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SUSTAINABLE TOURISM INDICATORS AS DRIVERS OF CHANGE: CASE STUDIES OF THE SELECTED EU COUNTRIES

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Abstract

The transformation of tourism into a more sustainable sector aligned with both economic and environmental goals has become a priority worldwide. This transition requires a stable measurement framework capable of identifying economic, environmental and social aspects of tourist activities and actors. The paper examines sustainable tourism indicators as drivers of change, structured into three pillars of sustainability, and their relationship to the Sustainable Development Goals. The measurement of sustainable tourism is presented through the case studies of Italy, Austria, Spain, and Sweden. Aiming to assess the extent to which sustainability is incorporated in the national tourism systems of the selected countries, the case studies address micro-destinations, tourism and travel influence on transport emissions, the environmental pressures from tourists' consumption, and compare these data with traditional tourism indicators. The findings reveal that while all the analyzed countries demonstrate progress towards sustainable tourism, significant disparities exist between tourist growth and environmental protection.

Key Words: sustainable tourism, indicators, EU countries, transformation, sustainability.

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Introduction

Sustainable tourism has remained a central topic in policy discussions for more than three decades. To inform decision-makers across both public and private sectors, extensive research has been conducted and numerous documents have been produced by international organizations. While the discourse on sustainable development has evolved, the foundational principles established in the 1980s and 1990s remain central to current approaches (Strippoli et al., 2024; Velasco-Muñoz et al., 2025; Radivojević et al, 2023).

According to the World Tourism Organization – UN Tourism (2026), sustainable tourism should respond to the requirements of tourists, environment, local communities, the industry, while considering its overall implications for current and future generations. Tourism serves as a compelling example, given that it inherently integrates economic, environmental, and social aspects at both local and destination levels. Consequently, tourism presents a significant opportunity to demonstrate the potential of integrated sustainability-based approaches. However, substantial challenges persist in implementing contextually relevant solutions across the diverse spectrum of the tourism domain (UNWTO, 2021; Kaszás et al., 2022; Mansi et al., 2025).

Due to the diverse direct and indirect impacts and stakeholders, an integrated approach to tourism development, management, and monitoring is essential. As such, sustainable tourism is closely linked to the Sustainable Development Goals (UN, 2026) and can contribute directly or indirectly to all of them. According to Punzo et al. (2022), sustainable tourism targets are reflected in enforcing policies in charge of job creation and local culture and products promotion, creating instruments to measure sustainable development implications of tourism, enlarging economic benefits derived from the use of marine resources, and conserving biodiversity and the environment through reduction in waste and resource consumption.

Therefore, advancing practical methods for measuring tourism sustainability, based on a comprehensive set of indicators, is essential to assist policymakers in evaluating alignment of tourism development with the SDGs and integrating community needs with the sustainable management of natural heritage and cultural resources. Thus, the study aims to explore the established sustainable tourism indicators and attempt

at their measurement, through the case studies of the selected EU countries: Spain, Italy, Austria and Sweden.

Sustainable Tourism Indicators

Significant advancements have been made in academic research on sustainable tourism (Ruhanen et al., 2015), shifting from a narrow environmental focus toward a holistic approach that incorporates economic, social, and institutional dimensions (Choi & Sirakaya, 2006; Ghisellini et al., 2016; Ko, 2005). Sustainable tourism should adhere to the following principles: utilize environmental resources efficiently, recognizing them as fundamental components of tourism development; respect the socio-cultural authenticity of host communities; ensure sustainable, long-term activities that provide socio-economic benefits to all stakeholders (UNWTO, 2023b). Consequently, a robust debate has focused on developing indicators that would provide a solid information base for monitoring tourism's contribution to achieving the Sustainable Development Goals (UNWTO, 2004, 2005).

The establishment and implementation of a comprehensive set of sustainable tourism indicators, based on relevant and reliable data, is essential for understanding the economic, social, and environmental dimensions of tourism's contribution to sustainable development. Indicators of sustainable tourism need to be developed and implemented in a coordinated way across countries to effectively communicate outcomes, compare results, recognize best practices, and integrate tourism into sustainable development policies (Rodríguez et al., 2020; UNWTO, 2004; Stanišić et al, 2022).

