

The Impact of Macroeconomic Indicators on Medical Tourism: A Global Perspective

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ABSTRACT

Medical tourism is an expanding global phenomenon stimulating economic development driven by a combination of multiple macro and socioeconomic factors. The study aims to investigate whether the development of medical tourism globally is associated with specific macroeconomic indicators. The association of Medical Tourism Index (MTI) is explored with Gross Domestic Product (GDP), healthcare spending and international tourism receipts. A countries' grouping method and an ordinary least squares (OLS) regression model were used. MTI was used as the outcome variable, while macroeconomic indicators as potential predictors. The grouping of countries showed that European and Asian countries as well as Canada excel high ranking in all indicators. However, the Gulf Cooperation Council countries (GCC) that exhibit high performance in GDP, rank below the MTI average. Caribbean and Latin American countries are ranking high in the MTI but fall below the average in all the indicators. The OLS analysis showed a positive correlation between the score of the MTI and health expenditure and no correlation among MTI, GDP and international tourism receipts, a finding also supported by the grouping analysis. Taking into consideration the similarities and disparities found among countries regarding the macroeconomic indicators mostly impacting medical tourism, it seems that there is a consensus on their relationship but not clearly identified rather due to a variety of social, cultural and ethical factors that dominate in each country. Further research is needed in order to obtain more robust and comparative evidence.

Keywords: Medical tourism, Economic development, Macroeconomic indicators, international tourism receipts, Healthcare expenditures, Gross Domestic Product.

INTRODUCTION

The tourism market is widely regarded as a highly effective means of generating income and employment, attracting foreign investments, reducing socioeconomic inequalities in access to healthcare, alleviating poverty and raising foreign exchange in both developed and developing countries. It represents a multi-sector contributor to the economy at the global, national and regional level, it has a strong relationship with a country's social and cultural ethics and also preserves local ecosystems [1–3]. In 2022, the tourism sector contributed to 6% of global GDP, with an 81.9% increase in international visitors' spending and the creation of 22 million new jobs [4]. Hence, numerous studies are focusing on the relationship between tourism and economic development given that this dynamic connection can exert significant influence as a driving factor at both the global and national economies [5–7].

Although there are numerous types of tourism, such as cultural, religious, athletic, food etc., recent research is increasingly focusing on the emerging impact of health tourism. Health tourism embodies all forms of geographic mobility wherein individuals seek healthcare, aesthetic procedures, preventive, relaxation and wellness services to sustain, enhance or restore their physical and mental well-being [8–13]. Medical tourism exhibits a more distinct and focused orientation when compared to health tourism as refers to the practice of individuals traveling to other countries or regions to receive health care [14–17]. It includes more elective and specialized high-quality health services, surgical procedures and treatments that may not be readily available or affordable in medical tourists' home country [18–20]. The global medical tourism market was valued at US\$ 9.7 billion in 2022 and is expected to witness significant growth in the coming years [21]. Also, medical tourists spend significantly more than leisure tourists, stimulating economic growth through foreign exchange inflows and output expansion [22,23].

An increasing number of countries recognize medical tourism as a key driver of economic and social development. Medical tourism benefits sending countries by increasing residents access to quality healthcare, addressing cost concerns and reducing waiting lists [24–26]. In addition, public and private insurance schemes are incorporating the provision of medical tourism services in their policies, covering population lacking adequate insurance, promoting access to medical services, minimizing healthcare costs and driving medical tourists toward affordable treatment options [27–31]. Medical tourism has garnered global interest as a catalyst for economic growth in host countries, driven by three key factors. First, it is recognized as a means of boosting a country's balance of payments through revenue generated from providing healthcare services to foreign patients and their accompanying spending on local tourism activities [22]. Second, medical tourism creates employment opportunities, benefiting the healthcare sector and related industries. It not only generates jobs in healthcare but also in tourism-related sectors, thus reducing the wage gap between domestic and overseas employment [32]. Third, medical tourism enhances domestic healthcare quality and accessibility, particularly in developing countries. Private healthcare providers invest in upgrading facilities, training staff and attracting skilled healthcare workers to cater to foreign patients. This, in turn, raises the overall quality of the healthcare system and encourages residents to seek treatment within their home country [33]. The advantages of adopting sustainable medical tourism practices include cost reduction, positive public relations, image enhancement and increased satisfaction leading to a rise in demand [34]. The above-mentioned advantages also foster environmental, economic and social sustainability. More specifically,

