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LIBECCIO

D1.3.1 Up-scaled DMSS functional and technical requirements report

Deliverable

10/02/2025

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Executive Summary

This deliverable presents the functional and technical requirements for the up-scaled DMSS. It presents an analysis of data availability across all partners selected tourist destinations. Availability check was performed based on partner input for different geographical levels of administration and for all initially selected tourism indicators. Also, a survey was conducted for on-demand information collection from internet sources. Furthermore, a set of available data that will feed the new DMMS is defined. Finally, the defined dataset was evaluated against the requirements of the requested new services of DMSS targeted at tourism destination decision makers and policy makers, according to the work of Activity 1.1. The conceptual and module architecture of the DMSS is finally presented followed by its specifications mapped on the user's requirements.

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1. Introduction

The current feasibility study aims to form the functional specifications that describe the new services provided of the LIBECCIO's Destination Management Support System (DMSS) to the targeted users.

Towards this scope a methodology was followed starting from collecting the user requirements interviewing the potential users' groups, defining the desired new services, surveying about the availability of data and finalising the DMSS system architecture with its specifications. The detailed steps of the followed methodology are:

- After identifying the two target users groups, policy maker and decision makers, a survey was conducted **defining their user requirements, in form of envisaged new services of DMSS**. The survey was contacted through interviews and concluded to the two following reports:
  - ○ Envisaged services for commercial planning, enhancing service quality, and executing targeted marketing actions, as defined in the preliminary report of Activity 1.1 "Preliminary identified DMSS commercial planning, service quality and marketing actions outputs/services."
  - ○ Envisaged services for policy makers, as defined in the preliminary report of Activity 1.1 "Shaping the Future: Preliminary DMSS Outputs and Services Identified by Policy Makers."
- **Each partner, hosting a pilot destination, thoroughly investigated the available data** sources of tourist related information. The basis of this search was the capitalized Interreg ADRION Innoxenia TIDSS set of indicators. This task investigated the necessary data foundation for the envisaged DMSS and its novel provided services.
- A **technical survey was performed related to the data that can be acquired on demand from sources on the web**, either from tourist websites or platforms, or other informational web platforms. This survey led to two ways of data collection, a) web scraping utilizing specific custom web services and b) invocation of web services APIs from platforms that already provide them.
- The next step was **the analysis of the findings of the previous tasks** to determine the schema of the data that can be collected in the DMSS.
- Following was **the evaluation of the available data against the requirements of the new envisaged services of DMSS** as they have been described in the relevant reports of Activity 1.1 works.
- The last step was the extraction of the **technical requirements and the system architecture** for the up-scaled DMSS, based on the user requirements and functional specifications described in the previous step.

2. User Requirements towards new DMSS services

The up-scaled DMSS will offer project stakeholders new services to enhance their decision-making capabilities, towards promoting a more sustainable tourism model in their areas of interest. Two distinct groups of services will be offered, targeted at different groups of stakeholders: a) Policy Makers, mainly targeting the local public administration authorities, as well as policy makers at regional and national level, and b) The decision-makers within a tourist destination. In the following sections these new services are described, offering details on the service functionality, purpose and improvement actions envisaged.

2.1. New Services for policy makers

To support the development of the DMSS platform, qualitative interviews were conducted with key stakeholders from different sectors of the tourism industry, including public administrators, environmental managers, business owners, and researchers. These interviews provide insights into the needs, challenges, and recommendations of those directly involved in managing tourism in diverse contexts. The services identified during these interviews were subsequently shared with all project partners, ensuring collaborative validation and a thorough assessment of data availability at the local, regional, and national levels. This collaborative approach not only enhanced the relevance of the identified services but also ensured their practical applicability across different governance contexts.

In the following paragraphs, the findings from these interviews are presented, highlighting key themes such as the relevance of sustainability indicators, the need for valuable data, and the importance of user-friendly, locally adaptable tools. Interview findings are presented in the form of envisaged services, that are expected to enable the platform to address the complex realities faced by destinations across the region, where environmental fragility, economic dependence on tourism, and the impacts of global trends such as climate change require nuanced, flexible solutions.

2.1.1. Monitoring accessibility of tourist destinations via public transport and sustainable travel options

Purpose:

Accessibility is a foundational aspect of a sustainable tourism strategy. The DMSS platform's ability to monitor and summarise accessibility indicators—such as the proportion of destinations accessible via public transport or through walking—provides essential data for policymakers. This information enables them to **compare accessibility standards across similar destinations**, ensuring alignment with inclusive tourism goals. Additionally, collecting tourist feedback on accessibility informs policy adjustments to **improve visitor satisfaction and travel ease**. This data is crucial for identifying areas where transport systems may be lacking or where walking routes could be expanded to encourage eco-friendly travel.

Improvement actions:

Destination-specific accessibility summaries: create static web pages for each destination that offer a comprehensive summary of accessibility metrics, benchmarked against comparable locations. This enables swift comparisons and helps policymakers identify areas where accessibility could be enhanced.

Implement mapping tools: use interactive maps, powered by technologies like google transport API, to visually represent accessible routes, public transport options, and pedestrian pathways. This visual data assists policymakers in assessing congestion patterns and travel flow, directing improvements where they are most needed.

2.1.2. Supporting sustainable mobility and infrastructure for cycling and walking

Purpose:

A commitment to **sustainable mobility through cycling and walking** infrastructure not only enhances the visitor experience but also reduces environmental impacts. The DMSS platform's monitoring of cycling lanes, pedestrian routes, and bike parking facilities supports policymakers in evaluating infrastructure use. Data on sustainable mobility options provide valuable insights for **targeted investment in eco-friendly transport**, allowing destinations to accommodate an increase in visitors without compromising environmental integrity.

Improvement actions:

Development of interactive maps: incorporate visual maps that highlight cycling routes, pedestrian paths, and bike parking locations. This tool allows policymakers to evaluate infrastructure density and identify areas that could benefit from further development.

2.1.3. Assessing social sustainability: accessibility for disabled persons and families

Purpose:

In assessing social sustainability, the focus on **providing accessible facilities for disabled persons and families** highlights a destination's inclusivity. The DMSS platform's monitoring of accessible accommodations, public amenities, and satisfaction scores from these targeted groups provides a vital perspective on whether current services meet diverse visitor needs. Policymakers rely on this data to make informed decisions about facility upgrades, resource allocation, and service enhancements to ensure that tourism benefits everyone, including those with unique access needs.

Improvement actions:

Dedicated accessibility summaries for destinations: each destination can have a static web page summarising accessible facilities and accommodations, offering a benchmark for policymakers to assess social sustainability across different areas.

Sentiment analysis for targeted feedback: utilise sentiment analysis on reviews and feedback from disabled visitors and families. This analysis helps policymakers to

understand specific challenges and adjust policies or services to address them more effectively.

User-friendly maps of accessible sites: develop maps indicating accessible beaches, parks, and public facilities. Accessible digital mapping on the DMSS platform enables policymakers to visualise coverage and identify gaps in accessible infrastructure, guiding investment where necessary.

2.1.4. Monitoring energy and water consumption in accommodation facilities

Purpose:

Monitoring energy and water consumption is essential for **resource conservation and environmental sustainability** within the tourism sector. By collecting data on average energy and water use in accommodations, the DMSS platform provides policymakers with insights into **consumption patterns and potential areas for efficiency improvements**. These metrics are critical for establishing benchmarks and implementing policies that encourage the adoption of green technologies, thereby reducing the tourism sector's environmental footprint.

Improvement actions:

Visual consumption dashboards: develop visualisation tools within DMSS that display energy and water usage per accommodation, allowing longitudinal analysis. These dashboards offer policy-makers clear trends, supporting data-driven conservation strategies.

2.1.5. Managing and monitoring waste separation

Purpose:

Effective waste management remains a critical element in promoting sustainable tourism. Policymakers benefit from data on waste separation practices and average waste volumes, which help in assessing the success of current waste management initiatives. The DMSS platform's ability to display waste data fosters transparency, informing visitors and locals alike of the destination's commitment to environmental responsibility. Accurate data on waste metrics guide policy adjustments and **enhance recycling and waste reduction strategies**.

Improvement actions:

Public waste separation displays: incorporate accessible data displays on waste separation within the DMSS portal, promoting transparency.

Waste management reports: provide regular updates on waste separation and recycling volumes to offer insights on progress. Policymakers can review these metrics to refine waste management policies and enhance resource allocation in response to seasonal changes.

2.1.6.   Monitoring and managing the blue economy and marine resources

<u>Purpose:</u>

Monitoring marine resources and the blue economy is essential for coastal and marine-based destinations. The DMSS platform's tracking of water quality, conservation projects, and tourist satisfaction regarding marine experiences enables policymakers to make informed decisions on **marine preservation**. Data on water quality alerts, contamination events, and marine biodiversity inform strategies that protect these sensitive ecosystems, ensuring the **sustainable growth of the blue economy**.

<u>Improvement actions:</u>

Tracking conservation projects: include a conservation project tracker within dmss to monitor marine biodiversity initiatives and water quality indicators. This provides policymakers with up-to-date data on the health of marine ecosystems and supports targeted conservation funding.

Water quality alerts: develop a system for visualising water quality alerts seasonally, ensuring swift notification for policymakers and tourism operators. Immediate response to contamination events protects both visitors and marine life, reinforcing environmental stewardship.

2.1.7.   Monitoring and managing the green tourism economy and mountain resources

<u>Purpose</u>

Monitoring mountain resources and fostering a green economy are critical for mountain-based destinations. The DMSS platform's capabilities in tracking snow and air quality, conservation projects, and tourist satisfaction with mountain experiences empower policymakers to make data-driven decisions for preserving these fragile ecosystems. By providing insights on snow alerts and contamination events, the platform supports strategies that safeguard sensitive environments while promoting the sustainable growth of the mountain economy.

<u>Improvement actions:</u>

Incorporate a dedicated conservation project tracker within the DMSS platform to monitor mountain biodiversity initiatives and key air quality indicators. This enhancement will provide policymakers with data on the health of mountain ecosystems, enabling better allocation of resources and targeted conservation funding.

Develop a system to visualize air quality alerts on a seasonal basis, offering swift notifications for policymakers and tourism operators. Rapid responses to contamination events will help protect visitors and the local ecosystem, reinforcing a commitment to environmental stewardship and sustainability.

2.1.8. Analysing tourist flows to prevent overcrowding and resource degradation

<u>Purpose:</u>

Understanding tourist flow within protected areas is crucial for **managing visitor density and preventing ecological harm**. The DMSS platform's data on visitor numbers and crowding frequency allows policymakers to regulate site access and optimise the distribution of visitors across locations. This analysis aids in implementing measures to prevent overcrowding and ensures a balanced approach to tourism, **maintaining the destination's appeal without compromising natural resources**.

<u>Improvement actions:</u>

Visitor flow tracking: utilise data track and display visitor density, allowing policymakers to assess and manage high-traffic areas effectively.

Implement visitor caps for sensitive sites: establish entry limits for protected areas based on data on daily visitor numbers, helping to preserve environmental quality. Limiting access during peak times can prevent overuse and ensure a high-quality experience for all visitors.

2.1.9. Measuring tourist satisfaction and loyalty with environmental practices

<u>Purpose:</u>

Visitor satisfaction with environmental practices reflects how well a destination aligns with sustainability expectations. By gauging sentiment regarding eco-friendly initiatives, such as recycling, energy-saving measures, and conservation efforts, policymakers can **adjust strategies to match visitor expectations**. The DMSS platform's sentiment analysis capabilities enable policymakers to proactively adapt their practices, fostering loyalty among eco-conscious visitors and **enhancing the destination's environmental image**.

<u>Improvement actions:</u>

Sentiment analysis of visitor feedback: use sentiment analysis tools within DMSS to track satisfaction with environmental practices. Policymakers can leverage this feedback to identify and address any negative perceptions, aligning practices with visitor preferences.

