23 Jan 2025   Prob (F-statistic):           7.51e-22
Time:                        05:23:15   Log-Likelihood:                -5737.4
No. Observations:                 193   AIC:                         1.148e+04
Df Residuals:                     188   BIC:                         1.150e+04
Df Model:                           4
Covariance Type:            nonrobust
=========================================================================================
                            coef    std err          t      P>|t|      [0.025      0.975]
-----------------------------------------------------------------------------------------
Intercept             -5.108e+11   2.52e+11     -2.030      0.044   -1.01e+12   -1.44e+10
Tourism_Arrivals       3.661e+04   3446.115     10.622      0.000    2.98e+04    4.34e+04
GDPgrowthannual        5.123e+10   4.71e+10      1.087      0.278   -4.17e+10    1.44e+11
PoliticalStability___ -1.775e+11    1.8e+11     -0.988      0.324   -5.32e+11    1.77e+11
ExchangeRate___        1.576e+06   1.26e+08      0.013      0.990   -2.46e+08    2.49e+08
==============================================================================
Omnibus:                      161.438   Durbin-Watson:                   0.371
Prob(Omnibus):                  0.000   Jarque-Bera (JB):             2345.571
Skew:                           3.125   Prob(JB):                         0.00
Kurtosis:                      18.893   Cond. No.                     9.99e+07
==============================================================================

Notes:
[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.
[2] The condition number is large, 9.99e+07. This might indicate that there are
strong multicollinearity or other numerical problems.
```

Summary ^

```
                            OLS Regression Results
==============================================================================
Dep. Variable:                    GDP   R-squared:                       0.858
Model:                            OLS   Adj. R-squared:                  0.848
Method:                 Least Squares   F-statistic:                     90.52
Date:                Thu, 23 Jan 2025   Prob (F-statistic):           1.02e-24
Time:                        05:23:31   Log-Likelihood:                -1473.6
No. Observations:                  65   AIC:                             2957.
Df Residuals:                      60   BIC:                             2968.
Df Model:                           4
Covariance Type:            nonrobust
=========================================================================================
                            coef    std err          t      P>|t|      [0.025      0.975]
-----------------------------------------------------------------------------------------
Intercept              2.805e+09   4.39e+08      6.394      0.000    1.93e+09    3.68e+09
Tourism_Arrivals       2154.1967    117.621     18.315      0.000    1918.919    2389.474
GDPgrowthannual       -6.752e+07   4.78e+07     -1.414      0.163   -1.63e+08     2.8e+07
PoliticalStability___ -4.191e+09   5.27e+08     -7.951      0.000   -5.25e+09   -3.14e+09
ExchangeRate___        2.707e+06   1.44e+06      1.880      0.065   -1.73e+05    5.59e+06
==============================================================================
Omnibus:                        9.850   Durbin-Watson:                   1.496
Prob(Omnibus):                  0.007   Jarque-Bera (JB):               19.695
Skew:                          -0.338   Prob(JB):                     5.29e-05
Kurtosis:                       5.611   Cond. No.                     8.13e+06
==============================================================================

Notes:
[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.
[2] The condition number is large, 8.13e+06. This might indicate that there are
strong multicollinearity or other numerical problems.
```