



Article

# Improving the Economic Mechanism for the Development of Green Tourism in the Digitalization of the Economy (A Case Study of the Samarkand Region)

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**Abstract:** The modern trend of immediate expansion of the global tourism business, and the growing environmental issues, have aggravated the necessity to create sustainable and green tourism models in the framework of digital transformation. Although past research has examined either ecological factors of tourism, or the effects of digitalization, there is still a large gap in comprehending the combined economic processes that lead to the development of green tourism. The present study seeks to fill this gap by examining the connection between digitalization and green tourism, and especially tourism in the region and the world. The study uses a mixed-methodology, which integrates statistical analysis, comparative evaluation, and econometric modeling of major tourism regions worldwide using time-series data. The model analyses how the flows of the European tourism affect the global tourism flows using the example of the European tourism. The results indicate that growth in the American and African regions has complementary and substitution effects: the positive impact of the growth of the American and African regions on the European tourism is evident; however, in the Asia-Pacific and Middle East regions, the situation is rather competitive. This model exhibits a high level of explanatory power that confirms the high level of interdependence of global tourism markets. The findings indicate that digitalization, investment, and infrastructure development are essential factors that can be used to improve the efficiency and sustainability of tourism systems. The research also adds to the theoretical concept of the so-called smart green tourism, as it underlines the importance of connecting digital technologies with the practices of sustainable tourism. The implications are that policy makers must focus on digital innovation, environmental sustainability and cross border collaboration in order to enhance tourism competitiveness. Environmental indicators and cross-country comparisons should also be included in future studies to learn more about the development of green tourism in a digital economy.

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## 1. Introduction

Over the past few decades, tourism has become one of the most rapidly developing spheres of the global economy, playing a significant role in terms of GDP, job creation, and the development of the region. Specifically, green tourism (or ecotourism) has become particularly popular as it may provide the means of environmental sustainability and economic growth. The ecotourism market is projected to increase at a high rate according to the recent global estimates as a result of the increasing environmental awareness and

trends of digital transformation [1]. Simultaneously, the shift to the digital economy has redefined old forms of tourism by bringing of new tools like online platforms, smart services, and data-driven decision-making systems. Such combination of digitalization and green tourism opens new possibilities in the field of sustainable development, particularly in such emerging economies as Uzbekistan.

Theoretically, the concept of green tourism is directly connected with such notions as sustainable development, environmental economics, and resource efficiency. Scholars like D. Bell and A. Toffler had already in the early 1960s expressed the shift to post-industrial and information-based economies, which had later transformed into the notion of the digital economy [2]. In the meantime, scholars such as D. Fennell and M. Honey have discussed the concept of ecotourism as a paradigm that can balance sustainable stewardship of the environment and economic returns [3]. Combining these views, recent research indicates that digital technologies, including big data, artificial intelligence, and smart tourism systems, are crucial in improving the efficiency and appeal of green tourism destinations. Thus, the connection between digitalization and the green development of tourism can be interpreted through the prism of sustainable economic development based on innovation.

Although the literature on green tourism development has continued to increase, the literature still has some major gaps concerning the economic processes that underlie the emergence of green tourism in the digital transformation context. Past research has been more towards environmental issues of tourism or technological development in the tourism industry with little merging of the two aspects. As an example, the Uzbekistan regional studies have examined the tourism potential and development of infrastructure, yet, they usually do not include systematic approach to modeling the economic processes of green tourism [4]. Moreover, there is a lack of empirical studies on the effects of digitalization on the green tourism performance through econometric analysis. This underscores the necessity of an all-encompassing framework, which incorporates both theoretical understanding and empirical examination and policy-driven recommendations [5], [6].

In order to fill this gap, the current study will be a mixed-method study by integrating both qualitative and quantitative research methods. The methodology will entail the comparative analysis, statistical analysis, econometric modeling and SWOT analysis to determine the current situation as well as development trends of green tourism. Samarkand region is chosen as the case study because of its huge potential in tourism and strategic consideration in the policy of tourism development in Uzbekistan. Also, the research includes the assessment of experts and national and international secondary data to guarantee the validity of results. Such a methodological framework can be used to take a multidimensional analysis of the economic processes that affect the development of green tourism in the digital economy [7], [8], [9].

The anticipated outcomes of this study have both theoretical and practical implications. The research will focus on creating a better conceptual model of the economic process of green tourism and using digital tools and new methods like a smart green tourism. It is believed that the findings will prove that there is a positive correlation between digitalization and the effectiveness of green tourism development, especially with regard to resource efficiency, service quality, and tourist attraction. Policymakers, business stakeholders and researchers find the implications of this research relevant because it offers evidence-based recommendations to improve sustainable tourism practices. Finally, the study contributes to the overall aim of switching to a green and digital economy, reinforcing the role of tourism as a sustainable means of regional development [10], [11], [12].