2.1.10. Interregional Comparison of Sustainability Data

<u>Purpose:</u>

Interregional benchmarking of sustainability indicators allows policymakers to evaluate their destination's performance within a broader context. Comparing data on key metrics, such as waste management and resource conservation, highlights strengths and identifies improvement areas. This analysis supports data-driven policy adjustments,

ensuring that the destination **maintains a competitive edge in sustainability** while **adopting best practices from high-performing regions**.

Improvement actions:

Benchmark reports: publish interregional comparisons of sustainability data to enable policymakers to assess their progress relative to similar destinations. These reports provide a framework for informed decision-making and highlight areas for future investment.

Implement best practices from leading regions: use findings from comparative analysis to adopt successful sustainability practices from top-performing destinations, optimising the destination's sustainability approach.

2.1.11. Measuring the Economic Impact of Sustainable Tourism Policies

Purpose:

Quantifying tourism's contribution to the local economy, including its role in employment and GDP, is essential for **demonstrating the value of sustainable tourism**. The DMSS platform's tracking of employment rates and tourism-related GDP provides policymakers with a clear picture of the sector's economic impact. These insights support policy initiatives that **balance economic growth with sustainable practices**, ensuring that tourism continues to benefit the local economy without compromising environmental or social integrity.

Improvement actions:

Detailed economic data analysis: provide comprehensive economic data on tourism's contribution to GDP and employment, with a focus on seasonal fluctuations. This enables policymakers to identify economic trends and prioritise investments that strengthen the tourism sector.

2.2. New Services for decision makers

The Destination Management Support System (DMSS) platform will offer invaluable support to decision-makers within a tourist destination. It is expected to furnish comprehensive insights and tools essential for commercial planning, enhancing service quality, and executing targeted marketing actions. Below, the suggested key outputs and services provided by the DMSS platform for decision making stakeholders are detailed.

2.2.1. Visitor Arrival Predictions:

Using current and historical visitor arrival data and current trends of booking and arrivals the platform can provide predictions on future visitor arrivals for the short and medium term. This information can help decision-makers prepare for fluctuations in demand and adjust marketing actions accordingly. This module can offer predictions in three different time intervals, namely short, medium, and long term.

Short term:

Periodicity: weekly

Data: weekly visitor arrivals, bookings, weather forecasts and events calendar

Suggested Data Source:

- ✓ Regional Ross 1000[1] (check-in data at accommodation) (IT)
- ✓ OTA scraping (Data collected during the online booking process)
- ✓ Meteo web sites

Purpose:

This module gives tourism stakeholders with decision-making capabilities the necessary information to prepare for future tourist demand fluctuations. Visitor arrival anticipation and demand forecast is important for tourist areas to sustain a high level of offered services and attractions. This module will also insights into the evaluation of the impact of weather conditions on tourist behavior, through **associating weather forecasts with arrival patterns**.

Improvement Actions

Dynamic Pricing Actions: Implement dynamic pricing actions that adjust pricing based on predicted visitor arrivals.

Flexible Booking Policies: Implement flexible booking policies that allow for easier cancellation or rescheduling in case of unfavorable weather conditions.

Medium term:

Periodicity: Monthly, Quarterly

Data: Monthly visitor arrivals, bookings, and events calendar; monthly weather historical data

Suggested Data Source:

- ✓ Summarized Regional Ross 1000 (IT)
- ✓ Summarized OTA scraping
- ✓ Regional/Central statistical institutes
- ✓ Tourism authorities
- ✓ Meteo authority
- ✓ Event organizers

Purpose:

The medium-term arrival prediction module aims to assist decision makers in their **operational planning** and **marketing optimization** actions. Operational planning refers to the ability to effectively prepare a tourism destination in terms of needed resources, adequate staffing levels and required infrastructure to cope with the expected visitor arrivals. Marketing optimization uses the predicted arrival patterns to allow for the better implementation of a marketing strategy and marketing funds allocation to maximize visitor engagement and the resulting revenue. This service also allows users to **measure the impact of specific events in tourist behaviors** by offering quantitative indices on

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[1] The ROS 1000 standard in presented in Appendix A.

arrival patterns and goes on to highlight **new opportunities for events that could be leveraged** by an area operators to attract new visitors through targeted marketing actions.

<u>Improvement Actions</u>

Dynamic Pricing Plans: Implement dynamic pricing models that adjust pricing based on predicted visitor arrivals to optimize revenue during peak periods and attract visitors during off-peak times.

Weather-Proof Attractions/Activities: Diversify tourist offerings to include indoor or weather-proof activities to attract visitors regardless of weather conditions.

Event Marketing Campaigns: Develop targeted marketing campaigns promoting events to potential visitors through various channels such as social media, email newsletters, and travel websites.

Targeted Marketing Campaigns: Launch targeted marketing campaigns timed to coincide with expected peaks in visitor arrivals, promoting exclusive offers or events to maximize engagement.

Capacity Management: Optimize resource allocation and staffing levels based on predicted visitor numbers to ensure a seamless visitor experience and efficient operations.

Collaboration with Partners: Share arrival predictions with tourism stakeholders, such as accommodation providers and attractions, to facilitate collaborative planning and resource management.

<u>Long term:</u>

Periodicity: Yearly

Data: Yearly visitor arrivals, bookings, and events calendar; yearly weather historical data

Suggested Data Source:

- ✓ Yearly Summarized Regional Ross 1000 (IT)
- ✓ Yearly Summarized OTA Scraping
- ✓ Regional/Central statistical institutes
- ✓ Tourism authorities
- ✓ Meteo authority
- ✓ Event organizers

<u>Purpose:</u>

The long-term prediction module offers services that can assist an area in updating their tourism policies to better cope with the changing conditions of tourism demand. **Identifying and analyzing long-term trends in tourist arrivals**, such as seasonality, year-on-year growth rates, and changes in visitor demographics, can help decision-makers understand evolving market dynamics and adjust marketing strategies accordingly. **Comparing long-term tourist flow data with competitor destinations** or similar tourist attractions can help decision-makers assess their destination's

competitive position and identify areas for improvement in marketing strategies, product development, and visitor experiences. **Seasonal Campaign Planning** offers the opportunity to identify peak booking and arrival periods to adjust pricing, promotions, and staffing, thus maximizing revenue during peak periods and attracting visitors during off-peak periods. It aims to represent patterns of tourist booking and arrivals at different times of the year, accurately identifying peak and off-peak periods.

Improvement Actions

Dynamic pricing plans:

- Peak Periods: Implement dynamic pricing plans to capitalize on high demand during peak periods, adjusting prices based on demand levels and availability.
- Off-Peak Periods: Offer discounted rates or special promotions during off-peak periods to attract visitors and stimulate demand.

Promotional Campaigns:

- Peak Periods: Launch targeted marketing campaigns highlighting unique offerings or events during peak periods to attract visitors.
- Off-Peak Periods: Create special packages or deals to incentivize visits during off-peak periods, emphasizing value for money and unique experiences.

Staffing Optimization:

- Peak Periods: Ensure sufficient staffing levels and training to handle increased demand and provide excellent customer service.
- Off-Peak Periods: Adjust staffing levels based on anticipated lower demand, while providing training and incentives to maintain service quality.

Enhanced Visitor Experience:

- Peak Periods: Offer additional amenities or services to enhance the visitor experience during peak periods, such as guided tours, entertainment events, or extended operating hours.
- Off-Peak Periods: Focus on personalized experiences and attention to detail to create memorable visits for visitors during off-peak periods, potentially offering exclusive access or behind-the-scenes tours.

2.2.2. Visitor segmentation analysis

Understanding the different needs and preferences of different visitor segments, such as demographics, travel preferences and interests, can help decision-makers to target specific audience segments more effectively and to customize service and tailor marketing campaigns offering planning in a targeted manner to ensure that offers and marketing efforts are in tune with each segment.

Medium, long- term:

Periodicity: Quarterly, Yearly

Data: Demographic data (age, gender, residence), psychographic data (interests, preferences)

Suggested Data Source:

- ✓ Summarized Regional Ross 1000 (IT)
- ✓ Summarized OTA scraping
- ✓ Online review and rating platforms scraping (TripAdvisor, Google Reviews)

<u>Purpose:</u>

Visitor segmentation analysis can help destination managers **understand their visitor needs and preferences** that can be highly diverse based on the visitor segment they belong to. By gaining insights into the potential visitor needs, decision makers can adjust their marketing efforts to target specific audience segments more effectively through **marketing customization**. The final added benefit of this new service is the possibility for operators to **customize their offered services and tailor their offers** to exactly cater for the specific preferences of their intended visitors, thus maximizing visitor engagement and revenue.

<u>Improvement Actions</u>

Targeted Marketing Campaigns: Develop marketing campaigns tailored to each visitor segment's preferences and interests.

Service Customization: Customize services and offerings to meet the unique needs of each visitor segment.

Product Development: Develop new products or experiences tailored to the preferences of specific visitor segments.

Customer Experience Enhancement: Improve the overall customer experience by addressing pain points and preferences identified through segmentation analysis.

Promotional plans: Design promotional plans targeting each segment with relevant offers and incentives.

2.2.3.   Visitor Feedback and Reviews

This service aims to help decision makers identify emerging issues or trends and take proactive measures to address them to ensure swift responses to visitor concerns and maintain a positive reputation. Users can also measure visitor satisfaction levels through surveys, feedback forms, and sentiment analysis of online reviews and social media mentions.

<u>Medium, long- term:</u>

Periodicity: Quarterly, Yearly

Data: Visitor Feedback and Reviews, Survey Responses, Sentiment Analysis of Online Reviews

Suggested Data Source:

- ✓ Feedback Forms and Surveys: Collected on-site or via email/post-visit communication.
- ✓ Online Reviews: Platforms such as TripAdvisor and Google Reviews

✓ Social Media Mentions: Monitoring social media platforms (e.g., Twitter, Facebook, Instagram) for mentions and comments related to the visitor experience

<u>Purpose:</u>

The **early identification of emerging issues or trends** that may impact visitor experience through monitoring visitor feedback and reviews is important for keeping destination visitor satisfaction at high levels. This module will offer decision makers a tool that will allow a **swift response to visitor concerns** through proactive measures that will promptly address them to maintain a positive reputation and enhance visitor satisfaction. The DMSS will also use surveys, feedback forms, and sentiment analysis of online reviews and social media mentions to **gauge visitor satisfaction levels**.

<u>Improvement Actions</u>

Service Improvement:

Swift Issue Resolution: Implement processes to address visitor concerns promptly and efficiently to enhance overall visitor satisfaction.

Continuous Improvement: Use feedback and reviews to identify areas for improvement in the services, facilities, or experiences offered to visitors.

Marketing and Reputation Management:

Highlight Positive Feedback: Showcase positive visitor feedback and reviews on marketing materials, websites, or social media channels to build trust and attract more visitors.

Address Negative Feedback: Respond promptly and professionally to negative reviews or feedback to demonstrate commitment to customer satisfaction and mitigate potential reputational damage.

Customer Experience Enhancement:

Personalized Experiences: Use insights from visitor feedback to tailor experiences and offers to meet the specific needs and preferences of different visitor segments.

Continuous Engagement: Engage with visitors through surveys, feedback forms, and social media to foster a sense of community and loyalty.

2.2.4.   Destination Feedback and Sentiment Analysis

This service involves facilitating a dialogue between residents and visitors to foster better relationships and mutual understanding. The application includes features such as survey creation and distribution, sentiment analysis of reviews and feedback, data visualization to represent sentiments and trends, and reporting functionalities for decision-makers' informed decisions.

<u>Medium, long- term:</u>

Periodicity: Quarterly, Yearly

Data: Feedback from surveys, reviews, and social media.

Suggested Data Source:

- ✓ Surveys conducted by the destination management organization
- ✓ Online review platforms (e.g., TripAdvisor, Google Reviews)
- ✓ Social media platforms (e.g., Twitter, Facebook).

Purpose:

The service will **provide insights to destination decision-makers** on how residents perceive tourists and their impact on the community. This will allow them to tailor their services accordingly to enhance the overall visitor experience without having a negative impact on residents. **Policy formulation support** is another important aspect of this offered service, as it will assist policymakers in formulating regulations and policies that balance the needs of residents and visitors and preserve the integrity of the destination while promoting sustainable tourism.

