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Innovative Approaches to Sustainable Tourism Assessment in Academic Cities of the Silesian Voivodeship

Abstract: This study aims to explore sustainable tourism management strategies by integrating qualitative and quantitative methodologies. The main objective of the study is to develop and verify an innovative system of sustainable tourism indicators for academic cities in the Silesian Voivodeship based on the European Tourism Indicator System (ETIS) and the Multi-Criteria Decision Analysis (MCDA) approach. The study involves three main stakeholder groups: local residents, tourists, and experts representing travel agencies and academia. The research was conducted between April and September 2024 in selected academic cities of the Silesian Voivodeship, combining survey-based quantitative data and qualitative interviews with key stakeholders. The research seeks to provide a comprehensive understanding of stakeholder perceptions and behaviors, assess the effectiveness of sustainable tourism policies, and identify emerging trends in tourist behavior and preferences. The study is grounded in the principles of sustainable tourism, emphasizing the balance between economic, environmental, and socio-cultural factors. It builds on integrated destination management and community-based tourism theories, highlighting the role of stakeholder collaboration, policy coherence and adaptive management. A mixed-methods approach is employed, combining in-depth interviews, focus groups, participant observation, and surveys. Qualitative data undergo thematic analysis to extract key insights, while quantitative data are analyzed using descriptive statistics, correlation analysis, and regression modeling to identify relationships and trends. Findings indicate that integrated destination management is a critical strategy for sustainable tourism, requiring coordinated stakeholder efforts. Community-based tourism enhances social equity, cultural authenticity, and environmental stewardship. Additionally, policy integration, innovation, technology adoption, and capacity-building initiatives significantly contribute to sustainable tourism practices. The study offers valuable insights for policymakers, tourism practitioners, and local communities by identifying effective strategies for sustainable tourism management. This research contributes to the existing literature by integrating qualitative and quantitative methodologies to provide a multidimensional analysis of sustainable tourism strategies. By highlighting best practices and emerging trends, it advances knowledge on how to balance tourism development with long-term sustainability goals.

Keywords: innovation; integrated frameworks; sustainability strategies; sustainable tourism; tourism management

Received: 18 July 2025

Accepted: 22 October 2025

Suggested citation:

Kabus, J., Brzowska, A., Piersiala, L., Lenort R. (2025). Innovative Approaches to Sustainable Tourism Assessment in Academic Cities of the Silesian Voivodeship. *Przedsiębiorczość – Edukacja [Entrepreneurship – Education]*, 21(2), 143–160. <https://doi.org/10.24917/20833296.212.9>

Introduction

Tourism plays a key role in the global economy, contributing to job growth, infrastructure development and the promotion of cultural heritage. However, the dynamic development of this sector brings with it significant challenges related to environmental protection, social balance and resource management. The increase in the number of tourists, uncontrolled urbanisation and the intensive exploitation of natural resources can lead to environmental degradation, the erosion of local cultures and the deepening of socio-economic inequalities. In response to these threats, the concept of sustainable tourism has gained importance, promoting strategies that reconcile the development of the tourism sector with the protection of natural resources and the welfare of local communities.

Sustainable tourism management is based on the principle of harmonious coexistence of economic, social and environmental aspects. It requires effective cooperation between various stakeholders, including government institutions, tourism entrepreneurs, non-governmental organisations and local communities. The key elements of effective management are: consistency of development policies, participation of local residents, implementation of innovative technological solutions and education in responsible tourism practices.

Current research on sustainable tourism management strategies emphasises the need to combine qualitative and quantitative methods in order to obtain a comprehensive picture of development challenges and opportunities. In this context, the analysis of trends in tourist behaviour, the effectiveness of sustainable development policies and the role of innovation in minimising the negative impact of tourism on the environment is of particular importance.

The main objective of the study is to develop and verify an innovative system of sustainable tourism indicators for academic cities in the Silesian Voivodeship based on the European Tourism Indicator System (ETIS) and the Multi-Criteria Decision Analysis (MCDA) approach. The specific objectives of the study include:

1. To identify key sustainability dimensions relevant to academic cities in the Silesian Voivodeship.
2. To adapt the ETIS indicator framework to local socio-economic and environmental conditions.
3. To integrate qualitative and quantitative findings using the MCDA method for indicator evaluation and prioritization.
4. To assess the applicability of the developed indicator system for supporting sustainable tourism policy and management at the local level.