environmental sustainability initiatives promote eco-friendly practices[35]. This shift toward sustainability is influenced by increasing global awareness and concern regarding the climate change and environmental degradation. Furthermore, economic sustainability in medical tourism is pursued through measures ensuring ongoing stability and prosperity, often involving the development of financial models supporting sustained growth [36]. Moreover, social sustainability efforts focus on equitable benefit distribution within local communities, prioritizing cultural sensitivity and safeguarding the well-being of both visitors and locals [37]. These multifaceted strategies collectively contribute to a balanced and enduring approach, aligning the market of medical tourism with principles that prioritize environmental responsibility, economic resilience and social inclusivity. Incorporating sustainability factors into medical tourism market entails the adoption of strategies and practices that not only elevate the quality of medical services but also contribute to the long-term economic health and resilience of the market and its surrounding environment[38].

International literature review highlights the association of medical tourism with various macroeconomic indicators. A study that examined the relationship between economic growth and medical tourism, utilizing data from Euromonitor International's health and wellness tourism reports (2007-2013), demonstrated that medical tourism can positively impact the economic growth of host economies [39]. Another study exploring the interaction of medical tourism with various economic indicators indicated that medical tourism is more profitable than other subdirectories of tourism and better aligns with the sustainable development of tourism destinations [40]. Moreover, similar researches revealed that economic development from medical tourism has a beneficial impact on society as a whole, stimulating economic growth [41,42], it plays a crucial role in earning foreign exchange and creates significant employment opportunities [43]. The development of medical tourism is also influenced by other socioeconomic, ethical, geographical and cultural factors that impact the overall economic environment and travel-related decisions [44]. Political stability and safety concerns influence the decision of international patients to travel for medical treatments [45]. Countries with political instability or safety issues may experience a decline in medical tourism [32]. Cultural differences including language and religion barriers and ethics, can affect the choice of destination for medical tourists [46]. Also, emerging global health trends, such as the rise of medical procedures like fertility treatments, cosmetic surgery or specialized medical services, can drive medical tourism to specific destinations [20,47]. Obviously, these factors contribute to the development and attractiveness of medical tourism destinations, fostering economic development, job creation, improving healthcare infrastructure and services as well as foreign direct investments [33,48].

The study aims to investigate whether the development of medical tourism is associated with specific macroeconomic indicators. More specifically, the association of Medical Tourism Index (MTI) is explored with countries' Gross Domestic Product (GDP), healthcare spending and international tourism receipts, at global level.

DATA AND METHODS

Sample Selection

The study made use of the following sequential information databases, enabling the collection, synthesis and analysis of specific macroeconomic indicators, namely the GDP and health expenditures per capita as well as the international tourism receipts, drawn from the World

Bank data [49]. Also, the Medical Tourism Index (MTI) is used as the outcome variable to rate countries, based on the Medical Tourism Association (MTA) annual benchmarking [50]. MTI tool is used to rank countries based on their attractiveness as a medical tourism (medical travel) destination. More specifically, it evaluates countries based on multiple criteria such as the healthcare quality, cost, travel convenience and local culture. In this study, the MTI for the year 2020 has been used (latest available data), with 46 countries listed. However, 33 countries were included in our analysis due to the lack of data among several countries. The excluded countries were Abu- Dhabi, China, Dubai, Iran, Israel, Jamaica, Lebanon, Oman, Russia, Saudi Arabian, Spain, Taiwan and the United Kingdom.

Statistical Analysis

To analyze the results, the Microsoft Excel software toolkit was used in order to create a) a matrix of grouping countries among MTI, international tourism receipts, healthcare expenditure and GDP per capita and b) a scatter plot for countries. The grouping was based on countries' absolute value compared to the arithmetic mean of the whole by using the above and below average. An ordinary least squares (OLS) regression model was fitted. The MTI was used as the outcome variable, while GDP per capita, health expenditure per capita and international tourism receipts were used as potential predictors.

To check whether the OLS model meets the assumptions of linear regression, several diagnostic tests were performed: (i) the normality of standardized residuals was tested using the Jarque-Bera test; (ii) the homoskedasticity of standardized residuals was tested using the Brown and Forsythe test; and (iii) the independence of standardized residuals was tested using the Run test. Furthermore, the existence of specification error was tested through the Link test.

The STATA 18 statistical software package was used for the analysis and specifically, the STATA commands "regress", "predict", "jb", "robvar", "runtest" and "linktest".