Improvement Actions

Visitor Experience Enhancement: Use feedback and sentiment analysis to identify areas of improvement in the visitor experience.

Targeted Marketing Campaigns: Utilize positive sentiment data to craft targeted marketing campaigns promoting the destination's strengths.

Community Engagement Initiatives: Implement community engagement initiatives based on resident feedback to foster better relationships with tourists.

Policy Adjustments and Regulations: Adjust regulations and policies based on sentiment analysis to balance resident and visitor needs.

3. Tourism Data

The Destination Management Support System (DMSS) platform aims to offer policy makers at regional and national levels, as well as decision making organizations and businesses of tourism destinations, with valid support in the form of insights, tools and analyses that will enable them to make informed decisions on the sustainable future of tourist destinations in their areas. To offer this invaluable input, the platform follows a data-driven approach, that analyzes a wealth of gathered data on the tourism destinations in question. The following sections of this report present the data required to enable the platform's full potential. The methodology followed considered as initial tourism data indices the set of data that was utilized by the TIDSS platform of the capitalized Interreg ADRION InnoXenia project (https://innoxenia.adrioninterreg.eu/).

3.1. Destination Overview (Yearly)

The first section of data presents a general overview of each destination, covering areas like popular tourist attractions, demographic and economic data. Area accessibility data is also required, in the form of information on establishments and modes of transport that a tourist can use to access the destination. Finally, environmental and weather data is included in this section to give a complete general perspective on the type of tourism the destination in question can attract and support. The following table presents the required data and the necessary coding of each indicator. This data is required annually.

Table 1 Destination Overview Indices

1.	DESTINATION OVERVIEW
	Destination Profile
1.1	Dominant habitats (place an X against all that apply)
	Urban
	Sand/shingle beach
	Moor/heathland:
	Farmland
	Forest/Woodland
	Alpine
	Scrubland
	Desert
	Wetland
1.2	Top five most popular tourist attractions (including environmental and cultural attractions).
1.3	Area
1.4	Population
1.5	Density
1.6	Gross Value-added Total
1.7	Gross Value added per capita
1.8	Total tourism expenditure over GDP
1.9	Number of Employees
1.10	* Of which, number of direct jobs in tourism

1.11	* Of which, number of women employed in tourism
1.12	Quality of life index
1.13	Criminality index
1.14	International Airports
1.15	♦ Number of daily flights
1.16	* Of which, charter flights
	* Of which, low-cost flights
1.14	Train Stations
1.15	♦ Number of daily stops
1.16	Coaches' stations
1.17	♦ Number of daily departures
1.18	Seaports
1.19	♦ Number of daily departures
1.21	Number of establishments ***accessible for people with disabilities***
1.26	* Of which, number of accessible Airports
1.27	* Of which, number of accessible Train Stations
1.28	* Of which, number of accessible Coaches Stations
1.29	* Of which, number of accessible Seaports
1.30	Total EU Funds received
	* Of which, for tourism
	Sunshine hours
1.32	♦ Total
1.33	* Of which, in winter
1.34	* Of which, in summer
	Precipitation:
1.35	♦ Total
1.36	* Of which, in winter
1.37	* Of which, in summer
	Temperature:
1.38	♦ Average of maximum temperature
1.39	* Of which, in winter
1.40	* Of which, in summer
1.41	♦Average of minimum temperature
1.42	* Of which, in winter
1.43	* Of which, in summer
1.44	Number of environmental certifications
	Waste production
1.45	♦ Total
1.46	* Of which, from tourism sector
1.47	* Of which, from recycling
	Water consumption
1.48	♦ Total
1.49	* Of which, from tourism sector
	Energy consumption

1.50	♦ Total
1.51	* Of which, from tourism sector

3.2. Tourism Industry (Yearly)

The second data section refers to information on the tourism industry in the destination concerned. Data is required on the numbers of tourism-related establishments and their types, as well as their accessibility to people with disabilities. Types and numbers of accommodation establishments are another important part of this section. Finally, 5 indicators related to the area sustainability are included in the tourism industry data. Yearly data is required by partners to fill this section. The entire data section is presented in the following table.

Table 2 Tourism Industry Indices

2.	TOURISM INDUSTRY
	Number of establishments
2.1	♦ Total
2.2	* Of which, Accommodation for visitors
2.3	* Of which, Food and beverage serving activities
2.4	* Of which, Passenger transportation
2.5	* Of which, Travel agencies and other reservation services activities
2.6	* Of which, Convention bureau/congress facilities services activities
2.7	* Of which, Museums
2.8	* Of which, Themes Parks
2.9	* Of which, Archaeological sites
2.10	* Of which, other tourism attractions
2.11	* Of which, other tourism industries
	Number of establishments accessible for people with disabilities
2.12	♦ Total
2.13	* Of which, Hotel and similar accommodations
2.14	* Of which, Holiday and other short-stay accommodation
2.15	* Of which, Camping grounds, recreational vehicle parks and trailer parks
2.16	* Of which, Food and beverage serving activities
2.17	* Of which, Museums
2.18	* Of which, Themes Parks
2.19	* Of which, Archaeological sites
2.20	* Of which, other tourism attractions
	Accommodation for visitors in hotels and similar establishments
	Hotel and similar accommodations
2.21	♦ Total
2.22	* Of which seasonal
2.23	♦ Number of rooms
2.24	♦ Number of beds

	Holiday and other short-stay accommodation
2.25	♦ Total
2.26	* Of which seasonal
2.27	♦ Number of rooms
2.28	♦ Number of beds
	Camping grounds, recreational vehicle parks and trailer parks
2.29	♦ Total
2.30	* Of which seasonal
2.31	♦ Number of rooms
2.32	♦ Number of beds
	Overall Satisfaction
2.33	♦Total
2.34	* Of which, domestic
2.35	* Of which, non-Domestic
	Indicators
2.36	Occupancy rate / rooms
2.37	Occupancy rate / beds
2.38	Average length of stay
2.39	Capacity ratio (beds per 1000 inhabitants)
2.40	Tourists / population

3.3. Tourism Flow (Monthly)

Tourism flow data is important for extracting information on seasonality aspects about the destination. Arrivals and overnights data is gathered and categorized based on tourist originating region, purpose of travel, mode of transport used and accommodation type. Expenditure and tourist satisfaction data are also required. Finally, indicators that show quality characteristics of arrivals are included in this data section. All data is gathered monthly, and the complete table is presented below.

Table 3 Tourism Flow Indices

3.	**TOURISM FLOW**
	Flow
3.1	♦ Total Arrivals
3.2	* Of which, domestic
3.3	♦ Overnight visitors (tourists)
3.4	* Of which, domestic
3.5	♦Daily visitors (no overnights)
3.6	* Of which, cruise passengers
	Arrivals by region
3.7	♦ Total Arrivals
3.8	* Of which from Africa
3.9	* Of which from Americas
3.10	* Of which from Asia
3.11	* Of which from Europe

3.12	* _Of which, domestic_
3.13	* Of which from Oceania
	Arrivals by main purpose
3.14	Total
3.15	♦ Personal
3.16	* Holidays, leisure, and recreation
3.17	* Other personal purposes
3.18	♦ Business and professional
	Arrivals by mode of transport
3.19	♦ Total
3.20	* Of which from by Air
3.21	* Of which from by Sea
3.22	* Of which from by Railway
3.23	* Of which from by Private car
3.24	* Of which from by Other not classified
	Accommodation
	Hotel and similar accommodations
3.25	♦ Arrivals
3.26	* Of which, domestic
3.27	♦ Overnights
3.28	* Of which, domestic
	Holiday and other short-stay accommodation
3.29	♦ Arrivals
3.30	* Of which, domestic
3.31	♦ Overnights
3.32	* Of which, domestic
	Camping grounds, recreational vehicle parks and trailer parks
3.33	♦ Arrivals
3.34	* Of which, domestic
3.35	♦ Overnights
3.36	* Of which, domestic
	Expenditure
3.37	Total
3.38	♦ Domestic
3.39	♦ non-domestic
	Overall Satisfaction
3.40	Total
3.41	♦ Domestic
3.42	♦ non-domestic
3.43	Intention to return
	Indicators
3.44	Average size of travel party
3.45	Average size of travel group
3.46	Average length of stay

3.47	Average expenditure per day

3.4. Web Data (Monthly)

The 4th data section deals with monthly web data, meaning data that can be accessed and gathered from several web platforms and is publicly available. Data gathering can be done utilizing different techniques like web scraping. Specifically, data pertaining establishments, user score and reviews from the most popular online hotel booking platforms are gathered in this section. The complete required set of data is shown in the following table.

Table 4 Web Data Indices

4.	WEB DATA
	Booking.com
4.1	♦Number of establishments
4.2	* Of which, hotel
4.3	* Of which, in apartments
4.4	♦Average Score
4.5	* Of which, hotel
4.6	* Of which, in apartments
4.7	♦Number of reviews
4.8	* Of which, hotel
	* Of which, in apartments
4.9	**Tripadvisor.com**
4.10	♦Number of establishments
4.11	* Of which, hotel
4.12	* Of which, in apartments
4.13	♦ Food and beverage serving activities
4.14	♦ Museums
4.15	♦ Themes Parks
4.16	♦Archaeological sites
4.17	♦Average Score
4.18	* Of which, hotel
4.19	* Of which, restaurants
4.20	* Of which, in apartments
4.21	* Of which, in Museum
4.22	* Of which, in Themes Park
4.23	* Of which, in Archaeological sites
4.24	♦Number of reviews
4.25	* Of which, hotel
4.26	* Of which, restaurants
4.27	* Of which, in apartments
4.28	* Of which, in Museum
4.29	* Of which, in Themes Park
4.30	* Of which, in Archaeological sites

4.31	**AirB&B.com**
4.32	♦Number of establishments
4.33	* Of which, sharing rooms
4.33	* Of which, full apartments
4.34	♦Number of reviews
4.35	* Of which, sharing rooms
4.36	* Of which, full apartments

3.5. European Tourism Indicator System Selection (Yearly)

This section is related to data on sustainable tourism performance. The data indices used here come from the established European Tourism Indicator System (ETIS) that represents a common methodology framework for measuring the sustainable management of destinations and monitoring their performance and progress over time. 32 of the total 67 indicators in the ETIS system were selected for use, and they are presented in the table below. They are related to destination management, economic value, social, cultural, and environmental impact of tourism in the destination.

Table 5 ETIS Selection Indices

5.	**ETIS**
	Destination management
5.1	♦ Tourism enterprises/establishments in the destination using a voluntary certification/labelling for environmental/quality/sustainability and/or Corporate Social Responsibility measures
5.2	♦ Tourists that are satisfied with their overall experience in the destination
5.3	♦ Repeat/return visitors (within 5 years)
	Economic Value
5.4	♦ Number of tourist nights
5.5	♦ Number of same day visitors
5.6	♦ Relative contribution of tourism to the destination's economy (% GDP)
5.7	♦ Daily spending per overnight tourist
5.8	♦ Average length of stay of tourists (nights)
5.9	♦ Occupancy rate in commercial accommodation establishments per month and average for the year
5.10	♦ Direct tourism employment as percentage of total employment in the destination
5.11	♦ Local producer of food, drink, goods, and services
	Social and Cultural Impact
5.12	♦ Number of tourists per resident
5.13	♦Residents who are satisfied with tourism in the destination (per month/season)
5.14	♦ Number of beds available in commercial accommodation
5.15	♦ Number of second homes
5.16	♦ Percentage of men and women employed in the tourism sector

5.17	♦ Tourism enterprises where the general manager position is held by a woman
5.18	♦ Rooms in commercial accommodation establishments accessible for people with disabilities
5.19	♦ Commercial accommodation establishments participating in recognized accessibility information schemes
5.20	♦ Public transport that is accessible to people with disabilities and with specific access requirements
5.21	♦ Tourist attractions that are accessible to people with disabilities and/or participating in recognized accessibility information schemes
5.22	♦ Residents that are satisfied with the impacts of tourism on destination's identity
	Environmental Impact
5.23	♦ Tourists and same day visitors using different modes of transport to arrive at the destination
5.24	♦ Tourists and same day visitors using local/soft mobility/public transport services to get around the destination
5.25	♦ Tourism enterprises involved in climate change mitigation schemes— such as: CO2 offset, low energy systems, etc.—and "adaptation" responses and actions
5.26	♦ Waste production per tourist night compared to general population waste production per person
5.27	♦Tourism enterprises separating different types of waste
5.28	♦Water consumption per tourist night compared to general population water consumption per resident night
5.29	♦ Tourism enterprises taking actions to reduce water consumption
5.30	♦ Energy consumption per tourist night compared to general population energy consumption per resident night
5.31	♦ Tourism enterprises that take actions to reduce energy consumption
5.32	♦ Annual amount of energy consumed from renewable sources (Mwh) compared to overall energy consumption at destination level per year

3.6. Sustainability related data

The requirements indicated by the users' interviews, and especially policy makers, raised the necessity of the definition of new information that will for indicators which will refer to the sustainable tourism factors in the destinations. These indicators are listed in the following table.

