BUILDING THE FUTURE OF TOURISM

INTERNATIONAL HANDBOOK OF SUSTAINABLE TOURISM ECONOMY

THEORIES, PRACTICES AND APPLICATIONS

EDITED BY

SURANGA SILVA, ANUKRATI SHARMA, SIDAR ATALAY ŞIMŞEK & PUWANENDRAM GAYATHRI

International Handbook of Sustainable Tourism Economy

BUILDING THE FUTURE OF TOURISM

Series Editor: Anukrati Sharma

The world is entering the Third Millennium in which great changes are expected in all areas of human interest, life, and activity. These changes have been brought on by past and present man-made events, which have had both positive and negative consequences. The coming millennium will be marked by significant social, political, demographic, and technological changes and will definitely differ from the last century. The future will bring more leisure time, a higher standard of living, and a better quality of life for us all. This series examines recent and the most probable changes and gives a wide range of visionary insights as well as operational takeaways

International Handbook of Sustainable Tourism Economy: Theories, Practices and Applications

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Introduction

Suranga Silva, Anukrati Sharma, Sidar Atalay Şimşek and Gayathri Puwanendram

The *International Handbook on Sustainable Tourism Economy* offers a multidimensional and critical exploration of tourism as a driver of sustainable development. Recognizing tourism as one of the most dynamic sectors in the global economy, the book delves into its intersections with environmental sustainability, economic resilience, social equity, technological innovation, and cultural preservation. This volume emphasizes that while tourism can generate employment, drive innovation, and contribute to national GDPs, it also carries risks of environmental degradation, cultural commodification, and socioeconomic inequality. Therefore, sustainable tourism must be approached not only as an economic agenda but as a holistic strategy aligned with the United Nations SDGs.

Divided into five thematic sections, the book begins with foundational perspectives on economic models and strategic management for sustainable tourism. This section includes empirical studies such as the application of Toda-Yamamoto causality analysis in Poland, revealing significant relationships between tourism, health expenditure, economic growth, and CO_2 emissions. Chapters in this part advocate for the integration of sustainability into strategic tourism management, with a strong emphasis on stakeholder engagement, planning, and alignment with global sustainability agendas. Strategic frameworks grounded in circular economy principles are proposed to guide long-term planning that supports resilience, ethical responsibility, and community well-being.

The second section expands on the concept of the circular economy in tourism, examining how waste reduction, resource regeneration, and value chain optimization can redefine sustainability practices. Through bibliometric reviews and practical case studies—such as a community-based agri-food tourism initiative in the Philippines—this section highlights the importance of community participation and rights-based approaches. It makes a compelling case for transitioning from linear tourism models to circular systems that are regenerative and inclusive, drawing attention to the necessity of cross-sector collaboration and value chain reform.

Technological innovation is the focus of the third section, which explores how digital tools, big data, and AI can revolutionize sustainable tourism. Chapters demonstrate how emerging technologies—from geospatial mapping and Internet

of Things (IoT) to AI-driven analytics—enhance data-informed decision-making, improve operational efficiency, and reduce tourism's ecological footprint. The section also addresses ethical implications of digital transformation, such as algorithmic bias and data privacy in geomarketing, urging a governance framework that balances innovation with ethical accountability. Case studies from China and other regions show how new business models driven by technology and entrepreneurship foster sustainable tourism practices and community engagement.

Integration, networking, and human resource development form the crux of the fourth section. It underscores the pivotal role of stakeholder collaboration in promoting sustainable outcomes. Digital platforms and smart tourism initiatives are presented as tools to enhance cultural heritage conservation and visitor engagement, while chapters on human resource development stress the need for sustainability-oriented training, recruitment, and performance evaluation. Bibliometric studies reveal shifting competency demands in the sector, advocating for capacity building, interdisciplinary learning, and professional development to create a tourism workforce that is both adaptable and environmentally conscious.