The paper also assesses the effectiveness of tourism policies, identifies trends in tourist behaviour and determines the role of local communities in the tourism management process. By using a mixed-methods approach, the article provides a multidimensional

analysis of key factors influencing the development of sustainable tourism, thus providing a valuable source of knowledge for decision-makers, researchers and tourism practitioners.

Theoretical framework

The tourism industry has undergone unprecedented growth in recent decades, emerging as one of the world's largest and most dynamic sectors. Fuelled by globalization, technological advancements, and rising disposable incomes, tourism has become a driving force of economic development, job creation, and cultural exchange. However, this rapid expansion has also raised concerns about the sustainability of tourism activities, as evidenced by mounting environmental degradation, socio-cultural disruptions, and economic inequalities in destination communities. In response to these challenges, sustainable tourism management has emerged as a critical paradigm shift that seeks to reconcile the economic benefits of tourism with environmental conservation and socio-cultural preservation (Streimikiene et al., 2021). Unlike conventional tourism approaches, which prioritize short-term economic gains at the expense of long-term sustainability, sustainable tourism management adopts a holistic perspective that integrates economic, environmental, and socio-cultural considerations to ensure that tourism activities generate positive outcomes for host communities, visitors, and the natural environment alike (Saarinen, 2009).

The concept of sustainable tourism management is rooted in the principles of sustainable development, as articulated in the Brundtland Report (WCED, 1987; 2025, 12 December), which defines sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” At its core, sustainable tourism management seeks to balance the economic, environmental, and socio-cultural dimensions of tourism to ensure that tourism activities contribute to the well-being of both present and future generations while safeguarding the planet's natural and cultural heritage. Achieving sustainable tourism management requires a multi-faceted approach that addresses the complex interactions between tourists, host communities, governments, and the natural environment. It involves integrating sustainability principles into all aspects of tourism planning, development, and management, from destination marketing and infrastructure development to visitor behaviour and resource management (Al-Swidi et al., 2021). By adopting a holistic perspective that considers the interconnections between economic, environmental, and socio-cultural factors, sustainable tourism management aims to optimize the benefits of tourism while minimizing its negative impacts on the environment, society, and culture.

Key components of sustainable tourism management include integrated management frameworks, community involvement, policy coherence, innovation, and capacity building. Integrated management frameworks facilitate collaboration and coordination among stakeholders across sectors and levels of governance, ensuring that tourism activities are aligned with broader sustainable development goals (Budeanu, 2005). Community involvement empowers local residents to participate in decision-making processes, benefit-sharing arrangements, and tourism planning activities, thereby fostering greater social equity, cultural authenticity, and environmental stewardship. Policy coherence is essential for aligning tourism policies with broader sustainable development objectives and avoiding trade-offs between economic growth and environmental conservation. Sustainable tourism

policies should be integrated into national development plans, environmental regulations, and cultural heritage preservation efforts to ensure consistency and effectiveness (Kabus et al., 2018). Innovation and technology offer opportunities to enhance the sustainability of tourism operations and experiences by reducing resource consumption, minimizing waste generation, and enhancing visitor satisfaction.

Capacity building and education are essential for fostering a culture of sustainability in the tourism industry by equipping stakeholders with the knowledge, skills, and attitudes needed to adopt sustainable practices and behaviours (Abdou et al., 2020). Training programs, workshops, and educational campaigns can raise awareness about sustainability issues and promote responsible tourism practices among tourists, tourism professionals, and local communities. Sustainable tourism management represents a paradigm shift that seeks to balance the economic benefits of tourism with environmental conservation and socio-cultural preservation. By adopting integrated approaches, community involvement, policy coherence, innovation, and capacity building, the tourism industry can contribute to the well-being of both present and future generations while safeguarding the planet's natural and cultural heritage.

In the context of strategies for sustainable tourism management, it is crucial to discuss the implementation of sustainable tourism concepts within the framework of global development strategies, including the concept of global development strategies and the implementation of sustainable tourism concepts (Nunes, Cook, 2021). Global development strategies play a pivotal role in shaping the trajectory of tourism development worldwide. These strategies encompass various initiatives, policies, and agreements aimed at promoting economic growth, social progress, and environmental sustainability on a global scale. Within this framework, the concept of sustainable tourism emerges as a key component, recognizing that tourism can and should contribute to broader sustainable development goals.