Table 6: Sustainable related data

6	**Sustainability related data**
6.1	Air quality alert
6.2	Average duration of contamination events
6.3	Average waste volume per visitor
6.4	Energy Consumption
6.5	Energy Consumption per Accomodation
6.6	Fire alert

6.7	Georeferenced data (GIS digital data) including accessible infrastructure (beaches, parks, and public facilities) and accommodations (coordinates, type of accessible facility).
6.8	Georeferenced data (GIS digital data) including cycling routes, pedestrian paths, and bike parking locations.
6.9	Marine water temperature
6.10	Number of active conservation projects
6.11	Percentage of separated waste
6.12	Recycling volumes
6.13	Snow alert
6.14	Tourist feedback on accessibility
6.15	Tourist satisfaction with enviromental practices
6.16	Water Consuption
6.17	Water Consuption per Accomodation
6.18	Water quality alert
6.19	Water quality indicators

4. Data Availability

4.1. Manual Collected Data

To assess the availability of data for all partners regarding their selected tourist destinations, a preliminary availability check was conducted. The required indicators mentioned in chapter 1 and stemming from the experience of the capitalized InnoXenia project were delivered to all partners and their input on available or not data was requested. For each indicator, partners were required to access available data sources for each destination and respond whether data is available or not. Available data sources were documented for future reference. Finally, data availability was checked at different geographical levels, starting from the lowest level of municipality, and moving up to province (where applicable), region (where applicable) and country level. Answers recorded direct data availability, indirect availability for data that could be retrieved after calculations or processing of existing indicators or data that was completely unavailable.

Results from partner answers regarding each selected destination were processed and an indicator categorization based on data availability and geographical level was made. Indicators were grouped based on the number of destinations that had available data on them. The following tables and charts represent the results of this preliminary process. Indicator groups were selected according to the following list:

1. **Availability** (more than 5 partners recorded data availability)
2. **Partial availability** (3 or 4 partners recorded data availability)
3. **Reduced availability** (2 or less partners recorded data availability)
4. **No availability** (no partner recorded data availability)

The following tables present an overview of data availability for each geographical level in a color-coded format (**light green** for group 1, **dark green** for group 2, **orange** for group 3 and **red** for group 4).

Table 7 Data availability at municipal level

MUNICIPAL LEVEL

1. DESTINATION OVERVIEW (Data)

Destination Profile

#	Item
1.1	Dominant habitats (place an X against all that apply)
1.2	Top five most popular tourist attractions (including environmental and cultural attractions).
1.3	Area
1.4	Population
1.5	Density
1.6	Gross Value added Total
1.7	Gross Value added per capita
1.8	Total tourism expenditure over GDP
1.9	Number of Employees
1.10	* of which, number of direct job in tourism
1.11	* of which, number of women employed in tourism
1.12	Quality of life index
1.13	Criminality index
1.14	International Airports
1.15	♦ Number of daily flights
1.16	* of which, charter flights
	* of which, low cost flights
1.14	Train Stations
1.15	♦ Number of daily stops
1.16	Coaches stations
1.17	♦ Number of daily departures
1.18	Seaports
1.19	♦ Number of daily departures
1.21	Number of establishments accessible for people with disabilities
1.26	* of which, number of accessible Airports
1.27	* of which, number of accessible Train Stations
1.28	* of which, number of accessible Coaches Stations
1.29	* of which, number of accessible Seaports
1.30	Total EU Funds received
	* of which, for tourism
	Sunshine hours
1.32	♦ Total
1.33	* of which, in winter
1.34	* of which, in summer
	Precipitation:
1.35	♦ Total
1.36	* of which, in winter
1.37	* of which, in summer
	Temperature:
1.38	♦ Average of maximum temperature
1.39	* of which, in winter
1.40	* of which, in summer
1.41	♦ Average of minimum temperature
1.42	* of which, in winter
1.43	* of which, in summer
1.44	Number of environmental certifications
	Waste production
1.45	♦ Total
1.46	* of which, from tourism sector
1.47	* of which, from recycling
	Water consumption
1.48	♦ Total
1.49	* of which, from tourism sector
	Energy consumption
1.50	♦ Total
1.51	* of which, from tourism sector

2. TOURISM INDUSTRY (Data)

Number of establishments

#	Item
2.1	♦ Total
2.2	* of which, Accommodation for visitors
2.3	* of which, Food and beverage serving activities
2.4	* of which, Passenger transportation
2.5	* of which, Travel agencies and other reservation services activities
2.6	* of which, Convention bureau/congress facilities services activities
2.7	* of which, Museums
2.8	* of which, Themes Parks
2.9	* of which, Archaeological sites
2.10	* of which, Other tourism attractions
2.11	* of which, Other tourism industries
	Number of establishments accessible for people with disabilities
2.12	* of which, Total
2.13	* of which, Hotel and similar accommodations
2.14	* of which, Holiday and other short-stay accommodation
2.15	* of which, Camping grounds, recreational vehicle parks and trailer parks
2.16	* of which, Food and beverage serving activities
2.17	* of which, Museums
2.18	* of which, Themes Parks
2.19	* of which, Archaeological sites
2.20	* of which, Other tourism attractions
	Accommodation for visitors in hotels and similar establishments
	Hotel and similar accommodations
2.21	♦ Total
2.22	* of which seasonal
2.23	♦ Number of rooms
2.24	♦ Number of beds
	Holiday and other short-stay accommodation
2.25	♦ Total
2.26	* of which seasonal
2.27	♦ Number of rooms
2.28	♦ Number of beds
	Camping grounds, recreational vehicle parks and trailer parks
2.29	♦ Total
2.30	* of which seasonal
2.31	♦ Number of rooms
2.32	♦ Number of beds
	Indicators
2.33	♦ Total
2.34	* of which, domestic
2.35	* of which, non Domestic
2.36	Occupancy rate / rooms
2.37	Occupancy rate / beds
2.38	Average length of stay
2.39	Capacity ratio (beds per 1000 inhabitants)
2.40	Tourists / population

3. TOURISM FLOW (Data)

Flow

#	Item
3.1	♦ Total Arrivals
3.2	* of which, domestic
3.3	♦ Overnight visitors (tourists)
3.4	* of which, domestic
3.5	♦ Daily visitors (no overnights)
3.6	* of which, cruise passengers
	Arrivals by region
3.7	♦ Total Arrivals
3.8	* of which from Africa
3.9	* of which from Americas
3.10	* of whch from Asia
3.11	* of which from Europe
3.12	* of which, domestic
3.13	* of whch from Oceania
	Arrivals by main purpose
3.14	Total
3.15	♦ Personal
3.16	* holidays, leisure and recreation
3.17	* other personal purposes
3.18	♦ Business and professional
	Arrivals by mode of transport
3.19	♦ Total
3.20	* of which from by Air
3.21	* of which from by Sea
3.22	* of which from by Railway
3.23	* of which from by Private car
3.24	* of which from by Other not classified
	Accommodation
	Hotel and similar accommodations
3.25	♦ Arrivals
3.26	* of which, domestic
3.27	♦ Overnights
3.28	* of which, domestic
	Holiday and other short-stay accommodation
3.29	♦ Arrivals
3.30	* of which, domestic
3.31	♦ Overnights
3.32	* of which, domestic
	Camping grounds, recreational vehicle parks and trailer parks
3.33	♦ Arrivals
3.34	* of which, domestic
3.35	♦ Overnights
3.36	* of which, domestic
	Expenditure
3.37	♦ Total
3.38	♦ Domestic
3.39	♦ Non Domestic
	Overall Satisfaction
3.40	♦ Total
3.41	♦ Domestic
3.42	♦ Non Domestic
3.43	Intention to return
	Indicators
3.44	Average size of travel party
3.45	Average size of travel group
3.46	Average length of stay
3.47	Average expenditure per day

5. ETIS (Data)

Destination management

#	Item
5.1	♦ Tourism enterprises/establishments in the destination using a voluntary certification/labelling for environmental/quality/sustainability and/or Corporate Social Responsability measures
5.2	♦ Tourists that are satisfied with their overall experience in the destination
5.3	♦ Repeat/return visitors (within 5 years)
	Economic Value
5.4	♦ Number of tourist nights
5.5	♦ Number of same day visitors
5.6	♦ Relative contribution of tourism to the destination's economy (% GDP)
5.7	♦ Daily spending per overnight tourist
5.8	♦ Average length of stay of tourists (nights)
5.9	♦ Occupancy rate in commercial accommodation establishments per month and average for the year
5.10	♦ Direct tourism employment as percentage of total employment in the destination
5.11	♦ Local producer of food, drink, goods and services
	Social and Cultural Impact
5.12	♦ Number of tourists per residents
5.13	♦ Residents who are satisfied with tourism in the destination (per month/season)
5.14	♦ Number of beds available in commercial accomodation
5.15	♦ Number of second homes
5.16	♦ Percentage of men and women employed in the tourism sector
5.17	♦ Tourism enterprises where the general manager position is held by a woman
5.18	♦ Rooms in commercial accomodation establishments accessible for people with disabilities
5.19	♦ Commercial accommodation establishments participating in recognised accessibility information schemes
5.20	♦ Public transport that is accessible to people with disabilities and with specific access requirements
5.21	♦ Tourist attractions that are accessible to people with disabilities and/or participating in recognised accessibility information schemes
5.22	♦ Residents that are satisfied with the impacts of tourism on destination's identity
	Environmental Impact
5.23	♦ Tourists and same day visitors using different modes of transport to arrive at the destination
5.24	♦ Tourists and same day visitors using local/soft mobility/public transport services to get around the destination
5.25	♦ Tourism enterprises involved in climate change mitigation schemes—such as: CO2 offset, low energy systems, etc.—and "adaptation" responses and actions
5.26	♦ Waste production per tourist night compared to general population waste production per person
5.27	♦ Tourism enterprises separating different types of waste
5.28	♦ Water consumption per tourist night compared to general population water consumption per resident night
5.29	♦ Tourism enterprises taking actions to reduce water consumption
5.30	♦ Energy consumption per tourist night compared to general population energy consumption per resident night
5.31	♦ Tourism enterprises that take actions to reduce energy consumption
5.32	♦ Annual amount of energy consumed from renewable sources (Mwh) compared to overall energy consumption at destination level per year