The final section addresses emerging challenges and future directions in sustainable tourism. Topics include inclusive growth, equitable labor practices, cultural heritage preservation, and responsible tourism alternatives. A case study on nautical tourism in Sri Lanka highlights the sector's potential for economic growth when supported by strategic infrastructure and policy reforms. Meanwhile, chapters explore how gastronomy, heritage photography, and alternative tourism models contribute to cultural sustainability and economic diversification. GIS-based assessments of public spaces in Colombo underscore the role of green infrastructure in promoting urban wellness tourism. Other contributions investigate how women's language practices and participation in tourism help reshape narratives of inclusion and empowerment. The next chapter is explain a conceptual framework linking built environments to sustainable tourism development, proposing participatory and inclusive planning to ensure environmental and social benefits. The section concludes with comprehensive evaluation of emerging tourism approaches developed within the framework of sustainability.

Altogether, the *International Handbook on Sustainable Tourism Economy* presents a timely and rigorous exploration of tourism's evolving role in global development. Bridging theoretical frameworks with empirical research, the book advocates for reimagining tourism as a transformative force that transcends profit-making to address climate action, social justice, cultural preservation, and community empowerment. It is an essential resource for academics, policymakers, and practitioners seeking to align tourism development with the values of sustainability, inclusion, and resilience.

Section 1

Introduction to the Sustainable Tourism Economy

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Chapter 1

Toda & Yamamoto Causality Analysis Between Tourism Arrivals, Health Expenditure, Economic Growth, and CO_2 Emissions: Evidence From Poland[1]

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Abstract

This study investigates the causal relationship between tourism arrivals, health expenditure (HE), economic growth (EG), and CO_2 emissions in Poland through annual data covering 1995–2022. The authors perform the Toda & Yamamoto causality test to explore the causal relationship between variables. The empirical findings show a feedback causal relationship between HE and CO_2 emissions, tourism arrivals and CO_2 emissions, tourism arrivals and EG, and EG and CO_2 emissions, and one-way from tourism arrivals and EG to HE in Poland. These findings may suggest that along with tourism arrivals, environmental degradation causes an increase in HE.

Keywords: Tourism; health expenditure; economic growth; CO_2 emissions; environmental degradation; Toda & Yamamoto causality

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Introduction

Tourism is crucial for countries as it provides external sources and contributes to economic development. Furthermore, tourism benefits include fracture, wealth, diverse income, job creation, environmental quality, social benefits, and business opportunities (Travel Tractions Marketing, 2024). The World Travel & Tourism Council (WTTC) (2024) report emphasizes that the travel and tourism industry contributed 9.1% to the global GDP and invented 27 million new employments globally (WTCC, 2024). The United Nations (UN) sustainable development goals (SDGs) underline the significance of sustainable tourism, which helps to establish new workplaces and promotes local heritage and products (United Nations, 2024). Although the tourism sector provides comprehensive benefits for all countries, it also causes some damage. For instance, it raises health expenditure (HE) through increasing CO_2 emissions (Atalay Şimşek et al., 2025). In other words, tourism activities increase CO_2 emissions, resulting in rising HE (Fan et al., 2022). The relevant literature has often studied the relationship between tourism and the deterioration of the environment. However, the effect of tourism on HE has not been investigated intensively. Furthermore, there is a strong connection between economic growth (EG) and HE. Scholars have focused on the role of health in EG since the 1990s based on endogenous growth theory (Bedir, 2016). They emphasize that HE is closely linked to EG in various ways. For example, the human capital approach emphasizes that health is a crucial part of human capital that promotes EG (Esen & Çelik-Keçili, 2022). The health-led growth theory states that health investments encourage labor productivity, leading to EG (Esen & Çelik-Keçili, 2022; Mushkin, 1962).

Poland is one of the most attractive tourist destinations in Europe. In particular, following its accession to the European Union (EU), the tourism flux in Poland has risen. Being a part of the EU stimulates new tourism opportunities and causes the adoption of new investments in tourism. According to Statista (2023) data, around 70 million international tourists arrived in Poland in 2022, which increased to 78.6 million in 2023. Moreover, more than 92 million international tourists are expected to visit Poland in 2029.