Global development strategies and the implementation of sustainable tourism concepts highlight the need to integrate sustainable tourism principles into overarching development agendas (Ivars-Baidal et al., 2023). It emphasizes the importance of coordinated action at the international level to address the complex challenges facing the tourism industry, including environmental degradation, cultural erosion, and social inequality (Sharpley, 2023). One of the primary objectives is to foster collaboration among governments, international organizations, industry stakeholders, and local communities to promote sustainable tourism practices (Sharma et al., 2021). This entails aligning tourism policies and initiatives with broader sustainable development objectives, which provide a comprehensive framework for addressing global challenges, including poverty, inequality, and environmental degradation (Purnomo et al., 2020).

By mainstreaming sustainable tourism within global development strategies, policy-makers can ensure that tourism contributes positively to economic growth, social inclusion, and environmental protection (Dias et al., 2021). This requires a holistic approach that considers the interdependencies between tourism, economic development, and environmental conservation, recognizing that sustainable tourism is not only about minimizing negative impacts but also maximizing positive contributions to society and the environment (Scott, 2021). Moreover, global development strategies and the implementation of sustainable tourism concepts underscore the importance of international cooperation and knowledge sharing in advancing sustainable tourism goals (Hunter, 2012). This includes exchanging best practices, capacity building, and technical assistance to support countries

in implementing sustainable tourism policies and initiatives effectively (Rasoolimanesh et al., 2023). These global concepts play a critical role in shaping the global agenda for sustainable tourism management (Brzozowska et al., 2023). By integrating sustainable tourism principles into broader development strategies and fostering international cooperation, they provide a roadmap for ensuring that tourism contributes to sustainable development outcomes for present and future generations (Hahn, 2021).

In the context of sustainable tourism management, tourist reception in conditions of sustainable development is another critical aspect to consider. This concept underscores the significance of creating tourism experiences that are environmentally responsible, socially equitable, and culturally sensitive. Tourist reception encompasses all facets of the tourist experience, starting from the moment a visitor arrives at a destination to their interactions with local communities and the natural environment. In conditions of sustainable development, tourist reception aims to minimize adverse impacts on the environment, uphold and support local cultures, and foster economic benefits for host communities. A fundamental principle of tourist reception in conditions of sustainable development is environmental stewardship. This involves implementing strategies to reduce the environmental footprint of tourism activities, conserve natural resources, and protect delicate ecosystems. Initiatives may include promoting eco-friendly transportation alternatives, minimizing waste generation, and supporting conservation projects in natural areas. Moreover, tourist reception in conditions of sustainable development highlights the importance of promoting social equity and preserving cultural authenticity. This entails involving local communities in tourism planning and decision-making processes, respecting their traditions and cultural heritage, and ensuring that tourism development benefits local residents economically. By prioritizing environmental conservation, social equity, and cultural preservation in tourist reception practices, destinations can create more sustainable tourism experiences that benefit both visitors and host communities while safeguarding the natural and cultural resources for future generations.

Methodology

The analysis of the sustainable tourism management strategy presented in the article is based on a combination of qualitative and quantitative methods, which enables a comprehensive approach to the study of this topic. The approach used allowed for a multidimensional analysis of the impact of tourism on the environment, the economy and local communities, as well as an assessment of the effectiveness of sustainable development policies.

The research was carried out in the academic cities of the Silesian Voivodeship, including Katowice, Częstochowa, Gliwice, and Bielsko-Biała. These cities were selected due to their strong academic character, high concentration of tourism-related services, and active participation in regional development initiatives. This geographical focus influenced the results, as academic cities combine educational, cultural, and business tourism functions typical of urban agglomerations.

Qualitative Methods

Qualitative methods such as in-depth interviews, group discussions and participant observation allowed for an in-depth exploration of the attitudes and opinions of key stakeholders

in the tourism sector. Researchers interviewed representatives of the administration, tourism entrepreneurs and environmental organisations, which allowed them to identify the main challenges and opportunities for sustainable destination management. The qualitative part of the research enabled the identification of local perspectives, barriers, and drivers of sustainable tourism in the context of academic cities. The in-depth interviews provided contextual insights that complemented the quantitative data. The participation of local communities in the discussions made it possible to assess their role in shaping tourism policy and their expectations for the development of the sector. The quantitative research was conducted in the Silesian Voivodeship between April and September 2024. The total number of respondents was 412, including 255 local residents (the largest group), 123 tourists, and 34 experts representing travel agencies and academic staff.

Quantitative Methods

Quantitative analysis, based on surveys and statistical methods, identified prevailing trends in tourist behaviour and assessed the effectiveness of sustainable development measures. Descriptive data analysis, correlation analysis and regression models were used to determine the relationship between tourist preferences and attitudes towards sustainable tourism.