Table 8 Data availability at provincial level

	PROVINCIAL LEVEL						
1.	**DESTINATION OVERVIEW**	**2.**	**TOURISM INDUSTRY**	**3.**	**TOURISM FLOW**	**5.**	**ETIS**
	Data		*Data*		*Data*		*Data*
	Destination Profile		**Number of establishments**		**Flow**		**Destination management**
1.1	Dominant habitats (place an X against all that apply)	2.1	◆ Total	3.1	◆ Total Arrivals	5.1	◆ Tourism enterprises/establishments in the destination using a voluntary certification/labelling for environmental/quality/sustainability and/or Corporate Social Responsability measures
1.2	Top five most popular tourist attractions (including environmental and cultural attractions).	2.2	* of which, Accommodation for visitors	3.2	* of which, domestic	5.2	◆ Tourists that are satisfied with their overall experience in the destination
1.3	Area	2.3	* of which, Food and beverage serving activities	3.3	◆ Overnight visitors (tourists)	5.3	◆ Repeat/return visitors (within 5 years)
1.4	Population	2.4	* of which, Passenger transportation	3.4	* of which, domestic		**Economic Value**
1.5	Density	2.5	* of which, Travel agencies and other reservation services activities	3.5	◆Daily visitors (no overnights)	5.4	◆ Number of tourist nights
1.6	Gross Value added Total	2.6	* of which, Convention bureau/congress facilities services activities	3.6	* of which, cruise passengers	5.5	◆ Number of same day visitors
1.7	Gross Value added per capita	2.7	* of which, Museums		**Arrivals by region**	5.6	◆ Relative contribution of tourism to the destination's economy (% GDP)
1.8	Total tourism expenditure over GDP	2.8	* of which, Themes Parks	3.7	◆ Total Arrivals	5.7	◆ Daily spending per overnight tourist
1.9	Number of Employees	2.9	* of which, Archaeological sites	3.8	* of which from Africa	5.8	◆ Average length of stay of tourists (nights)
1.10	* of which, number of direct job in tourism	2.10	* of which, Other tourism attractions	3.9	* of which from Americas	5.9	◆ Occupancy rate in commercial accommodation establishments per month and average for the year
1.11	* of which, number of women employed in tourism	2.11	* of which, Other tourism industries	3.10	* of which from Asia	5.10	◆ Direct tourism employment as percentage of total employment in the destination
1.12	Quality of life index		**Number of establishments accessible for people with disabilities**	3.11	* of which from Europe	5.11	◆ Local producer of food, drink, goods and services
1.13	Criminality index	2.12	◆ Total	3.12	* of which, domestic		**Social and Cultural Impact**
1.14	International Airports	2.13	* of which, Hotel and similar accommodations	3.13	* of which from Oceania	5.12	◆ Number of tourists per residents
1.15	◆ Number of daily flights	2.14	* of which, Holiday and other short-stay accommodation		**Arrivals by main purpose**	5.13	◆Residents who are satisfied with tourism in the destination (per month/season)
1.16	* of which, charter flights	2.15	* of which, Camping grounds, recreational vehicle parks and trailer parks	3.14	Total	5.14	◆ Number of beds available in commercial accomodation
	* of which, low cost flights	2.16	* of which, Food and beverage serving activities	3.15	◆ Personal	5.15	◆ Number of second homes
1.14	Train Stations	2.17	* of which, Museums	3.16	* holidays, leisure and recreation	5.16	◆ Percentage of men and women employed in the tourism sector
1.15	◆ Number of daily stops	2.18	* of which, Themes Parks	3.17	* other personal purposes	5.17	◆ Tourism enterprises where the general manager position is held by a woman
1.16	Coaches stations	2.19	* of which, Archaeological sites	3.18	◆ Business and professional	5.18	◆ Rooms in commercial accomodation establishments accessible for people with disabilities
1.17	◆ Number of daily departures	2.20	* of which, Other tourism attractions		**Arrivals by mode of transport**	5.19	◆ Commercial accommodation establishments participating in recognised accessibility information schemes
1.18	Seaports		**Accommodation for visitors in hotels and similar establishments**	3.19	◆ Total	5.20	◆ Public transport that is accessible to people with disabilities and with specific access requirements
1.19	◆ Number of daily departures		**Hotel and similar accommodations**	3.20	* of which from by Air	5.21	◆ Tourist attractions that are accessible to people with disabilities and/or participating in recognised accessibility information schemes
1.21	Number of establishments *accessible for people with disabilities*	2.21	◆ Total	3.21	* of which from by Sea	5.22	◆ Residents that are satisfied with the impacts of tourism on destination's identity
1.26	* of which, number of accessible Airports	2.22	* of which seasonal	3.22	* of which from by Railway		**Environmental Impact**
1.27	* of which, number of accessible Train Stations	2.23	◆ Number of rooms	3.23	* of which from by Private car	5.23	◆ Tourists and same day visitors using different modes of transport to arrive at the destination
1.28	* of which, number of accessible Coaches Stations	2.24	◆ Number of beds	3.24	* of which from by Other not classified	5.24	◆ Tourists and same day visitors using local/soft mobility/public transport services to get around the destination
1.29	* of which, number of accessible Seaports		**Holiday and other short-stay accommodation**		**Accommodation**	5.25	◆ Tourism enterprises involved in climate change mitigation schemes—such as: CO2 offset, low energy systems, etc.—and "adaptation" responses and actions
1.30	Total EU Funds received	2.25	◆ Total		**Hotel and similar accommodations**	5.26	◆ Waste production per tourist night compared to general population waste production per person
	* of which, for tourism	2.26	* of which seasonal	3.25	◆ Arrivals	5.27	◆ Tourism enterprises separating different types of waste
	Sunshine hours	2.27	◆ Number of rooms	3.26	* of which, domestic	5.28	◆Water consumption per tourist night compared to general population water consumption per resident night
1.32	◆ Total	2.28	◆ Number of beds	3.27	◆ Overnights	5.29	◆ Tourism enterprises taking actions to reduce water consumption
1.33	* of which, in winter		**Camping grounds, recreational vehicle parks and trailer parks**	3.28	* of which, domestic	5.30	◆ Energy consumption per tourist night compared to general population energy consumption per resident night
1.34	* of which, in summer	2.29	◆ Total		**Holiday and other short-stay accommodation**	5.31	◆ Tourism enterprises that take actions to reduce energy consumption
	Precipitation:	2.30	* of which seasonal	3.29	◆ Arrivals	5.32	◆ Annual amount of energy consumed from renewable sources (Mwh) compared to overall energy consumption at destination level per year
1.35	◆ Total	2.31	◆ Number of rooms	3.30	* of which, domestic		
1.36	* of which, in winter	2.32	◆ Number of beds	3.31	◆ Overnights		
1.37	* of which, in summer		**Overall Satisfaction**	3.32	* of which, domestic		
	Temperature:	2.33	◆Total		**Camping grounds, recreational vehicle parks and trailer parks**		
1.38	◆ Average of maximum temperature	2.34	* of which, domestic	3.33	◆ Arrivals		
1.39	* of which, in winter	2.35	* of which, non Domestic	3.34	* of which, domestic		
1.40	* of which, in summer			3.35	◆ Overnights		
1.41	◆Average of minimum temperature		**Indicators**	3.36	* of which, domestic		
1.42	* of which, in winter	2.36	Occupancy rate / rooms		**Expenditure**		
1.43	* of which, in summer	2.37	Occupancy rate / beds	3.37	Total		
1.44	Number of environmental certifications	2.38	Average length of stay	3.38	◆ Domestic		
	Waste production	2.39	Capacity ratio (beds per 1000 inhabitants)	3.39	◆ Non Domestic		
1.45	◆ Total	2.40	Tourists / population		**Overall Satisfaction**		
1.46	* of which, from tourism sector			3.40	◆ Total		
1.47	* of which, from recycling			3.41	◆Domestic		
	Water consumption			3.42	◆ Non Domestic		
1.48	◆ Total			3.43	Intention to return		
1.49	* of which, from tourism sector						
	Energy consumption				**Indicators**		
1.50	◆ Total			3.44	Average size of travel party		
1.51	* of which, from tourism sector			3.45	Average size of travel group		
				3.46	Average length of stay		
				3.47	Average expenditure per day		

Table 9 Data availability at regional level

	REGIONAL LEVEL						
1.	**DESTINATION OVERVIEW**	**2.**	**TOURISM INDUSTRY**	**3.**	**TOURISM FLOW**	**5.**	**ETIS**
	Data		*Data*		*Data*		*Data*
	Destination Profile		**Number of establishments**		**Flow**		**Destination management**
1.1	Dominant habitats (place an X against all that apply)	2.1	♦ Total	3.1	♦ Total Arrivals	5.1	♦ Tourism enterprises/establishments in the destination using a voluntary certification/labelling for environmental/quality/sustainability and/or Corporate Social Responsability measures
1.2	Top five most popular tourist attractions (including environmental and cultural attractions).	2.2	* of which, Accommodation for visitors	3.2	* of which, domestic	5.2	♦ Tourists that are satisfied with their overall experience in the destination
1.3	Area	2.3	* of which, Food and beverage serving activities	3.3	♦ Overnight visitors (tourists)	5.3	♦ Repeat/return visitors (within 5 years)
1.4	Population	2.4	* of which, Passenger transportation	3.4	* of which, domestic		**Economic Value**
1.5	Density	2.5	* of which, Travel agencies and other reservation services activities	3.5	♦Daily visitors (no overnights)	5.4	♦ Number of tourist nights
1.6	Gross Value added Total	2.6	* of which, Convention bureau/congress facilities services activities	3.6	* of which, cruise passengers	5.5	♦ Number of same day visitors
1.7	Gross Value added per capita	2.7	* of which, Museums		**Arrivals by region**	5.6	♦ Relative contribution of tourism to the destination's economy (% GDP)
1.8	Total tourism expenditure over GDP	2.8	* of which, Themes Parks	3.7	♦ Total Arrivals	5.7	♦ Daily spending per overnight tourist
1.9	Number of Employees	2.9	* of which, Archaeological sites	3.8	* of which from Africa	5.8	♦ Average length of stay of tourists (nights)
1.10	* of which, number of direct job in tourism	2.10	* of which, Other tourism attractions	3.9	* of which from Americas	5.9	♦ Occupancy rate in commercial accommodation establishments per month and average for the year
1.11	* of which, number of women employed in tourism	2.11	* of which, Other tourism industries	3.10	* of which from Asia	5.10	♦ Direct tourism employment as percentage of total employment in the destination
1.12	Quality of life index		**Number of establishments accessible for people with disabilities**	3.11	* of which from Europe	5.11	♦ Local producer of food, drink, goods and services
1.13	Criminality index	2.12	♦ Total	3.12	* of which, domestic		**Social and Cultural Impact**
1.14	International Airports	2.13	* of which, Hotel and similar accommodations	3.13	* of which from Oceania	5.12	♦ Number of tourists per residents
1.15	♦ Number of daily flights	2.14	* of which, Holiday and other short-stay accommodation		**Arrivals by main purpose**	5.13	♦Residents who are satisfied with tourism in the destination (per month/season)
1.16	* of which, charter flights	2.15	* of which, Camping grounds, recreational vehicle parks and trailer parks	3.14	Total	5.14	♦ Number of beds available in commercial accomodation
	* of which, low cost flights	2.16	* of which, Food and beverage serving activities	3.15	♦ Personal	5.15	♦ Number of second homes
1.14	Train Stations	2.17	* of which, Museums	3.16	* holidays, leisure and recreation	5.16	♦ Percentage of men and women employed in the tourism sector
1.15	♦ Number of daily stops	2.18	* of which, Themes Parks	3.17	* other personal purposes	5.17	♦ Tourism enterprises where the general manager position is held by a woman
1.16	Coaches stations	2.19	* of which, Archaeological sites	3.18	♦ Business and professional	5.18	♦ Rooms in commercial accomodation establishments accessible for people with disabilities
1.17	♦ Number of daily departures	2.20	* of which, Other tourism attractions		**Arrivals by mode of transport**	5.19	♦ Commercial accommodation establishments participating in recognised accessibility information schemes
1.18	Seaports		**Accommodation for visitors in hotels and similar establishments**	3.19	♦ Total	5.20	♦ Public transport that is accessible to people with disabilities and with specific access requirements
1.19	♦ Number of daily departures		**Hotel and similar accommodations**	3.20	* of which from by Air	5.21	♦ Tourist attractions that are accessible to people with disabilities and/or participating in recognised accessibility information schemes
1.21	Number of establishments *accessible for people with disabilities*	2.21	♦ Total	3.21	* of which from by Sea	5.22	♦ Residents that are satisfied with the impacts of tourism on destination's identity
1.26	* of which, number of accessible Airports	2.22	* of which seasonal	3.22	* of which from by Railway		**Environmental Impact**
1.27	* of which, number of accessible Train Stations	2.23	♦ Number of rooms	3.23	* of which from by Private car	5.23	♦ Tourists and same day visitors using different modes of transport to arrive at the destination
1.28	* of which, number of accessible Coaches Stations	2.24	♦ Number of beds	3.24	* of which from by Other not classified	5.24	♦ Tourists and same day visitors using local/soft mobility/public transport services to get around the destination
1.29	* of which, number of accessible Seaports		**Holiday and other short-stay accommodation**		**Accommodation**	5.25	♦ Tourism enterprises involved in climate change mitigation schemes—such as: CO2 offset, low energy systems, etc.—and "adaptation" responses and actions
1.30	Total EU Funds received	2.25	♦ Total		**Hotel and similar accommodations**	5.26	♦ Waste production per tourist night compared to general population waste production per person
	* of which, for tourism	2.26	* of which seasonal	3.25	♦ Arrivals	5.27	♦Tourism enterprises separating different types of waste
	Sunshine hours	2.27	♦ Number of rooms	3.26	* of which, domestic	5.28	♦Water consumption per tourist night compared to general population water consumption per resident night
1.32	♦ Total	2.28	♦ Number of beds	3.27	♦ Overnights	5.29	♦ Tourism enterprises taking actions to reduce water consumption
1.33	* of which, in winter		**Camping grounds, recreational vehicle parks and trailer parks**	3.28	* of which, domestic	5.30	♦ Energy consumption per tourist night compared to general population energy consumption per resident night
1.34	* of which, in summer	2.29	♦ Total		**Holiday and other short-stay accommodation**	5.31	♦ Tourism enterprises that take actions to reduce energy consumption
	Precipitation:	2.30	* of which seasonal	3.29	♦ Arrivals	5.32	♦ Annual amount of energy consumed from renewable sources (Mwh) compared to overall energy consumption at destination level per year
1.35	♦ Total	2.31	♦ Number of rooms	3.30	* of which, domestic		
1.36	* of which, in winter	2.32	♦ Number of beds	3.31	♦ Overnights		
1.37	* of which, in summer		**Overall Satisfaction**	3.32	* of which, domestic		
	Temperature:	2.33	♦Total		**Camping grounds, recreational vehicle parks and trailer parks**		
1.38	♦ Average of maximum temperature	2.34	* of which, domestic	3.33	♦ Arrivals		
1.39	* of which, in winter	2.35	* of which, non Domestic	3.34	* of which, domestic		
1.40	* of which, in summer		**Indicators**	3.35	♦ Overnights		
1.41	♦Average of minimum temperature	2.36	Occupancy rate / rooms	3.36	* of which, domestic		
1.42	* of which, in winter	2.37	Occupancy rate / beds		**Expenditure**		
1.43	* of which, in summer	2.38	Average length of stay	3.37	♦ Total		
1.44	Number of environmental certifications	2.39	Capacity ratio (beds per 1000 inhabitants)	3.38	♦ Domestic		
	Waste production	2.40	Tourists / population	3.39	♦ Non Domestic		
1.45	♦ Total				**Overall Satisfaction**		
1.46	* of which, from tourism sector			3.40	♦ Total		
1.47	* of which, from recycling			3.41	♦ Domestic		
	Water consumption			3.42	♦ Non Domestic		
1.48	♦ Total			3.43	♦ Intention to return		
1.49	* of which, from tourism sector				**Indicators**		
	Energy consumption			3.44	Average size of travel party		
1.50	♦ Total			3.45	Average size of travel group		
1.51	* of which, from tourism sector			3.46	Average length of stay		
				3.47	Average expenditure per day		