RESULTS

Based on our data analysis, the countries' grouping showed that the average value of MTI for the studied countries was 65,73 units, 9.754.136 US\$, for the international tourism receipts, 1.633 US\$ for health expenditures per capita and 18.306 US\$ of the GDP per capita (Appendix A). In terms of the MTI ranking, 45.4% of the countries under study are above the average. As for the International Tourism Receipts and GDP per capita, 39.3% of countries performed above the average. When it comes to health expenditures per capita, 36.3% exceeded the average. The European countries, France, Germany, Italy, Czech Republic and Portugal exhibit high ranking in all indicators (Table.1).

Also, Canada, Singapore, Japan and South Korea show high scores in all indicators. However, despite the high scores of Qatar in the macroeconomic indicators, MTI is very low. Moreover, countries from the Caribbean and Latin America (Costa Rica, Dominican Republic and Argentina) that are high in the MTI ranking, are below the average to all the other indicators.

Table 1: Grouping of Countries by Macroeconomic Indicators.

	MTI	International tourism receipts	Health expenditures per capita	GDP per capita
Above Average	<u>Canada</u> <u>Singapore</u> <u>Japan</u> Costa Rica India <u>France</u> <u>Germany</u> <u>South Korea</u> Czech Republic Thailand <u>Italy</u> Dominican Republic Argentina <u>Portugal</u> South Africa	<u>Germany</u> <u>France</u> <u>Italy</u> <u>Singapore</u> <u>Canada</u> <i>Thailand</i> <i>Qatar</i> <i>Turkey</i> <i>India</i> <u>South Korea</u> <i>Mexico</i> <u>Japan</u> <u>Portugal</u>	<u>Germany</u> <u>Canada</u> <u>France</u> <u>Japan</u> <u>Singapore</u> <i>Malta</i> <u>Italy</u> <u>South Korea</u> <u>Portugal</u> <i>Qatar</i> Czech Republic <i>Greece</i>	<u>Singapore</u> <i>Qatar</i> <u>Germany</u> <u>Canada</u> <u>Japan</u> <u>France</u> <u>Italy</u> <u>South Korea</u> <u>Malta</u> <i>Kuwait</i> <i>Bahrain</i> Czech Republic <u>Portugal</u>
Below Average	Hungary Philippines Colombia Egypt Malta Brazil Poland Turkey Morocco Bahrain Greece Jordan Panama Tunisia Qatar Mexico Guatemala Kuwait	Poland Dominican Republic Greece Egypt Morocco Hungary Czech Republic Brazil Philippines South Africa Colombia Panama Jordan Argentina Costa Rica Malta Tunisia Bahrain Kuwait Guatemala	Kuwait Panama Hungary Bahrain Poland Costa Rica Argentina Brazil Mexico South Africa Colombia Turkey Dominican Republic Thailand Jordan Guatemala Tunisia Morocco Philippines Egypt India	Greece Hungary Poland Panama Costa Rica Mexico Turkey Argentina Dominican Republic Thailand Brazil South Africa Colombia Guatemala Jordan Egypt Tunisia Morocco Philippines India

Note: For the underlined countries all the studied indicators are above average. Countries in italics have above-average value of other studied indicators and below-average value on MTI.

As presented in Figure 1, countries exhibiting a substantial development in the international tourism receipts and in the MTI, ranking are mainly those from Asia (3rd quadrant: e.g., Singapore, Japan and South Korea) and Europe (3rd quadrant: e.g., Italy, Germany, France and Portugal). Countries with a high medical tourism ranking and above the average health

expenditure are mainly the European countries (3rd.quadrant: e.g., France, Germany, Italy) (Figure 2). Furthermore, the Gulf Cooperation Council countries (GCC), (4th quadrant: e.g., Kuwait, Qatar, Bahrain) with a relatively high level of GDP per capita do not necessarily possess leading positions in the MTI ranking (Figure 3). Also, countries with low GDP per capita exhibit high MTI ranking (2nd quadrant: e.g., India, South Africa, Thailand) (Figure 3).