Integrating both approaches provided a more holistic view of the issue under study. Qualitative analysis made it possible to capture the relevant narratives and opinions of key stakeholders, while quantitative methods provided data that allowed for more general conclusions to be drawn about the dominant trends in the tourism sector. The combination of these methods also allowed for a better understanding of the effectiveness of implemented policies and management mechanisms in tourism.

Research Procedure and Analytical Framework

The research procedure followed the multi-criteria decision analysis (MCDA) approach and was based on the European Tourism Indicator System (ETIS) framework. ETIS, developed by the European Commission (European Commission, 2016), provides a standardized yet flexible set of indicators and methodological tools for monitoring and evaluating sustainable tourism at the destination level. It emphasizes a participatory approach involving local authorities, residents, and tourism stakeholders, which aligns with the concept of community-based tourism and stakeholder collaboration adopted in this study.

In the present research, ETIS served as both a reference and a conceptual foundation for constructing a localized system of sustainability indicators tailored to the specific socio-economic and environmental characteristics of academic cities in the Silesian Voivodeship. The ETIS framework covers four key dimensions—management, economy, society and culture, and environment—each of which was adapted to regional conditions through expert consultations and data availability analyses. This allowed for the creation of a coherent model that could reflect local tourism dynamics while maintaining compatibility with European sustainability monitoring standards.

The MCDA method was selected due to its capacity to address complex decision-making processes involving multiple, often conflicting criteria. Its application enabled the integration of quantitative and qualitative data, expert judgments, and stakeholder opinions into a single analytical framework. Through MCDA, different sustainability dimensions were

weighted and prioritized, supporting the development of an indicator-based model for assessing the effectiveness of sustainable tourism management. The procedure included several stages: (1) defining sustainability objectives and evaluation criteria, (2) collecting primary and secondary data, (3) assigning weights to criteria based on expert evaluation, (4) analyzing the consistency of stakeholder assessments, and (5) constructing the final model of sustainable tourism indicators for academic cities.

The analytical framework also took into account regional development strategies and existing tourism management policies at both the national and local levels (cf. Panasiuk, 2020; Ivars-Baidal et al., 2023). Integrating ETIS with MCDA allowed the researchers to operationalize sustainability concepts within a measurable, transparent, and comparable structure. Moreover, it enhanced the practical applicability of the research results, offering local governments and destination management organizations (DMOs) a tool for continuous monitoring and policy adjustment in line with the principles of adaptive management and the European Green Deal objectives.

The research procedure also involved the creation of a theoretical construct and its subsequent operationalization. This approach enabled the translation of conceptual sustainability dimensions into measurable indicators. In accordance with best practices in tourism research, a combination of source analysis, survey methods, statistical estimation, and expert evaluation was applied to ensure methodological triangulation and reliability of findings.

The results of the study confirmed that an integrated approach to destination management that takes into account various environmental, economic and socio-cultural aspects is crucial for sustainable tourism management. Community-based tourism plays a special role in this, as it promotes sustainable development by involving local residents in decision-making processes and striving to preserve cultural authenticity and protect the environment.

The article also demonstrated the importance of tourism policies based on cohesion and integration of various economic sectors, which allows for effective combination of economic development goals with environmental protection. In addition, the role of innovation and new technologies was emphasised, as they can contribute to reducing the negative impact of tourism on the environment and improving the tourist experience.

The methods used in the study contributed to a comprehensive analysis and provided valuable conclusions on sustainable tourism management. The combination of qualitative and quantitative research enabled an in-depth assessment of the effectiveness of tourism strategies, the identification of key factors influencing the development of the sector, and the development of practical recommendations for decision-makers and tourism managers. The article makes a significant contribution to the development of scientific literature in this area, offering a multifaceted approach to the issue of sustainable tourism and providing useful guidelines for future research and management practice in the tourism sector. The methodology of an article outlines the procedures employed to conduct the research, including the type of study, sample selection, data collection and analysis methods, ethical considerations, and limitations of the study. Its detailed and transparent description is essential to guarantee the replicability and reliability of the results, in addition to providing a solid basis for the interpretation and generalization of the findings.