Table 10 Data availability at national level

NATIONAL LEVEL

1. DESTINATION OVERVIEW — Data — Destination Profile

No.	Item
1.1	Dominant habitats (place an X against all that apply)
1.2	Top five most popular tourist attractions (including environmental and cultural attractions).
1.3	Area
1.4	Population
1.5	Density
1.6	Gross Value added Total
1.7	Gross Value added per capita
1.8	Total tourism expenditure over GDP
1.9	Number of Employees
1.10	* of which, number of direct job in tourism
1.11	* of which, number of women employed in tourism
1.12	Quality of life index
1.13	Criminality index
1.14	International Airports
1.15	♦ Number of daily flights
1.16	* of which, charter flights
	* of which, low cost flights
1.14	Train Stations
1.15	♦ Number of daily stops
1.16	Coaches stations
1.17	♦ Number of daily departures
1.18	Seaports
1.19	♦ Number of daily departures
1.21	Number of establishments *accessible for people with disabilities*
1.26	* of which, number of accessible Airports
1.27	* of which, number of accessible Train Stations
1.28	* of which, number of accessible Coaches Stations
1.29	* of which, number of accessible Seaports
1.30	Total EU Funds received
1.26	* of which, for tourism
	Sunshine hours
1.32	♦ Total
1.33	* of which, in winter
1.34	* of which, in summer
	Precipitation:
1.35	♦ Total
1.36	* of which, in winter
1.37	* of which, in summer
	Temperature:
1.38	♦ Average of maximum temperature
1.39	* of which, in winter
1.40	* of which, in summer
1.41	♦ Average of minimum temperature
1.42	* of which, in winter
1.43	* of which, in summer
1.44	Number of environmental certifications
	Waste production
1.45	♦ Total
1.46	* of which, from tourism sector
1.47	* of which, from recycling
	Water consumption
1.48	♦ Total
1.49	* of which, from tourism sector
	Energy consumption
1.50	♦ Total
1.51	* of which, from tourism sector

2. TOURISM INDUSTRY — Data — Number of establishments

No.	Item
2.1	♦ Total
2.2	* of which, Accommodation for visitors
2.3	* of which, Food and beverage serving activities
2.4	* of which, Passenger transportation
2.5	* of which, Travel agencies and other reservation services activities
2.6	* of which, Convention bureau/congress facilities services activities
2.7	* of which, Museums
2.8	* of which, Themes Parks
2.9	* of which, Archaeological sites
2.10	* of which, Other tourism attractions
2.11	* of which, Other tourism industries
	Number of establishments accessible for people with disabilities
2.12	♦ Total
2.13	* of which, Hotel and similar accommodations
2.14	* of which, Holiday and other short-stay accommodation
2.15	* of which, Camping grounds, recreational vehicle parks and trailer parks
2.16	* of which, Food and beverage serving activities
2.17	* of which, Museums
2.18	* of which, Themes Parks
2.19	* of which, Archaeological sites
2.20	* of which, Other tourism attractions
	Accommodation for visitors in hotels and similar establishments
	Hotel and similar accommodations
2.21	♦ Total
2.22	* of which seasonal
2.23	♦ Number of rooms
2.24	♦ Number of beds
	Holiday and other short-stay accommodation
2.25	♦ Total
2.26	* of which seasonal
2.27	♦ Number of rooms
2.28	♦ Number of beds
	Camping grounds, recreational vehicle parks and trailer parks
2.29	♦ Total
2.30	* of which seasonal
2.31	♦ Number of rooms
2.32	♦ Number of beds
	Overall Satisfaction
2.33	♦ Total
2.34	* of which, domestic
2.35	* of which, non Domestic
	Indicators
2.36	Occupancy rate / rooms
2.37	Occupancy rate / beds
2.38	Average length of stay
2.39	Capacity ratio (beds per 1000 inhabitants)
2.40	Tourists / population

3. TOURISM FLOW — Data — Flow

No.	Item
3.1	♦ Total Arrivals
3.2	* of which, domestic
3.3	♦ Overnight visitors (tourists)
3.4	* of which, domestic
3.5	♦ Daily visitors (no overnights)
3.6	* of which, cruise passengers
	Arrivals by region
3.7	♦ Total Arrivals
3.8	* of which from Africa
3.9	* of which from Americas
3.10	* of which from Asia
3.11	* of which from Europe
3.12	* of which, domestic
3.13	* of which from Oceania
	Arrivals by main purpose
3.14	Total
3.15	♦ Personal
3.16	* holidays, leisure and recreation
3.17	* other personal purposes
3.18	♦ Business and professional
	Arrivals by mode of transport
3.19	♦ Total
3.20	* of which from by Air
3.21	* of which from by Sea
3.22	* of which from by Railway
3.23	* of which from by Private car
3.24	* of which from by Other not classified
	Accommodation
	Hotel and similar accommodations
3.25	♦ Arrivals
3.26	* of which, domestic
3.27	♦ Overnights
3.28	* of which, domestic
	Holiday and other short-stay accommodation
3.29	♦ Arrivals
3.30	* of which, domestic
3.31	♦ Overnights
3.32	* of which, domestic
	Camping grounds, recreational vehicle parks and trailer parks
3.33	♦ Arrivals
3.34	* of which, domestic
3.35	♦ Overnights
3.36	* of which, domestic
	Expenditure
3.37	Total
3.38	♦ Domestic
3.39	♦ Non Domestic
	Overall Satisfaction
3.40	Total
3.41	♦ Domestic
3.42	♦ Non Domestic
3.43	Intention to return
	Indicators
3.44	Average size of travel party
3.45	Average size of travel group
3.46	Average length of stay
3.47	Average expenditure per day

5. ETIS — Data — Destination management

No.	Item
5.1	♦ Tourism enterprises/establishments in the destination using a voluntary certification/labelling for environmental/quality/sustainability and/or Corporate Social Responsability measures
5.2	♦ Tourists that are satisfied with their overall experience in the destination
5.3	♦ Repeat/return visitors (within 5 years)
	Economic Value
5.4	♦ Number of tourist nights
5.5	♦ Number of same day visitors
5.6	♦ Relative contribution of tourism to the destination's economy (% GDP)
5.7	♦ Daily spending per overnight tourist
5.8	♦ Average length of stay of tourists (nights)
5.9	♦ Occupancy rate in commercial accommodation establishments per month and average for the year
5.10	♦ Direct tourism employment as percentage of total employment in the destination
5.11	♦ Local producer of food, drink, goods and services
	Social and Cultural Impact
5.12	♦ Number of tourists per residents
5.13	♦ Residents who are satisfied with tourism in the destination (per month/season)
5.14	♦ Number of beds available in commercial accomodation
5.15	♦ Number of second homes
5.16	♦ Percentage of men and women employed in the tourism sector
5.17	♦ Tourism enterprises where the general manager position is held by a woman
5.18	♦ Rooms in commercial accommodation establishments accessible for people with disabilities
5.19	♦ Commercial accommodation establishments participating in recognised accessibility information schemes
5.20	♦ Public transport that is accessible to people with disabilities and with specific access requirements
5.21	♦ Tourist attractions that are accessible to people with disabilities and/or participating in recognised accessibility information schemes
5.22	♦ Residents that are satisfied with the impacts of tourism on destination's identity
	Environmental Impact
5.23	♦ Tourists and same day visitors using different modes of transport to arrive at the destination
5.24	♦ Tourists and same day visitors using local soft mobility/public transport services to get around the destination
5.25	♦ Tourism enterprises involved in climate change mitigation schemes—such as: CO2 offset, low energy systems, etc.—and "adaptation" responses and actions
5.26	♦ Waste production per tourist night compared to general population waste production per person
5.27	♦ Tourism enterprises separating different types of waste
5.28	♦ Water consumption per tourist night compared to general population water consumption per resident night
5.29	♦ Tourism enterprises taking actions to reduce water consumption
5.30	♦ Energy consumption per tourist night compared to general population energy consumption per resident night
5.31	♦ Tourism enterprises that take actions to reduce energy consumption
5.32	♦ Annual amount of energy consumed from renewable sources (Mwh) compared to overall energy consumption at destination level per year