## 2. Materials and Methods

This research involved a thorough mixed-methodology to assess and enhance the economic system of green tourism development in digitalization. The theoretical basis of green tourism and its connection with the digital economy has been analyzed with the help of logical and systematic analysis and compared with each other to reveal the differences in international practice and national experience. To evaluate the developmental trends of the tourism sector in Uzbekistan, especially in the Samarkand region, data collected by national statistical agencies, tourism committee and international organizations were used to evaluate the developmental trends. The econometric modeling was performed to determine and measure the relationship between the main determinants of the green tourism development such as the level of digital services, investment, infrastructure development, and flows of tourists, which allowed assessing their overall effectiveness. Moreover, SWOT analysis was employed to evaluate the strengths, weaknesses, opportunities and threats of development of regional green tourism in a systematic manner, and expert evaluation methods were used to integrate the knowledge of industry experts. The research object was economic organizations that worked in the green tourism industry and their performance formed the foundation of practical conclusions. This combined methodological approach guarantees the credibility of the results and the creation of an efficient economic mechanism to promote green tourism in the conditions of digital transformation, which corresponds to the requirements of high-quality research in the academic field.

## 3. Results and Discussion

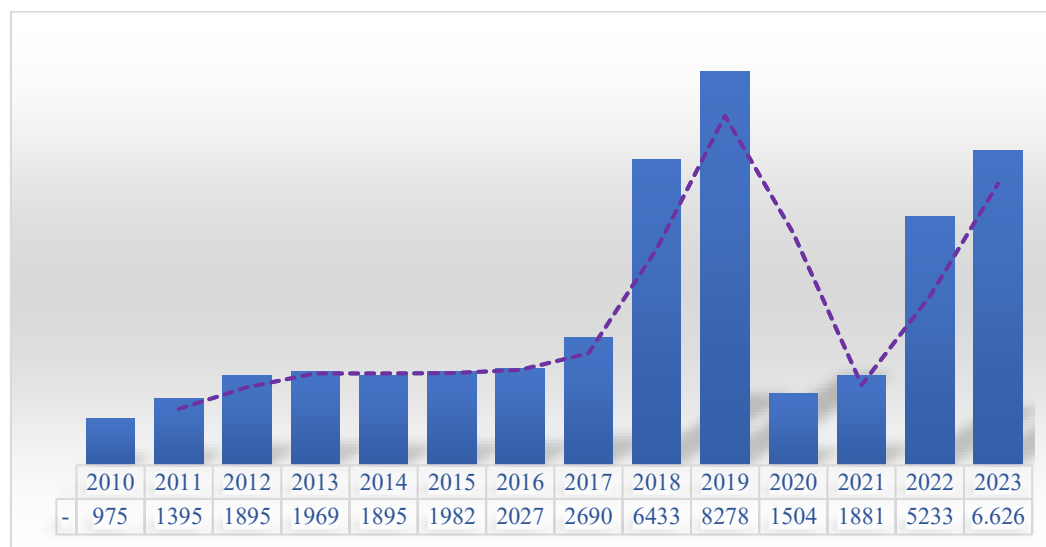
As To evaluate the current situation on the tourism industry in the Republic of Uzbekistan, as well as to design effective interventions that will help to improve the efficiency of sustainable tourism, a longitudinal analysis of crucial sectoral indicators was performed during a number of years. This method will enable a thorough analysis of tourism dynamics, structural developments, and growth trends that are critical in developing evidence-based policy responses [13].

Based on the analysis, the total foreign arrivals to Uzbekistan totaled 3,530.8 thousand persons in the January-June 2024, which is 13.3 percent more than the January-June 2023. This positive growth trend is a sign of a stable recovery and growth of the tourism industry, which is the increasing appeal of Uzbekistan as a global tourist destination. This type of growth may be linked to the enhancement of tourism facilities, diversification of tourism services, and the introduction of conducive government policies to facilitate both local and inbound tourism [14].

Further subdivision of the tourist arrivals in terms of the mode of transport shows significant structural features of tourist mobility. In the analyzed period, 655.8 thousand visitors (18.6%) have arrived on air transportation, 48.3 thousand (1.4) on railroad transportation and only 5.0 thousand (0.1) on automobile transportation. It is important to note that most of the tourists, 2,822.0 thousand people (79.9%), entered the country on foot. This distribution indicates that the tourist flows of the neighboring countries are significantly concentrated and this fact should be emphasized in the tourism development strategy of Uzbekistan as the cross-border mobility and regional tourism integration [15].