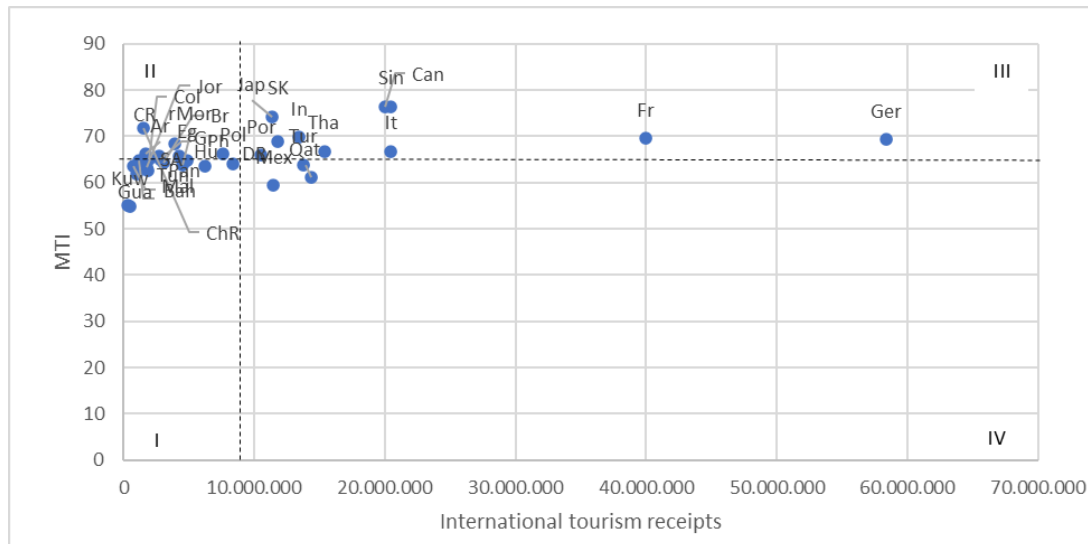


Figure 1: Scattering of countries according to international tourism receipts and MTI

Symbols of countries: Arg -Argentina, Bah- Bahrain, Br-Brazil, Can-Canada, ChR- Czech Republic, Col-Colombia, C R- Costa Rica, DR- Dominican Republic, Eg-Egypt, Fr-France, Ger-Germany, Gr-Greece, Hu-Hungary, Gua-Guatemala, It-Italy, In-India, Jor-Jordan, Jap-Japan, Kuw-Kuwait, Mal-Malta, Mex-Mexico, Mor-Morocco, Pan-Panama, Ph-Philippines, Pol-Poland, Por-Portugal, Qat-Qatar, Sin-Singapore, SA-South Africa, SK-South Korea, Tha-Thailand, Tun-Tunisia, Tu- Turkey.