Results and discussion

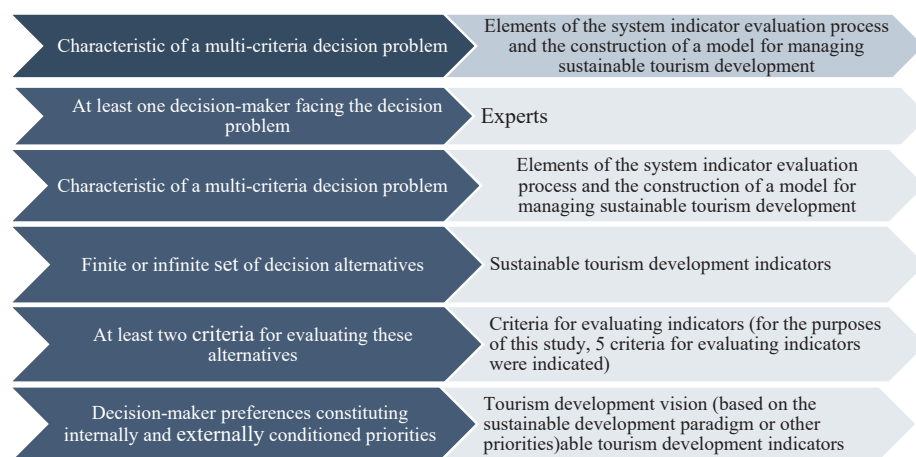
A detailed empirical analysis was conducted on the utility, effectiveness, and implementation possibilities of a customized set of indicators for academic cities in the Silesian Voivodeship, as well as selected aspects of sustainable tourism development in the urban agglomeration using academic cities in the Silesian Voivodeship as an example, as perceived by tourists and residents. An evaluation of the indicator system among experts was also conducted, which served to create a model for managing sustainable tourism development in the agglomeration of academic cities in the Silesian Voivodeship.

The main objective of this study is to create a customized set of indicators for measuring sustainable tourism development for academic cities in the Silesian Voivodeship based on ETIS. The research procedure for analyzing and verifying the system was referenced to the multiple criteria decision analysis (MCDA) method.

The construction of the system, and generally the entire process of MCDA, depends on many factors, including the structure and method – qualitative or quantitative – of describing goals, the size of the decision-making process, etc. Regardless of the uniqueness of the content and context of the decision-making process, all multi-criteria decision problems exhibit a certain fixed set of characteristics, allowing for a synthetic description of the phenomenon under study.

The characteristics of a multi-criteria decision problem, along with elements of the research process for building a model for managing sustainable tourism development in urban agglomerations are presented in Figure 1.

Figure 1. Characteristics of a multi-criteria decision problem and the process of evaluating the indicator system and constructing a model for managing sustainable tourism development



Source: own elaboration.

Decision theory proposes a classification of multi-criteria problems based on the type of analytical issues into four types of problems: description, choice, sorting (classification), and ranking construction. The results of exploratory-analytical work are utilized to formulate prescriptive conclusions and decision recommendations in later stages of project

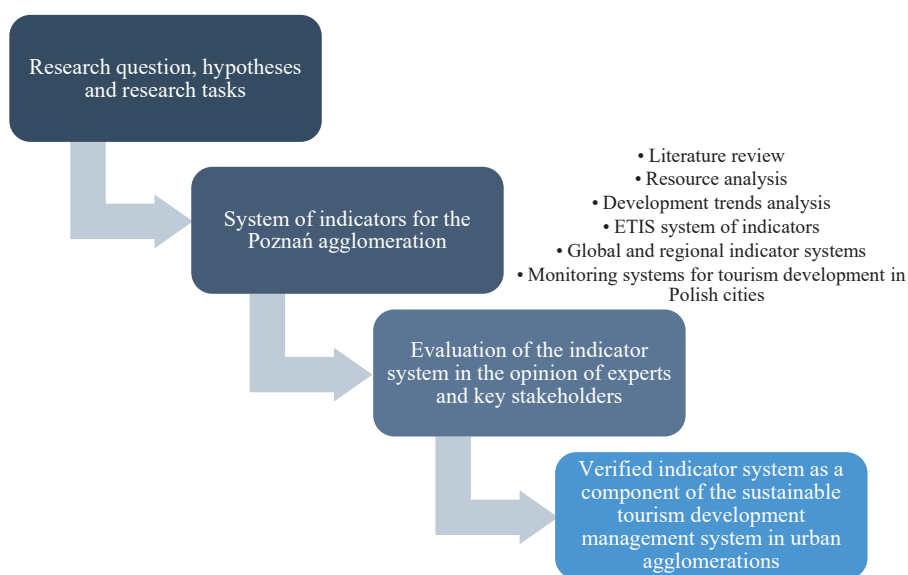
implementation after updating and supplementing data: in this specific case, including the analysis of survey results from tourists, residents, and experts. Problems encountered during the verification stage of the indicator system in the above-mentioned approaches are of a choice and ranking construction nature, as well as indicator construction.