The following charts show availability percentages of the required tourism indicators, grouped by data section or by geographical level of administration.
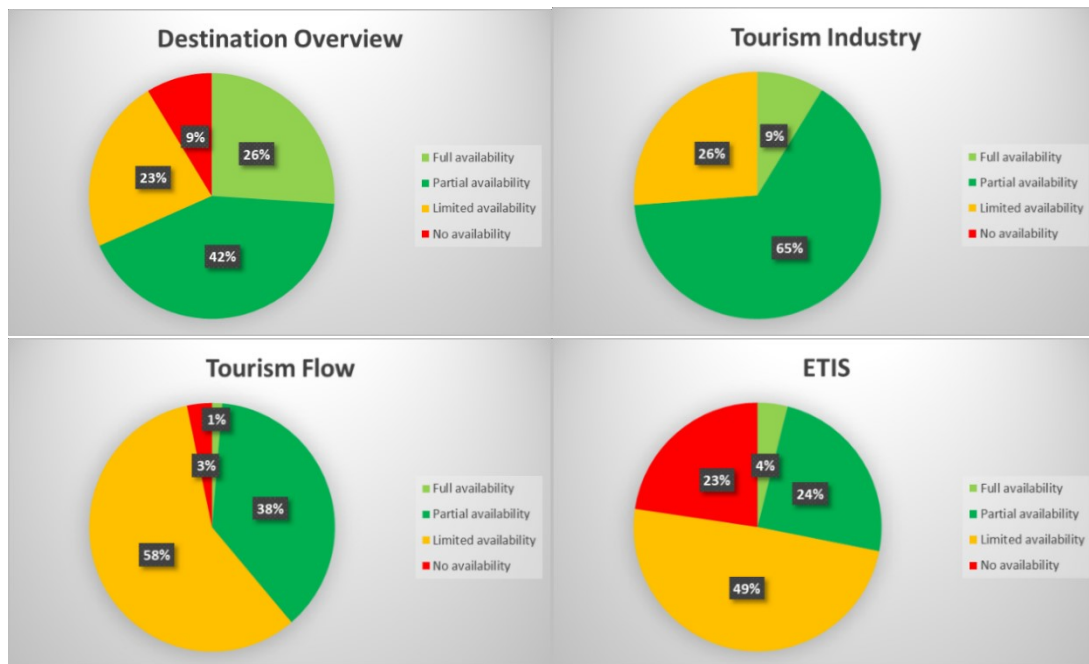
Figure 1 Data availability analysis based on data section
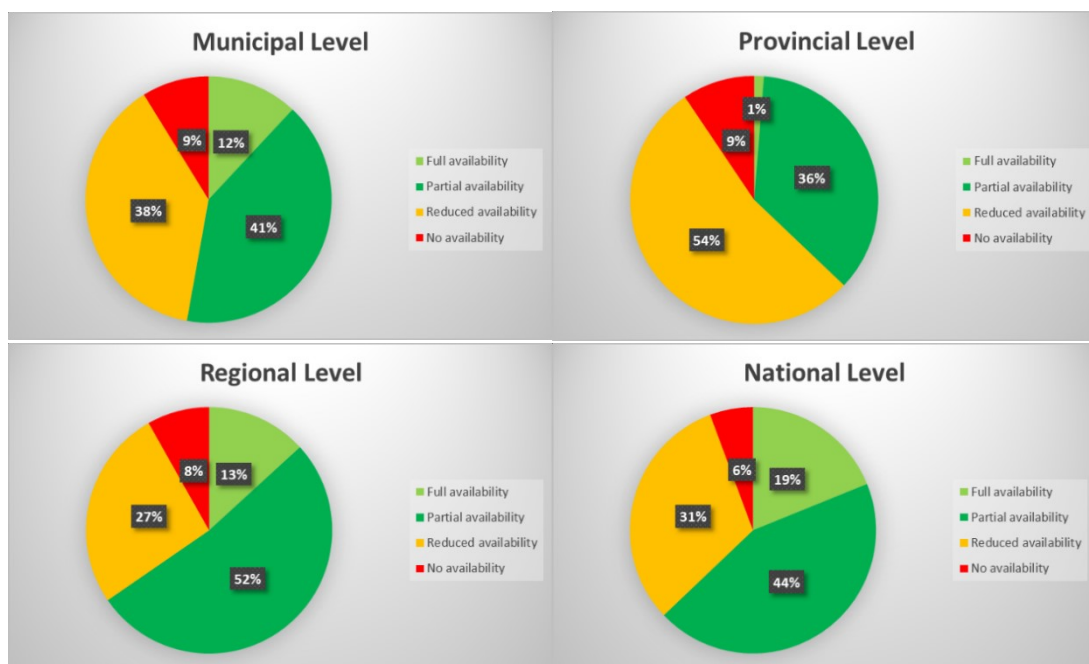
Figure 2 Data availability analysis based on geographical level

From the above charts it is obvious that Destination Overview and Tourism Industry sections have high data availability across most partner areas, while ETIS indicators have the lowest availability (28% full or partial availability). In terms of geographical area, the provincial level is the most problematic for data acquisition, while regional ana national levels appear to be quite high, with data availability (full and partial) well over 60%.

The following figures provide a more detailed view of available data per geographical administration level and data section. We observe a general increase in data availability as we move from local to national level across all data sections. The tourism industry

section is the only data category where there are no unavailable indices. ETIS indicators appear to be the least available, especially for local administration levels.
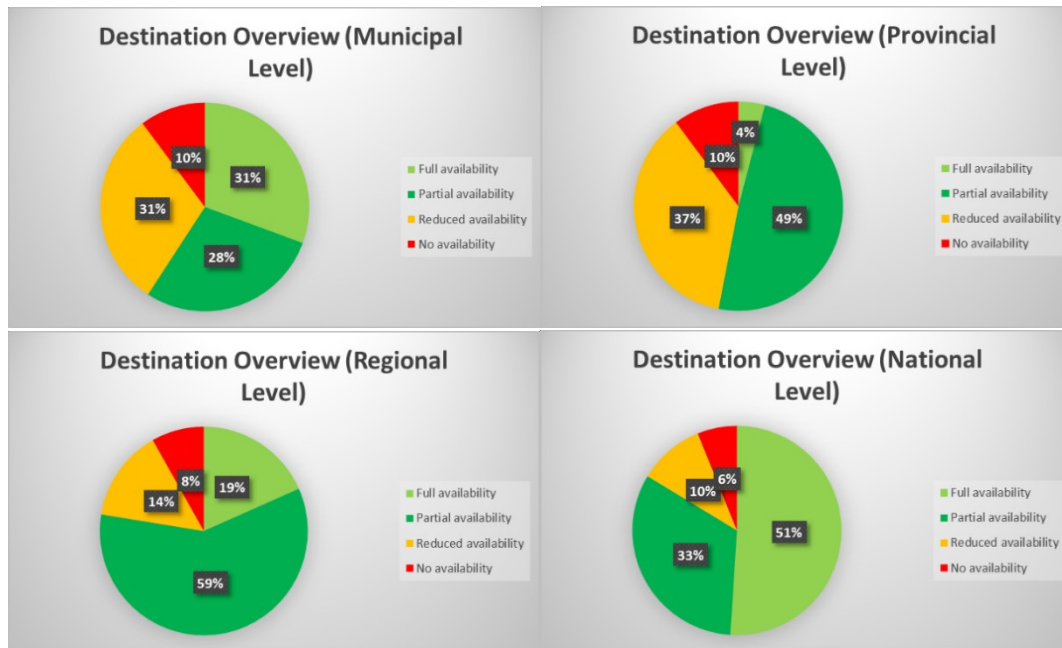
Figure 3 Destination overview data availability per geographical level
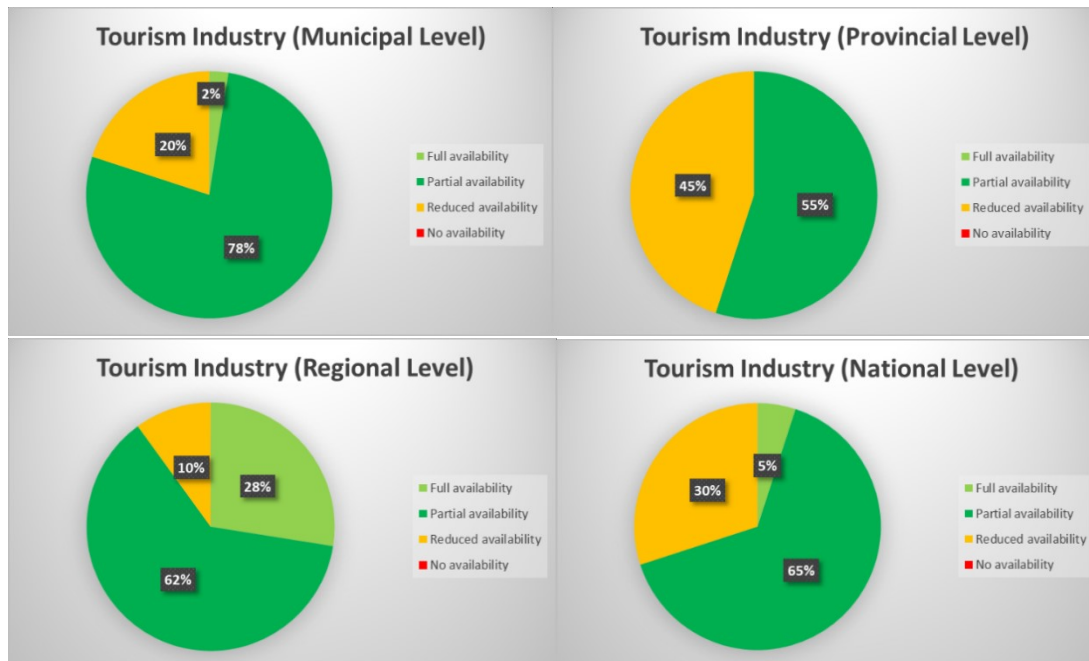
Figure 4 Tourism industry data availability per geographical level
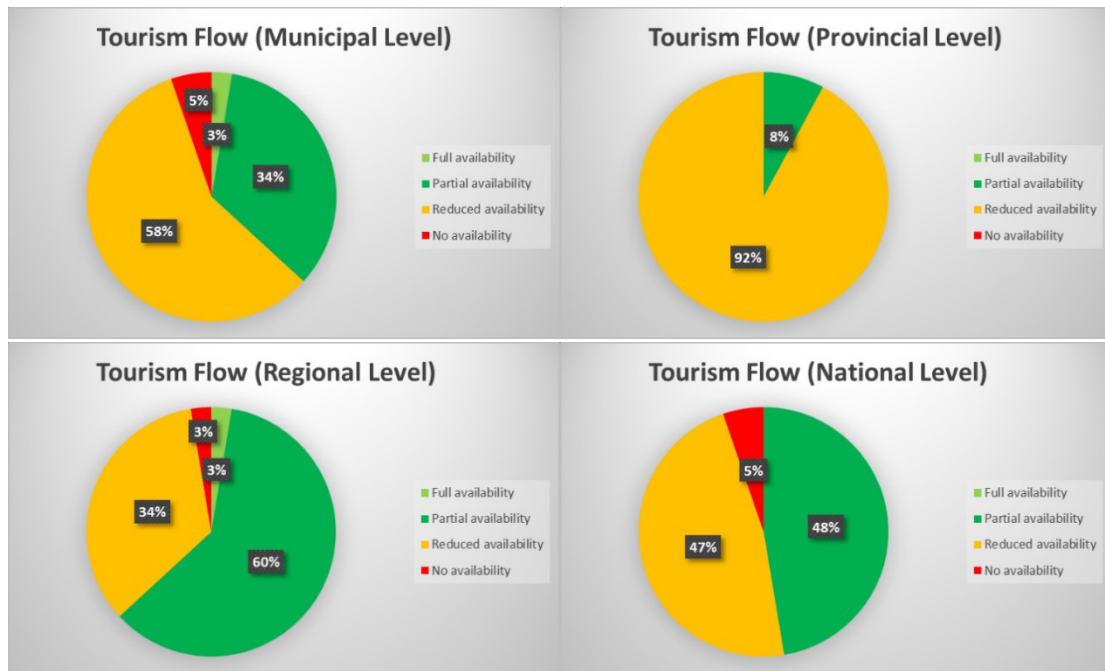
Figure 5 Tourism flow data availability per geographical level
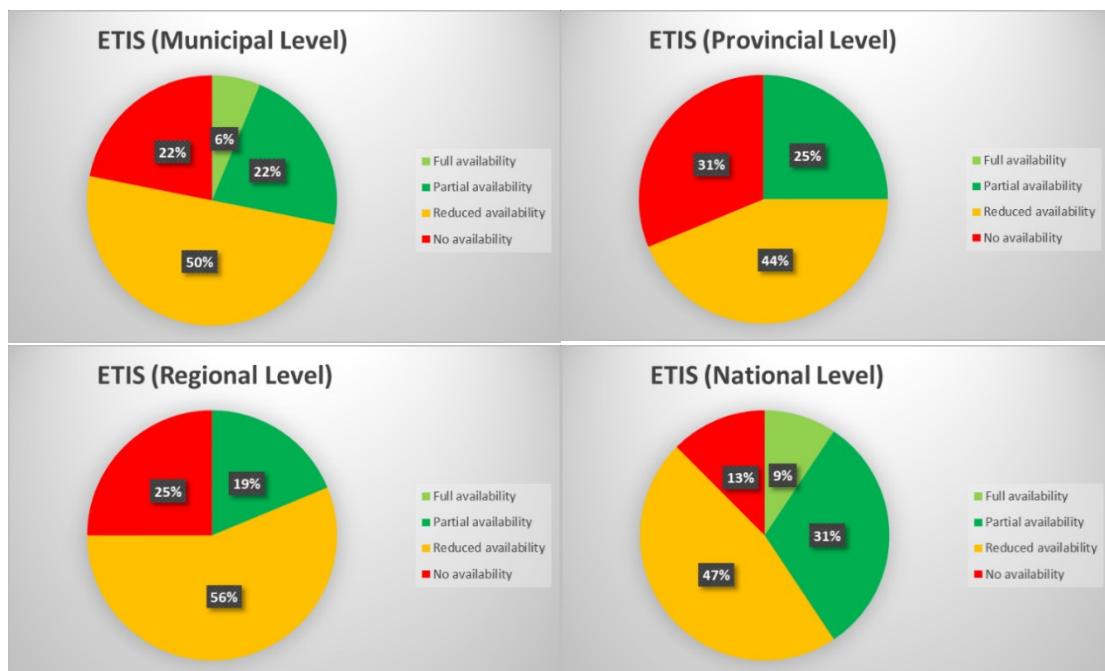
Figure 6 ETIS indicators data availability per geographical level