The World Tourism Organization, in cooperation with other relevant international organizations, has proposed a common framework of indicators to measure tourism's impact across different dimensions at national and sub-national levels. This set of indicators aims to facilitate the measurement of tourism sustainability and to serve as a foundation for developing a standardized core dataset for international reporting on tourism sustainability (UNWTO, 2023a). Accordingly, the four groups of indicators are (Table 1):

- *General pressure indicators*, focused on the overall implications of visitor flows that generate the benefits and challenges surrounding tourism's sustainability;

- *Economic indicators*, related to the economic performance and outcomes of tourism activities;
- *Environmental indicators*, reflected in the environmental dimension of tourism activity, such as ecosystem, energy, water, and GHG emissions;
- *Social indicators*, associated with the social consequences of tourism on various stakeholders, including visitors, host communities, suppliers and authorities.

Table 1: *Core set of sustainable tourism indicators*

General pressure indicators	Social indicators
Visitor length of stay Visitor intensity Visitor density Inbound tourism dependency Tourism seasonality	Visitor satisfaction Host community sentiment Decent work Women empowerment Accessibility Governance
Environmental indicators	Economic indicators
Energy use Water use Water resources GHG emissions Solid waste flows Wastewater Tourism related ecosystems Biodiversity	Visitor expenditure Tourism economic contribution Tourism economic structure Tourism business structure Employment in tourism Accommodation occupancy Tourism investment Government tourism related transactions

Source: *UNWTO (2023)*

Although tourism is clearly noted in three SDGs (SDG 8, SDG 12, and SDG 14), there is a strong link between tourism indicators and all sustainable development indicators, as evidenced by direct contribution of tourism to sustainable development (UN, 2026; UNWTO, 2023a; UNWTO, 2023b):

- Tourism plays an important role in poverty reduction by creating employment opportunities in the tourism sector, supplying goods and services to visitors, establishing different forms of tourism businesses, and investing tourism-generated taxes and fees in infrastructure or in poverty-reduction initiatives (*SDG1 – No poverty*).
- Tourism encourages the sustainable production of agricultural products and their supply to tourism businesses and visitors, thereby integrating them into the tourism value chain (*SDG2 – No hunger*).
- The positive impact of tourism on health and well-being has become increasingly apparent, particularly during the COVID-19 pandemic,

due to the sector's reliance on contact-intensive services. Destinations that maintain high standards of cleanliness and hygiene are perceived more favorably by visitors, helping restore traveler confidence during public health crises. Furthermore, tourism-generated tax revenues can be allocated to enhance health care and related services within local communities (*SDG3 - Good Health and Well-Being*).

- Tourism has the potential to support quality education by demanding competent, skilled workers, encouraging people to enhance their knowledge, creating opportunities for career development, and, as an important stakeholder, being involved in creating relevant, high-quality study programs (*SDG4 - Quality education*).
- As a sector with the highest women's participation rate, tourism is a good ground for women to use their full potential and be engaged, not only in lower-skilled, but in all activities (*SDG5 – Gender equality*).
- Efficient water use in tourism activities, safety protocols, effective wastewater management, pollution control, and advanced technologies are vital to protecting water resources (*SDG6 – Clean water and sanitation*).
- Even though it is an energy-intensive sector, tourism can lead the transition to renewable energy and prioritize efficiency throughout its operations (*SDG7 – Affordable and clean energy*).
- Facilitating employment opportunities and contributing to the GDP, tourism, as one of the most developed sectors, is considered a driver of economic growth (*SDG8 – Decent work and economic growth*).
- Relying on public and private infrastructure, tourism can support investments or public policy upgrades towards more resource-efficient and sustainable outcomes (*SDG 9 – Industry, innovation and infrastructure*), as well as reduce inequalities by developing local and rural communities and engaging the local population and different stakeholders in tourism activities (*SDG 10 – Reduced inequalities*).
- Investment in green infrastructure is expected to create smarter and greener cities for residents and tourists alike. Tourism can facilitate the development of urban infrastructure and accessibility, as well as the preservation of cultural and natural heritage, which are critical assets for the sector (*SDG 11 – Sustainable cities and communities*).
- As one of the biggest users of natural resources, tourism needs to shift to a more sustainable consumption and production system (*SDG 12 - Responsible consumption and production*).