Moreover, stakeholder opinions and expert insights were analyzed using both quantitative methods (diagnostic survey method, survey techniques – CAWI, PAPI) and qualitative methods – in-depth structured interviews with experts. Both methods consist of sequences of tasks and procedures aimed at achieving research objectives and addressing adopted hypotheses and research problems.

By combining the above-mentioned approaches, methods, and techniques, results were obtained that allowed for the construction of a model for managing sustainable tourism development in the urban agglomeration of academic cities in the Silesian Voivodeship, considering detailed measurement indicators.

The research process leading to the development of a set of indicators for the urban agglomeration of academic cities in the Silesian Voivodeship can be represented by the following model (Figure 2).

Figure 2. Process of developing and verifying a system of indicators for sustainable tourism management in urban agglomerations



Source: own elaboration.

In the face of prevailing trends in tourism, the concept of sustainable development is gaining significance. Analysis of literature, resources, tourism development trends, and academic cities in the Silesian Voivodeship, which are tourist destinations, as well as existing sets of sustainable development measurement indicators, with particular emphasis on ETIS, has led to the construction of a proposed set of indicators for monitoring sustainable tourism development in the agglomeration of academic cities in the Silesian Voivodeship.

Below are the proposed indicators along with the rationale for their selection, significance, and potential suggestions for action, depending on observed trends and phenomena.

Table 1 presents a comprehensive set of sustainable tourism development indicators to assist in monitoring and managing tourism in academic cities in the Silesian Province. The indicators are divided into thematic areas: management, economy, society/culture and environment. Each indicator includes: Justification for its selection Measurement methods Suggested actions and directions for development.

This table 1 presents indicators related to management efficiency and economic impact. They provide tools for monitoring destination performance and supporting strategic decisions towards sustainability.

Table 1. Management and Economic Indicators

Indicator	Rationale for indicator selection	Measurement method/data source	Suggested sector activities and values/ trends towards which the destination should strive in the context of sustainable development
Number of tourism businesses certified in categories: ecology, social responsibility, quality, ISO	Certification indicates the industry's interest in implementing sustainable business practices. This indicator illustrates the percentage of tourism businesses that have undergone independent verification of sustainable development practices and allows destination managers and decision-makers to take action and create initiatives to encourage participation in these processes.	Survey of businesses: surveys, interviews, analysis of secondary sources – databases related to certification.	Activities aimed at increasing the number of certifications by tourism businesses and efforts to promote verified and appropriate certification systems, improving the quality of certification procedures.
Tourist satisfaction	The quality of visitor experiences influences the destination's ability to generate economic benefits, including increased likelihood of revisiting the destination.	Tourist survey: surveys, interviews, user experience research.	Low results require further analysis. Matching data to visitor profiles and tourism products can help gain a deeper understanding and identify issues to focus on, striving for the highest level of satisfaction with the destination experience.

Budgetary funds allocated to tourism	Realizing complex goals requires public support. DMOs often indicate limited funds for achieving comprehensive goals.	Municipal and regional budget reports; local government financial statements; analysis of expenditure categories related to tourism and sustainability programs.	Increasing public funding for tourism development can enable the comprehensive achievement of sustainable development goals for the destination. These funds should be treated as investments rather than costs, contributing to long-term socio-economic and environmental benefits.
Number of accommodations provided monthly	The number of tourist accommodations is a key indicator of tourism development in the destination. This indicator provides monthly data throughout the year, revealing seasonal patterns in tourism development – allowing observations that may impact the overall economy and decisions related to the development of business tourism, tourist products targeted towards individuals from the silver head sector, etc.	GUS (Local Data Bank)	Monitoring annual trends enables the comparison of achieved results and the forecasting of further development (internal and external benchmarking).
Contribution of the tourism sector to the GDP of academic cities in the Silesian Voivodeship	This is a fundamental economic indicator used in the tourism industry to determine the level of its development, significant for the economy, most often at the national level.	Research project – cooperation of stakeholders to develop reporting methodology.	Monitoring annual trends should contribute to better forecasting of economic consequences and the development of further development policies.

Source: own compilation.

The indicators included in this category highlight the economic and managerial dimensions of sustainable tourism in academic cities. Their monitoring enables the identification of seasonal fluctuations, local economic dependencies, and areas for targeted intervention in policy design.