The tourism sector in Poland is getting attention day by day. In the last three decades, it has been evident that tourism is one of the crucial factors for the Polish economy. As depicted in Fig. 1.1, tourism shows an upward trend. The number of total arrivals at tourist accommodation establishments was around 13.5 million in 1995 and increased to more than 35 million in 2019. Due to the COVID-19 pandemic, it sharply declined to 17.9 million in 2020 and recovered following COVID-19, increasing to more than 34 million in 2022. Moreover, CO_2 emissions per capita in Poland declined from 1996 to 2002 (Fig. 1.2). Following this date, it fluctuated slightly and reached 8.10 (tons) in 2022.

Fig. 1.3 illustrates the HE trend in Poland from 1995 to 2022. This indicates a slow increase in HE. The share of HE was 4.92 of GDP; it has slightly increased and reached its highest value, 6.68%, in 2022. Besides, the Polish economy has experienced increasing EG in the last three decades. As depicted in Fig. 1.4, from

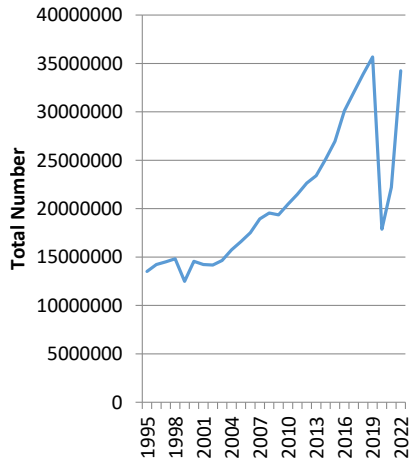


Fig. 1.1. Total Tourist Arrivals. *Source:* Eurostat (2024).

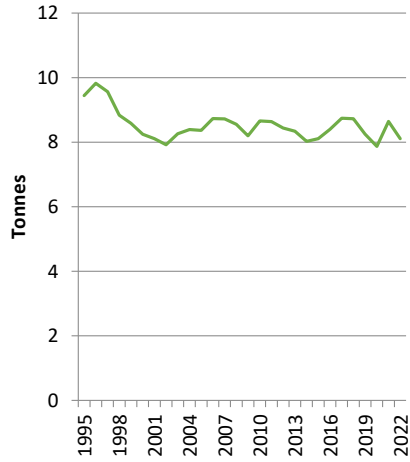


Fig. 1.2. CO_2 Emissions per Capita. *Source:* Our World in Data (2024)

1995 to 2020, GDP per capita rose. However, it dropped in 2020, and after 2020, it increased from US$14.774 to US$17.178.

Considering tourism's multidimensional positive effect, whether tourism can adversely affect society should be searched. Nowadays, the effects of economic activities are not one-dimensional. In addition, along with globalization, countries' integration into the world economy continues rapidly and deeply. Hence,

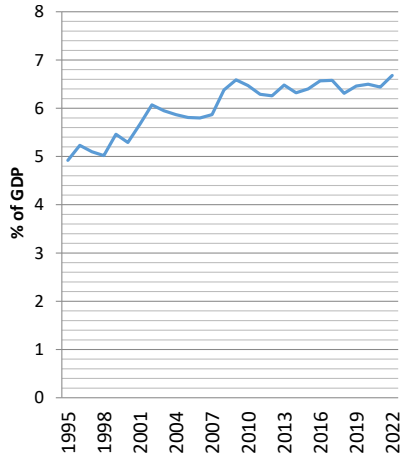


Fig. 1.3. HE in Poland: 1995–2022. *Source:* OECD (2024).

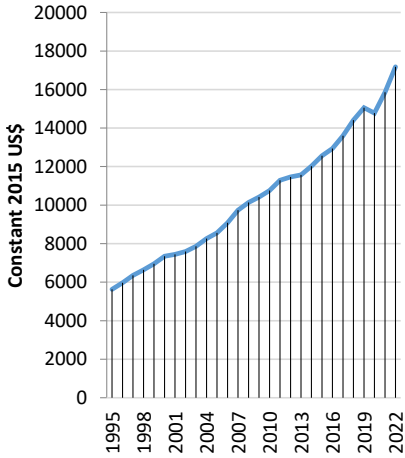


Fig. 1.4. GDP per Capita in Poland: 1995–2022. *Source:* World Bank (2024).

several mechanisms can emerge affecting HE. According to our experience, less empirical work has investigated the association between, tourism, HE, EG, and CO_2 emissions. The current paper aims to fill the gap in the existing studies by examining the possible causality between these variables.