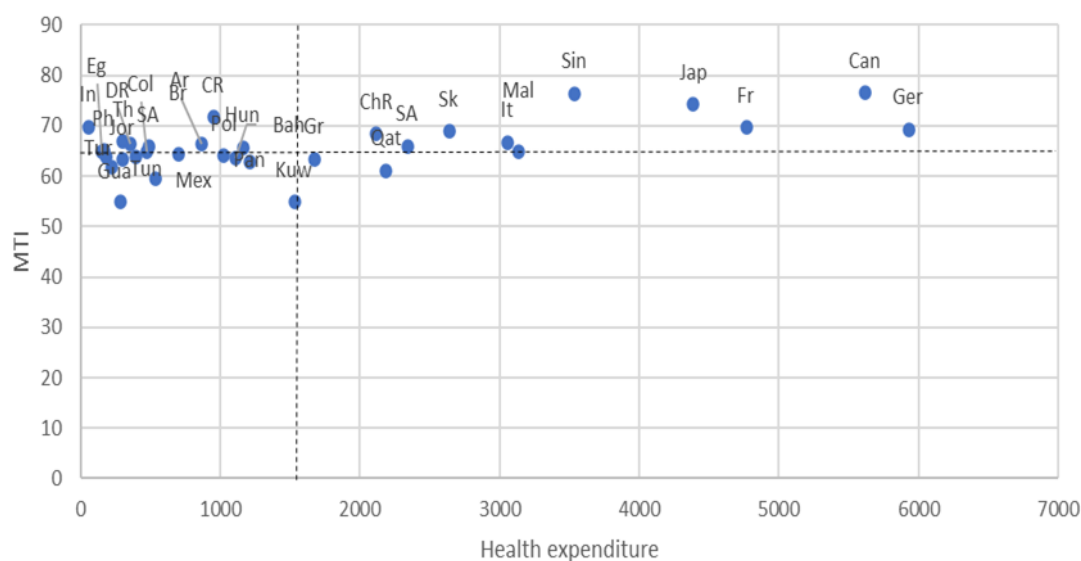


Figure 2: Scattering of countries according to Health expenditures and MTI

Symbols of countries: Arg -Argentina, Bah- Bahrain, Br-Brazil, Can-Canada, ChR- Czech Republic, Col-Colombia, C R- Costa Rica, DR- Dominican Republic, Eg-Egypt, Fr-France, Ger-Germany, Gr-Greece, Hu-Hungary, Gua-Guatemala, It-Italy, In-India, Jor-Jordan, Jap-Japan, Kuw-Kuwait, Mal-Malta, Mex-Mexico, Mor-Morocco, Pan-Panama, Ph-Philippines, Pol-Poland, Por-Portugal, Qat-Qatar, Sin-Singapore, S A-South Africa, SK-South Korea, Tha-Thailand, Tun-Tunisia, Tu- Turkey.

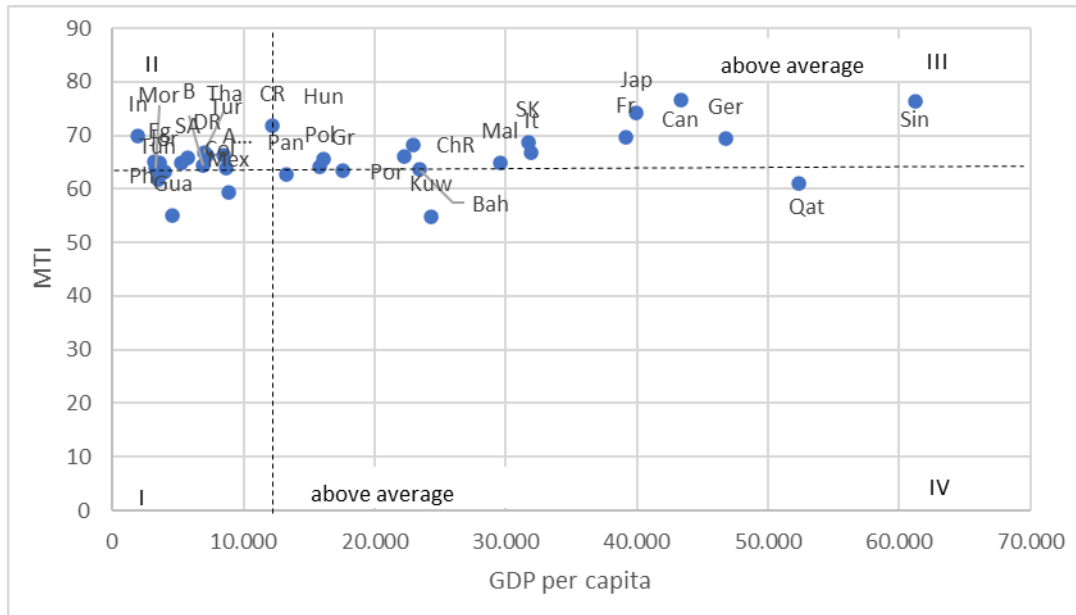


Figure 3: Scattering of countries according to GDP per capita and MTI

Symbols of countries: Arg -Argentina, Bah- Bahrain, Br-Brazil, Can-Canada, ChR- Czech Republic, Col-Colombia, C R- Costa Rica, DR- Dominican Republic, Eg-Egypt, Fr-France, Ger-Germany, Gr-Greece, Hu-Hungary, Gua-Guatemala, It-Italy, In-India, Jor-Jordan, Jap-Japan, Kuw-Kuwait, Mal-Malta, Mex-Mexico, Mor-Morocco, Pan-Panama, Ph-Philippines, Pol-Poland, Por-Portugal, Qat-Qatar, Sin-Singapore, SA-South Africa, SK-South Korea, Tha-Thailand, Tun-Tunisia, Tu- Turkey. As presented in Table 2, health expenditure per capita is positively associated with the MTI. Based on the diagnostic tests, the assumptions of the OLS regression model are not violated: i) the standardized residuals follow the normal distribution (pJarque-Bera Test=0.4611); ii) the standardized residuals are homoscedastic (pBrown & Forsythe Test=0.5780); and iii) the standardized residuals are independent (pRun Test=0.3800). In addition, the model does not suffer from specification error (pLink Test h-square=0.4320). The ordinary least squares (OLS) regression results indicates that the estimated coefficient between MTI and international tourism receipts is not statistically significant (p=0.8892). Furthermore, there was no statistically significant correlation observed between MTI and GDP per capita (p=0.7620).

Table 2: OLS Regression Model Results.