Socio-cultural indicators assess the interaction between tourism development and local communities, focusing on resident satisfaction, cultural heritage preservation, and social inclusion (Table 2).

Table 2. Socio-Cultural Indicators

Indicator	Rationale for indicator selection	Measurement method/data source	Suggested sector activities and values/ trends towards which the destination should strive in the context of sustainable development
Percentage of residents satisfied with tourism development	Regular monitoring of the level of acceptance of residents for the development of tourism is an important indicator affecting visitors' experiences.	Surveys, interviews.	Being vigilant about changes in residents' satisfaction levels and taking action where necessary is fundamental for sustainable tourism.
Percentage of residents satisfied with the impact of tourism on the local identity of the destination	This indicator is a barometer of the cultural impact of tourism, connecting with the previous indicator, referring to specific impacts on culture and local identity.	Surveys, interviews.	In the case of numerous negative opinions, consideration should be given to an integrative participatory planning process for further tourism development.
Number of short-term rental apartments	The existence of a large number of properties designated for short-term rental can change the character of the destination, especially when their number exceeds the number of resident households in a given property.	Booking platform surveys, Business activity register.	Monitoring the balance between residential and commercial functions, especially in areas threatened by gentrification, can help anticipate the emergence of problems.
Gender: the percentage of men and women employed in the tourism sector. Gender Equality: The percentage of tourism businesses where the position of CEO is held by a woman.	This measurement enables actions aimed at ensuring equal representation of women and men at various levels of employment in tourism, including managerial positions.	Surveys and interviews with businesses are conducted to gather data.	If the percentage of women in managerial positions is significantly lower than the percentage of women in the sector, programs should be developed to support the recruitment and career development of women in collaboration with the sector.
Percentage of commercial accommodation facilities accessible to people with disabilities	The broad availability of resources, including tourism-related ones, is one of the main principles of sustainable development.	GUS (Local Data Bank)	Supporting accessibility for people with disabilities, as well as the elderly, is one of the trends shaping tourism supply.

Source: own compilation.

Socio-cultural indicators emphasize the human dimension of sustainability and reveal how tourism affects residents' quality of life and cultural integrity.

Environmental indicators focus on tourism's ecological footprint, resource use, and contribution to climate change mitigation (Table 3).

Table 3. Environmental Indicators

Indicator	Rationale for indicator selection	Measurement method/data source	Suggested sector activities and values/trends towards which the destination should strive in the context of sustainable development
Percentage of tourists and day visitors using various means of transportation	Diagnosing the mode of transportation used by visitors helps identify the need to increase the availability of sustainable transportation options and promote them in tourists' awareness.	Surveys, interviews, and user experience studies are conducted to gather data.	Creating strategies to increase the availability of sustainable transportation options.
Waste production per tourist compared to waste production per capita (kg)	This indicator measures the amount of solid waste footprint at the tourism destination. It shows the extent to which tourism contributes to waste generation compared to waste generated by residents, to assess the effectiveness of waste reduction initiatives.	Surveys of businesses, waste and recycling reports, and waste storage statistics are conducted to gather data.	In case of significant disparity between waste generated by residents and tourists, programs and campaigns to raise awareness are necessary.
Water consumption per tourist per day compared to resident consumption	Tracking the consumption of fresh water in tourism businesses and comparing it with resident consumption indicates the water footprint of the tourism sector.	Surveys of businesses and water consumption reports are conducted to gather data.	Increasing awareness of the importance of water conservation and investing in water-saving programs for the tourism sector is crucial.
Percentage of tourism businesses that take action to reduce energy consumption	Monitoring the engagement of tourism businesses in energy-saving measures helps assess the success of various energy-saving programs and initiatives.	Surveys of businesses and energy consumption reports are conducted to gather data.	Increased investment in energy-saving programs for the tourism sector is necessary.

Proportion of green areas in the city's surface	Contemporary urban development trends emphasize the benefits of developing and caring for green areas in academic cities in the Silesian Voivodeship.	Analysis of municipal documents is conducted to gather data.	Striving for the highest possible share of green areas in the city's surface is crucial.
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Source: own compilation.

Environmental indicators provide a framework for assessing ecological sustainability, including resource consumption, mobility patterns, and environmental awareness among businesses and visitors.

The European Tourism Indicator System (ETIS) serves as the methodological foundation of this study. It offers a comprehensive structure for evaluating sustainable tourism at the destination level, encompassing management, economic, social, and environmental dimensions.