The paper was planned according to the scheme below: Part 2 briefly explains the literature review. Part 3 contains a description of the data, model, and

method. Part 4 presents the research findings, and finally, Part 5 provides conclusions of the study with recommendations.

Literature Review

Studies on the nexus between EG and environmental degradation (ED) have been explored profoundly and comprehensively in the relevant literature. The theoretical background of EG and the destruction of the environment is based on the Environmental Kuznets Curve (EKC) hypothesis (Alvarado & Toledo, 2017). Furthermore, another approach to the nexus of EG and ED links energy consumption (particularly fossil energy) and EG (Ozcan et al., 2020). Hence, it is expected that EG causes ED since production methods are based on primary energy sources. Moreover, the function of tourism in EG and ED is also a prominent point. Specifically, as demonstrated by several studies, tourism positively affects EG. However, increasing tourism activity causes transportation and energy demand, resulting in ED (Aslan et al., 2021). Due to the direct link between tourism and ED, health problems inevitably occur in tourism-attracting nations. Therefore, the adverse environmental effects of tourism activities trigger increased HE (Fan et al., 2022). Despite the expectation of a relationship between EG, destruction of the environment tourism, and HE, the existing literature provides different and conflicting findings caused by data, samples, and methodologies. Table 1.1 exhibits a literature summary regarding the variables used in our study.

The existing literature includes various studies on EG and CO_2 emissions, tourism and CO_2 emissions, HE, and EG. However, there is a lack of research investigating the correlation between tourism, HE, EG, and CO_2 emissions. Hence, our study intends to fill this gap by exploring the relationship among these variables in the context of Poland.

Data, Model, and Methodology

Data

This paper focuses on revealing the causal relationship between tourism arrivals, HE, EG, and CO_2 emissions in Poland by using annual data from 1995 to 2022. Table 1.2 provides the variables used in the study with their definitions, units, and sources.

Model Specification

The empirical model of the study to reveal the causal relationship between variables is constructed as follows:

$$\mathrm{HE}_t = f(\mathrm{TOUR}_t, \mathrm{GDP}_t, \mathrm{CO2}_t) \quad [1]$$

where HE is the health expenditure, GDP is the gross domestic per capita with constant US$2015 representing economic growth, TOUR is the tourism arrivals,

Table 1.1. Literature Summary.

Study	Sample, Period	Methodology	Result
Studies on EG-CO_2 Nexus			
Anwar et al. (2020)	Far East countries, 1980–2017	Fixed Effects (FE)	EG increases CO_2.
Li and Haneklaus (2021)	China, 1990–2020	ARDL	U-shaped association between EG and CO_2.
Adebayo and Akinsola (2021)	Thailand, 1971–2018	Wavelet coherence, Granger and the Toda & Yamamoto (T&Y) causality	Causality: EG → CO_2
Chen et al. (2023)	Bangladesh, 1972Q1–2020Q4	ARDL bounds test, FMOLS, Granger causality	EG increases CO_2. Causality: EG → CO_2
Piłatowska et al. (2020)	Spain, 1970–2018	TVAR	A positive association between EG and CO_2.
Studies on Tourism, CO_2, and EG Nexus			
Ghosh (2022)	100 countries, 1995–2014	FMOLS and DOLS, MG, PMG, Correlated Effects MG	Tourism causes to CO_2
Zhang and Zhang (2021)	30 Chinese provinces, 2000–2017	Cointegration tests, VECM Granger causality	Tourism ↔ CO_2, Tourism ↔ GDP
Satrovic and Muslija (2020)	10 countries, 1995–2014	PVAR	Tourism ↔ CO_2
Rehman et al. (2021)	Pakistan, 1991–2019	NARDL, Granger Causality	Negative shocks of tourism and GDP influence CO_2; Tourism → CO_2; GDP ↔ CO_2; Tourism ↔ GDP