Variable	Coefficient	p	95% Confidence Interval	
Current Health Expenditure per Capita	0.0017	0.001	0.0008	0.0025
Constant	63.0102	<0.001	60.9849	65.0354

DISCUSSION

This study aims to examine whether the development of medical tourism is associated with countries' GDP and health expenditure per capita as well as the international tourism receipts. The grouping of countries showed that European and Asian countries as well Canada excel high ranking in all indicators. However, GCC countries that exhibit high performance in GDP, rank below the MTI average. Also, countries in the Caribbean and Latin America that rank high in the MTI, fall below the average in the other indicators. The OLS analysis showed a positive correlation between the score of the MTI and health expenditure and no correlation among MTI, GDP and international tourism receipts.

Moreover, our findings are in line with the international literature. Asian countries are among the top destinations for medical tourism due to their quality healthcare facilities, skilled healthcare professionals and affordable treatment options [51–53]. The European countries targeting to become a top choice for medical tourists is also reported by many studies [34,54–56]. Most of the GCC countries are putting strategic efforts into enhancing their tourism sector and increasing the contribution of tourism toward their national economies considering tourism as an alternative to their oil-based economies and a catalyst for diversification [11]. Regarding the potential of GCC countries in medical tourism, several studies highlight their comparative advantages related to recent government initiatives taken, the competitiveness among health providers as well as the high quality in health infrastructure and medical staff [11,57,58]. Furthermore, several Caribbean and Latin American countries aspire to increase their earnings in the medical tourism sector [59,60]. However, concerns have been raised regarding the absence of skilled professionals to handle medical tourism development as well as the increase in post-procedures complications and costs in the public health sector [17,61]. Concerning the positive relationship between medical tourism (MTI) and health expenditure, the results of our survey are also in line with several international ones. The studies of World Travel & Tourism Council [45] and Vovk et al. 2021 found a positive correlation between health expenditure and medical tourism. Similar research examining health expenditure and international tourism receipts in EU-27, from 2000 to 2019, showed that health expenditure has a positive long-term effect on tourism growth and an increase in health expenditure is associated with a rise in tourism receipts [61]. Numerous European studies indicate that promoting medical tourism enhances a country's tourism sector and boosts revenue and employment [16,62–65]. A few studies in Greece indicate that there is a direct effect between economic growth and healthcare expenditure and that the quality of health services in the host countries is a significant factor influencing tourist behavior [62–64]. Furthermore, several studies conducted in India, Malaysia and BRICS (Brazil, Russia, India, China and South Africa) countries indicate that the development of medical tourism has the potential to significantly boost economic growth in host countries by contributing to foreign exchange earnings, creating jobs and improving healthcare infrastructure and services [39,42,43]. Also, the study of Kim & Hyun conducted in Korea, in 2022, indicates that medical tourism may act as a basis for increasing tourism in general [32].

It should be noted that despite the associations reported by Vovk et al. 2021 among MTI with other socioeconomic indicators, such as healthcare funding and the political and civil development, there was not significant enough correlation found between the MTI countries' rankings and their GDP. Also, the same study states the MTI failed to show a cause-and-effect link with international tourism receipts. Also, another study conducted in Turkey found no

significant relationship between the growth of the health sector and inbound health tourism [66].

Taken into consideration the similarities and disparities found among countries regarding the macroeconomic indicators mostly impacting medical tourism, it seems that there is a consensus on their relationship but not clearly identified rather due to a variety of social, cultural and ethical factors that dominate in each country. Therefore, further research by country and globally is needed in order to obtain a more robust and comparative evidence. Despite all efforts to mitigate the limitations of the study, certain shortcomings persist. First, the study didn't encompass all 46 countries originally listed in the 2020 MTI ranking due to the lack of comparable data. Second, despite the use of only three macroeconomic indicators in our analysis, their importance is recognized across the international literature. Third, the study did not focus on other socioeconomic and cultural factors, which might consider in future studies.

CONCLUSION

Medical tourism development is driven by a combination of multiple macro and socioeconomic factors, including healthcare infrastructure and quality, costs, insurance coverage, accessibility, technology advancements, safety, political stability, ethics as well as the physical and regulatory environment of each country. Our results showed a positive correlation among countries' medical tourism indexing with health expenditure and no correlation with their economic growth and tourism receipts. It seems that any relations among the indicators under examination are not clearly identified and further empirical evidence is needed, considering the increasing economic significance of medical tourism.

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