Moreover, the trend during the long-term period of the number of foreign visitors to Uzbekistan in 2010-2023 shows that the trend is mostly growing as shown in Figure 3.3. Although it experienced some short-term decreases as a result of global shocks, such as the COVID-19 pandemic, the industry has demonstrated resilience and high chances of recovery. This favorable trend highlights the success of the continued reforms and the prospects of further development, especially by means of incorporating digital technologies and popularizing green tourism projects.

On the whole, the results suggest that the tourism industry in Uzbekistan is entering the period of active growth, and its demand and structural trends change. These findings offer a concrete empirical basis on improving sustainable and green tourism policies and priorities, which should focus more on advancing digital infrastructure, enhance the quality of services, and enhance regional connectivity.



**Figure 1.** The trend in the number of tourists visiting the Republic of Uzbekistan over the period 2010–2023.

It is observed that the number of international tourists has been rising steadily between 2010 and 2019. Around 975 thousand tourists came to Uzbekistan in the year 2010 and in 2019 the number had increased greatly to 8.278 million. Such a significant increase demonstrates the reinforcement of Uzbekistan in the global tourist market and shows the success of reforms to liberalize visa policies, enhance infrastructure and the global image of the country.

Nonetheless, the tourism industry has declined drastically during 2020–2021 because of the COVID-19 pandemic that severely limited international travel. This led to a significant decline in tourists to 1.504 million in 2020. This has underscored the susceptibility of tourism industry to external shocks and global crises to which more resilient and diversified tourism models such as creation of sustainable and domestic tourism should be undertaken.

Since 2022, recovery in the tourism industry was also observed. In 2022, the figure of tourists was 5.233 million and in 2023, the figure rose to 6.263 million. An increase in tourist numbers can be attributed to the fact that travel restrictions are gradually being lifted, the international mobility is restored, and the supporting policies are introduced to restore the tourist industry. Also, growth in tourism services and ease of access have led to this recovery.

The econometric model shows that international tourism flows are very interdependent and relationships of complement and competition across the regions are evident. The estimated model has a very high explanatory power ( $R^2 = 0.991$ ) which indicates that the changes in the tourist arrivals of the Europeans are substantially explained by the changes in the other regional tourism markets. Specifically, the negative impact of Asia-Pacific region on Europe is statistically significant indicating that Asian tourism development may be substitutionary in nature whereby the rise in tourism activities in Asia may in part reduce tourist flows to European destinations. The same negative effect is recorded on the Middle East meaning that these areas can rival Europe

in attracting international tourists particularly on their alternative destinations and the upcoming tourism markets.

The analysis in this study is based on a **multiple linear regression model**, which examines the influence of global regional tourism flows on European tourist arrivals. The functional form of the model is specified as follows:

$$\text{Europe} = -34.88 - 0.99 \text{ Asia} + 3.05 \text{ America} - 2.10 \text{ MiddleEast} + 8.43 \text{ Africa}(1)$$

where:

**Europe** – dependent variable representing the number of tourist arrivals in Europe,

**Asia** – tourist flows in the Asia-Pacific region,

**America** – tourist flows in the American region,

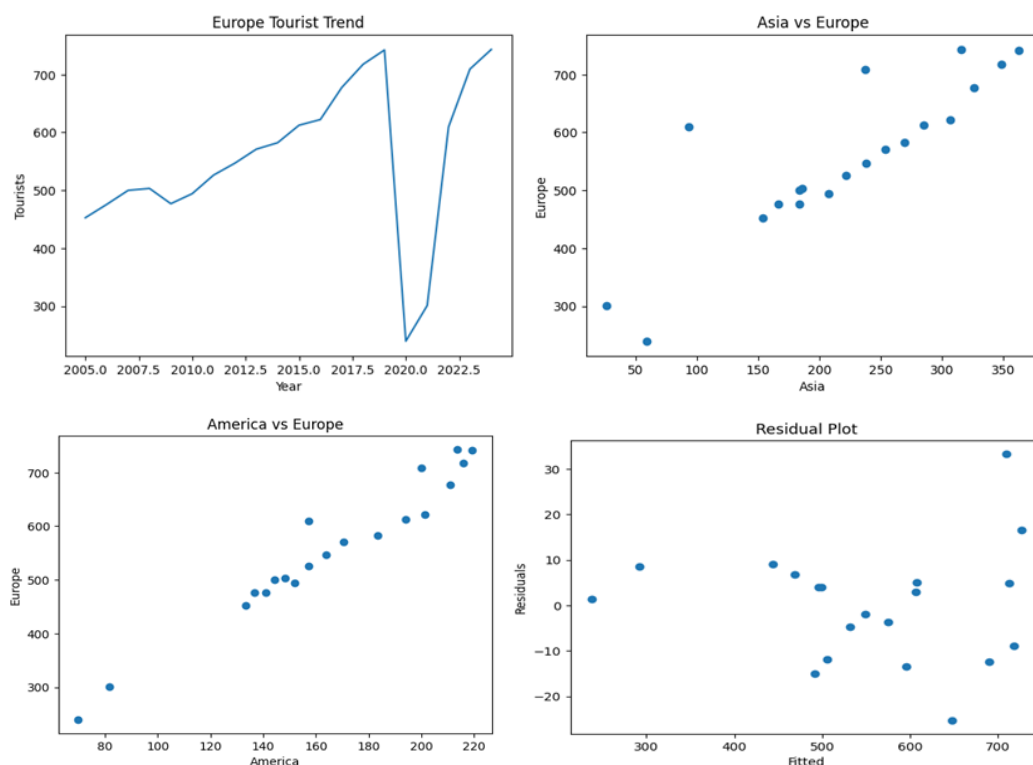
**Middle East** – tourist flows in the Middle East region,

**Africa** – tourist flows in the African region,

$\beta_0$  – intercept term,

$\beta_1, \beta_2, \beta_3, \beta_4$  – regression coefficients measuring the impact of each independent variable,

$\varepsilon$  – error term capturing unobserved factors.



**Figure 2.** “Econometric Analysis of Regional Tourism Interdependence and Its Impact on European Tourist Flows (2005–2024)”.

The econometric analysis indicates that global tourism flows are closely related to each other with competitive and complementary relationships evident among regions. The estimated model shows a very high explanatory power ( $R^2 = 0.991$ ), which implies that the changes in the number of European tourists arriving at the region are high, which can be attributed to the changes in other tourism markets in the region. The Asia-Pacific region, in particular, has a statistically significant negative impact on Europe indicating a substitution relationship where increased tourism in Asia would cause a partial diversion

of tourist flows in European countries. The same unfavorable effect is also being felt in the case of the Middle East which means that these areas will compete with Europe with regard to receiving international tourists particularly in alternative destinations and emerging tourism markets.

Conversely, the findings depict that there is a strong positive correlation between Europe and the American and African region. The positive and statistically significant coefficient of America indicates that growth of tourism in this region is behind the overall growth of global tourism demand which in turn is benefiting Europe. This is an aspect of a complementary relationship, where enhanced international mobility and international tourism activity have a positive impact on various regions. Equally, the high positive effect of Africa means that the development of tourism in this area is highly interrelated with the European flows of tourism, which may be explained by the geographical proximity, common routes of travel, and the multi-destination travel patterns.

On the whole, the results prove that global tourism is an integrated system and not a complex of regional markets. The fact that both substitution and complementary effects exist demonstrates the complexity of the international tourism dynamics. In addition, the analysis highlights the sensitivity of tourism flows to the events around the world, as the tourism flows dropped significantly during the COVID-19 period and the following recovery phase. These findings highlight the significance of strategic positioning, diversification and cross-border collaboration in tourism development policy especially in the environment of sustainable and green tourism in a fast-paced digitalized global economy.

#### 4. Conclusion

As this paper has shown, the emergence of green tourism in the framework of digitalization is a result of a multifaceted interplay between economic, tech, and geographical factors. The empirical results, complemented by econometric analysis, point to the fact that global tourism flows are highly interrelated, with complementary and substitution effects of regional flows. The impact of the American and African tourism markets on European tourism, in particular, as the positive factor demonstrates the growth of the global demand and integrated tourism patterns, whereas the negative effect of the Asia-Pacific and Middle East regions indicates the growing competition of the new destinations. Moreover, the fact that the model can explain a large portion of the changes in tourism development confirms that external regional processes are major contributors to the development, along with internal processes, including investment, infrastructure, and digital transformation. These findings suggest that successful tourism policies must aim at improving digital infrastructure, sustainable (green) tourism, and reinforcing international cooperation in order to stay relevant in the global market. Meanwhile, the results underline the necessity of using a so-called smart green tourism strategy that allows considering both innovation and environmental sustainability. In future studies, it is suggested to broaden the econometric model with the addition of other variables like environmental indicators, use of digital platforms, and policy interventions, and undertake comparative cross-country analysis to gain further insights on the dynamics of green tourism development in various economic settings.

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