- Given that tourism both impacts and is affected by climate change, certain measures in accommodation and transport should be part of the global response to climate change (*SDG 13 - Climate action*).
- A healthy marine ecosystem is a precondition for the development of coastal and maritime tourism, as rich biodiversity and natural heritage are crucial for most tourist destinations. Therefore, tourism plays a crucial role in promoting a blue economy and the sustainable use of marine resources (*SDG14 - Life below water*), as well as in supporting biodiversity conservation and providing alternative income for local communities (*SDG15 - Life on land*).
- Tourism can advance human rights and access to justice by supporting host communities and tourism enterprises that implement ethical, sustainable practices. Effective planning and coordination are necessary to reduce the adverse effects of tourism activities on public security within destinations (*SDG16 – Peace, justice and strong institutions*).
- Due to its cross-sectoral nature, tourism strengthens partnerships between private and public sectors and facilitates collaboration among international, national, regional, and local stakeholders to achieve the SDGs and other shared objectives (*SDG17 – Partnership*).

Measuring sustainability of tourism: case study approach

Tourism is a sector that both depends on and influences the environment, natural resources, the economy, and a wide range of stakeholders. This interdependence highlights the necessity for a comprehensive approach to tourism measurement. Given that the available data on tourism is mostly economic in nature, there is a need to expand it with social and environmental data, as well as with economic measures focusing on sustainability.

The following case studies of the selected EU countries represent an attempt to combine all dimensions of sustainability (UNWTO, 2020; UNWTO, 2022; UNWTO, 2023a, UN Tourism, 2026):

Austria

The *economic contribution* of tourism in Austria, reflected in the share of tourism in total GDP, was 2.6% in 2021 (compared to 5.3% in 2019), while the number of people employed in tourism also decreased in the same period (from 451,200 in 2019 to 389,400 in 2021). Due to COVID-19, international tourism receipts decreased by 25% and international

tourist arrivals by 16%, while international tourism expenditure increased by 62% in 2021 compared to the previous year. Nights spent at tourist accommodation changed from 36,504 in 2019 to 26,674 in 2021, while establishments, bedrooms and bed-places in tourist accommodation had a positive change (from 21,951 in 2019 to 22,695 in 2021).

From the *environmental perspective*, in 2019, the tourism industry accounted for 1.3% of Austria's total final energy consumption. In the accommodation and restaurant sectors, electricity accounted for 53% of total energy use, while oil products and natural gas accounted for 26%. The proportion of renewable energy sources in these sectors reached 54%, up 5% from 2017.

From a *social perspective*, the tourism perception index as a personal opinion regarding tourism in Austria and its impact on the overall economy, labor market, agriculture, and environment, reached 78 points on a scale from 0 to 100, consistent with the result recorded before the COVID-19 crisis.

Spain

Sustainability challenges related to tourism development frequently occur in specific, localized areas within a country. Therefore, locally generated data are crucial for effective destination management and for analyzing the impacts and pressures on the environment, society, and resident populations. Spain is a country with a developed tourism sector that has contributed around 6% to GDP over the last few years and employs more than 2.5 million people. However, tourist destinations are not equally distributed over the country. A supply-side methodology was used to identify and map 47 micro-destinations in the Canary Islands, Spain, each characterized by a high concentration of tourism establishments. In 2021, these areas received 35.9 million visitors, accounting for about 90% of overnight stays in hotels and apartments, while covering only 118 km², or 1.6% of the region. Focusing on these micro-destinations offers clearer insight into sustainability challenges, as most tourism-related issues are concentrated there.

Italy

Tourism in Italy contributes over 5% to the national GDP and accounts for 16.4% of ground-level ozone emissions, 15.5% of acidification

emissions, and 5.9% of greenhouse gas emissions. A pilot study estimating emissions from residents' travel between 2015 and 2019 indicates that, among available transport modes such as air, train, waterway, motorized private vehicles, and coach or bus, the majority of residents choose cars as their primary means of transportation. Over 70% of personal trips are undertaken by car, and within the private road transport category (including rental cars, private cars, motorhomes, caravans, motorbikes, scooters, and others), private cars represent 90% of trips. Cars are the main source of pollutant emissions, contributing 70.8% of PM_{2.5} (fine particulate matter) and 94.9% of VOCs (volatile organic compounds) in 2019. Among other private road vehicles, campers, caravans, and vans are the most significant contributors to PM_{2.5} (26.2%) and nitrogen oxides (18.6%) emissions. Although tourism-related emissions fluctuate annually, there is an overall upward trend, primarily driven by the increasing number of trips. In contrast, the smallest increases among pollutants are observed for carbon monoxide (CO) and VOCs, with rises of 29.5% and 27.8%, respectively, in 2018, and 5% for CO and 2.6% for VOCs in 2019.