The proposed indicator system is primarily based on the ETIS indicator system for several significant reasons:

- It encompasses comprehensive accompanying documents, such as forms and survey templates, which can be utilized among tourists, entrepreneurs, residents, and organizations managing tourism in the region, thus constituting a valuable tool.
- It includes an implementation procedure that reflects the principles of strategic management, which is crucial for the effective functioning of the system.
- It represents the latest tool among those promoted by experts, indicating that it takes into account the most current trends and needs of the tourism industry.
- It is a proposal by the European Commission, which sets guidelines to which the Polish economy must adhere in many areas of operation and management, underscoring its significance and relevance.
- It presents a comprehensive and in-depth approach in all areas, especially in the environmental sphere, which is crucial for sustainable tourism development in the context of global climate change.
- It emphasizes opinion research and the participation of the local community in the process of tourism development planning, which becomes particularly important in light of the growing social conflicts resulting from so-called "overtourism" (Veríssimo et al., 2020).

All these elements contribute to the comprehensive nature of the ETIS system and can serve as arguments for its implementation or complementation of existing monitoring systems for sustainable tourism development.

Conclusion

Integrated destination management emerges as a cornerstone strategy for sustainable tourism development. By fostering collaboration and coordination among various stakeholders, including government agencies, local communities, tourism operators, and conservation groups, integrated destination management frameworks facilitate the alignment of tourism activities with sustainability objectives. Through integrated planning, development, and

management processes, destinations can optimize the benefits of tourism while minimizing its negative impacts on the environment, society, and culture. Community-based tourism development plays a crucial role in promoting sustainable tourism practices and empowering local communities. By involving residents in tourism planning, decision-making, and benefit-sharing processes, community-based tourism initiatives foster greater social equity, cultural authenticity, and environmental stewardship. Through partnerships between communities and tourism stakeholders, destinations can leverage local knowledge, resources, and traditions to create unique and authentic tourism experiences that benefit both residents and visitors.

Policy coherence and integration are essential for aligning tourism policies with broader sustainable development objectives. Sustainable tourism policies should be integrated into national development plans, environmental regulations, and cultural heritage preservation efforts to ensure consistency and effectiveness. By mainstreaming sustainability principles into tourism policy frameworks and promoting multi-sectoral collaboration, governments can create an enabling environment for sustainable tourism development (Panasiuk, 2020) and mitigate potential conflicts between economic growth and environmental conservation. Innovation and technology offer opportunities to enhance the sustainability of tourism operations and experiences. Sustainable tourism innovation encompasses a wide range of initiatives, including eco-friendly accommodations, renewable energy technologies, sustainable transportation solutions, and digital platforms for promoting responsible tourism behaviour. By embracing innovative approaches and leveraging technology, destinations can reduce their environmental footprint, enhance visitor experiences, and improve destination competitiveness.

Capacity building and education are essential for fostering a culture of sustainability in the tourism industry. Training programs, workshops, and educational campaigns can raise awareness about sustainability issues and promote responsible tourism practices among tourists, tourism professionals, and local communities. By investing in human capital development and promoting lifelong learning opportunities, destinations can build resilience and adaptability to environmental and socio-cultural changes, ensuring the long-term viability of their tourism sectors. Across all discussions, several cross-cutting themes and emerging trends emerge, including the importance of stakeholder engagement, the need for adaptive management approaches, the role of tourism certification and accreditation schemes, and the potential of sustainable tourism for poverty alleviation and social inclusion. These themes underscore the complexity and interconnectedness of sustainable tourism management and highlight the importance of holistic and collaborative approaches in addressing the multifaceted challenges facing the tourism industry.

In conclusion, sustainable tourism management represents a paradigm shift that seeks to balance the economic benefits of tourism with environmental conservation and socio-cultural preservation. By adopting integrated, community-based, and innovative approaches, destinations can optimize the benefits of tourism while minimizing its negative impacts, ensuring the long-term sustainability of their tourism sectors. However, achieving sustainable tourism requires concerted efforts from stakeholders across sectors and regions, as well as strong political will and institutional support. It is imperative that governments, tourism stakeholders, and local communities work together to mainstream sustainability principles into tourism policies, practices, and behaviours, thereby ensuring the well-being of both present and future generations while safeguarding the planet's natural and cultural heritage. The

research demonstrates that focusing on academic cities of the Silesian Voivodeship provides valuable insights into urban tourism sustainability in a regional context. The developed ETIS-based indicator system can be used as a practical tool for local authorities and policymakers to monitor and improve sustainable tourism management in the region.

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