Sweden

Sweden aims to provide the next generation with a society where major environmental issues are resolved. However, measuring the varied environmental impacts of national consumption, particularly those occurring outside Sweden, remains challenging. These effects are often spread across complex and dynamic global supply chains. In 2019, tourism accounted for 18 million tons of carbon dioxide equivalents, with 55% of these emissions occurring beyond Sweden's borders. This is a smaller share than the Swedish economy as a whole, where 63% of consumption-based emissions are linked to foreign production. Notably, between 2015 and 2019, tourism-related emissions dropped by 7%, largely due to cleaner production in Sweden. Both indirect emissions from the production phase and direct emissions from the use phase within Sweden declined by 12%. Emissions generated abroad by Swedish tourism fluctuated but decreased by 3% over the same period. The current model cannot accurately measure emissions from international aviation, which affects total greenhouse gas estimates. Further research is needed to improve data on allocating international tourism transport emissions at the national level.

Discussion and Conclusion

Sustainable tourism indicators play a crucial role in operationalizing the concept of sustainability by translating broad policy objectives into measurable and comparable metrics. They enable continuous monitoring of tourism's economic benefits alongside its environmental pressures and social impacts, thereby supporting evidence-based decision-making. By integrating indicators across different dimensions and spatial levels, policymakers can identify trade-offs, detect emerging risks, and adjust strategies in a timely manner. Moreover, standardized indicator frameworks facilitate international comparability and benchmarking, allowing countries and destinations to learn from best practices and track their progress toward the SDGs.

The case studies confirm that sustainable tourism indicators are vital tools for guiding the transformation of tourism systems toward alignment with sustainability principles. However, they reveal substantial differences in the capacity of the analyzed EU countries to reconcile tourism growth with sustainability objectives, thereby illustrating the uneven nature of tourism transformation across Europe. While all four countries recognize tourism as a strategic economic sector, the experiences of Austria, Spain, Italy, and Sweden demonstrate that progress remains uneven, especially in balancing economic performance with environmental and social outcomes. Austria and Sweden demonstrate relatively stronger environmental governance capacity, higher energy efficiency, and better integration of sustainability objectives into tourism policy. Austria's renewable energy share in tourism-related sectors (54%) and Sweden's 7% reduction in tourism emissions between 2015 and 2019 indicate measurable progress toward decarbonization. By contrast, Spain and Italy remain characterized by tourism intensity models associated with higher environmental and spatial pressures. Spain's concentration of 35.9 million tourists within 1.6% of regional territory highlights extreme overtourism dynamics, while Italy's dominance of private car transport and high pollutant emissions reveal structural weaknesses in sustainable mobility transitions. The analysis also demonstrates that tourism sustainability cannot be evaluated exclusively through economic contribution indicators such as GDP share or employment levels. Spain and Italy achieve substantial economic gains from tourism, yet these benefits are accompanied by significant environmental costs and growing sustainability risks. Austria and Sweden, although also economically dependent on tourism, exhibit stronger evidence of policy coordination

and environmental adaptation. Furthermore, the analyzed countries reveal different dominant sustainability challenges: Austria faces climate vulnerability in alpine ecosystems, Spain struggles with territorial concentration and carrying-capacity exceedance, Italy confronts transport-related emissions and mobility dependence, while Sweden faces methodological and accounting challenges related to transboundary emissions.

These findings confirm that sustainable tourism transformation is not a uniform process but a context-dependent transition shaped by geography, energy systems, governance quality, transport structures, tourism intensity, and policy integration. The case studies further demonstrate that sustainability indicators should function not only as descriptive statistical measures but also as strategic governance instruments capable of identifying systemic vulnerabilities, evaluating policy effectiveness, and guiding structural transformation pathways. At the same time, differences in indicator methodologies, spatial scales, and environmental accounting systems continue to limit cross-country comparability within the EU. Strengthening harmonized sustainability indicator frameworks therefore remains essential for improving evidence-based tourism governance and supporting the transition toward more resilient and sustainable tourism systems aligned with the SDGs.

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