4.2. Web Data Availability

This chapter presents an overview of the availability of tourism related data that can be harvested online, using web scraping techniques. An introduction to cloud-based web scraping services is made, followed by a presentation of the selected web scraping platform that will be used for data retrieval. Further data related to meteorological conditions can also be retrieved using APIs. Preliminary testing of web scraping tools has led to an updated list of web data indices that are available for the up-scaled DMSS

platform. Finally, information on the pricing of web scraping tools required is presented in the last section of this chapter.

4.2.1. Web scraping using cloud services

A cloud-based web scraping platform offers numerous advantages over running scrapers on local machines or self-managed infrastructure, making it a preferred choice for many users. One of the primary benefits is scalability. These platforms are designed to handle large-scale scraping tasks effortlessly, whether extracting data from a few pages or millions across multiple websites. Resources like CPU, memory, and bandwidth are automatically scaled based on demand, allowing a focus on tasks without concerns about infrastructure limitations.

Another key advantage is the lack of infrastructure management. Cloud-based solutions eliminate the need to set up servers or maintain hardware. All aspects, from system updates to troubleshooting failures, are handled by the platform, freeing users from the complexities of server maintenance. This ease of use also extends to cost efficiency, as cloud services operate on a pay-as-you-go model, meaning payment is only required for the resources used. This flexibility avoids the upfront costs of purchasing hardware and prevents resource over-provisioning to manage potential usage spikes.

Reliability is another significant benefit. Cloud platforms offer fault tolerance and redundancy, ensuring scrapers can run 24/7 without interruptions, even in the event of hardware failures or unexpected traffic surges. The global reach of many cloud platforms also enhances performance, with data centers located worldwide allowing deployment of scrapers from different regions, bypassing geo-restrictions, and accessing localized content with ease, reducing latency and speeding up operations.

For tasks requiring automation, cloud platforms come with built-in scheduling and task automation. Scrapers can be set to run daily, weekly, or at any custom interval, making these platforms ideal for monitoring websites for changes, tracking prices, or collecting time-sensitive data without the need for manual intervention.

Collaboration is another benefit provided by cloud-based solutions. Teams can work together seamlessly by sharing access to scrapers and data in real-time. Since the data is stored in the cloud, it remains accessible from anywhere, facilitating smooth and efficient collaboration.

Cloud platforms often offer advanced tools and pre-built scrapers. Ready-made scrapers for common websites like Amazon, Google, or social media platforms can be accessed, eliminating the need to start from scratch. For more advanced needs, these platforms offer the flexibility to build custom scrapers tailored to specific requirements.

Compliance is another area where cloud platforms excel. Many include tools to ensure that scraping activities follow legal guidelines, such as adhering to a website's robots.txt file or managing rate limits to avoid detection and blocking. Additionally, these platforms provide secure data storage and processing, enabling efficient management of large volumes of data, including cleaning, structuring, and storing it in formats like CSV, JSON, or SQL databases directly in the cloud.

Built-in proxy management is another critical feature offered by cloud-based platforms. It helps avoid IP blocking by rotating proxies and distributing traffic across

different IP addresses. Some platforms even provide geo-specific proxies, allowing localized content to be scraped while bypassing geo-restrictions.

Security is also a significant advantage of cloud-based platforms. They often implement encryption for data in transit and at rest, ensuring the security of scraped data. Features like user authentication and access controls protect scrapers and data from unauthorized access.

Cloud platforms also excel in error handling. Many include automated retries, error logging, and real-time monitoring, ensuring immediate notification if a scraper encounters issues, such as CAPTCHA challenges or changes in the target website structure. This reduces downtime and keeps scrapers operational.

In summary, cloud-based web scraping platforms provide a scalable, cost-effective, and reliable solution for data extraction. By eliminating the need for infrastructure management, offering automated tools, ensuring robust security, and handling errors efficiently, these platforms streamline the entire web scraping process. Whether managing small-scale tasks or large-scale data extraction, cloud-based platforms simplify and enhance the scraping experience for organizations and individuals alike.

The Apify cloud platform

Apify (https://apify.com/) is a web scraping and automation platform that allows users to extract data from websites, process it, and automate web-based tasks. It provides tools for building, running, and managing web scrapers, bots, and other automation workflows. Some key features of Apify include:

1. **Web Scraping**: Apify offers a powerful infrastructure for scraping data from websites. You can create custom scrapers (called Actors in Apify) that can navigate websites, extract data, and store it in structured formats like JSON or CSV.

2. **Pre-built Scrapers**: Apify has a marketplace with pre-built scrapers for popular websites (like Amazon, Instagram, and Google Maps), making it easy to collect data with minimal effort.

3. **Automation**: Apify can automate repetitive tasks, such as filling out forms, logging into accounts, or scheduling posts on social media platforms.

4. **Cloud Infrastructure**: Apify platform runs in the cloud, so users do not need to manage their own servers. It handles scaling, scheduling, and error handling for scraping tasks.

5. **API Integration**: Apify provides an API that allows you to integrate scraping and automation workflows into your own applications.

6. **Customizable with JavaScript**: While Apify has no-code solutions, advanced users can write custom scrapers and automation scripts in JavaScript using its Actor SDK.

Overall, Apify is widely used for data extraction, monitoring competitors, lead generation, price tracking, and other tasks that involve interacting with web-based systems.

Apify Actors are serverless cloud programs designed to perform specific tasks on the Apify platform, such as web scraping, data extraction, or automation workflows. These actors can run scripts in various programming languages (like JavaScript, Python) and are highly customizable, allowing users to automate processes such as scraping websites, transforming data, interacting with APIs, or running complex automation jobs.

A single isolated Actor consists of source code and various settings. An Actor can be considered as a cloud app or service that runs on the Apify platform. The run of an Actor is not limited to the lifetime of a single HTTP transaction. It can run for as long as necessary, even forever.

Basically, Actors are programs packaged as Docker images, which accept a well-defined JSON input, perform an action, and optionally produce an output.

Key Features of Apify Actors:

1. **Task Automation**: Actors can be programmed to automate almost any repetitive task, from web scraping to interacting with external APIs, managing workflows, or processing large datasets.

2. **Customizable**: Each actor is built with custom code, allowing flexibility to suit various use cases. They can be tailored to specific tasks like scraping dynamic websites, managing databases, or processing text.

3. **Scalability**: Actors run in the Apify cloud, enabling them to handle jobs of any scale, from simple one-time tasks to complex, large-scale data collection operations involving millions of pages.

4. **Scheduling**: Actors can be scheduled to run periodically, making them perfect for tasks that require continuous data monitoring or time-sensitive workflows, such as scraping real-time price changes or content updates.

5. **Input and Output**: Actors take inputs (such as URLs, API keys, or search parameters) and produce outputs (like data in JSON, CSV, or XML formats). They can be configured to store results in databases or cloud storage.

6. **Integrations**: Apify Actors can integrate with various third-party services like Google Sheets, Dropbox, or AWS, enabling seamless data flow between platforms and simplifying data processing and management.

The Apify platform allows for complete control through a REST API, which is detailed in the API Reference (https://docs.apify.com/api/v2). For users looking to access the Apify API using JavaScript/Node.js or Python, there are two official API clients:

- **apify-client** NPM package for JavaScript, compatible with both browser and server environments.

- **apify-client** PyPI package for Python.

While it is not mandatory to use these packages since the REST API is compatible with any HTTP client, the official API clients incorporate best practices, including exponential backoff and rate limiting.

Apify's pricing model for **Actors** (the custom web scrapers, bots, and automation scripts) is based on several factors, including resource usage, plan tiers, and additional usage beyond the plan's limits. The core of the pricing model revolves around **Actor compute units (CUs)**, **storage**, and **data transfer**:

- **Compute Units**: The more resource-intensive an Actor or task is, the more CUs it will use.
- **Storage**: If the data extraction requires storing large volumes of data for extended periods, a need for upgrading the pricing plan or paying for extra storage might arise.
- **Data Transfer**: Scraping large websites with lots of data may require more bandwidth. Going beyond the plan's data transfer limit can incur extra costs.

Apify offers different subscription plans tailored to different levels of usage. Each plan includes a certain number of compute units, storage, and data transfer limits. Moreover, for users who exceed the limits of their plan, Apify offers a pay-as-you-go model, that allows you to purchase additional compute units as needed.

Three pricing models are offered for utilizing pre-built web scrapers, automation tools, or bots developed by third-party creators. These models include "Pay per result," "Pay per usage," and "Rental", as depicted in the following table. Each model caters to different use cases and pricing strategies depending on the type of Actor and how it is used.

Table 11 Comparison of pricing models on Apify platform

Model	Pricing Basis	Best Use Cases	Advantages
Pay per Result	Data extracted	Specific quantities of data needed (e.g., product listings, reviews)	Predictable costs, only pay for useful data
Pay per Usage	Compute Units (CUs)	Complex tasks, large data sets, unpredictable data volumes	Flexible, scales with resource consumption
Rental	Time-based (daily, weekly, monthly)	Frequent or regular scraping/automation tasks	Fixed costs, ideal for ongoing projects

Here is a detailed breakdown of each model:

1. Pay per Result

In this model, payment is based on the number of results or data points the Actor extracts or returns. The pricing depends on the amount of data the Actor collects rather than how long or how often the Actor runs.

- **How it works**: After running the Actor, you are charged for each piece of data or result extracted. For example, if you are using an Actor to scrape e-commerce product data, you may be charged for each product listing retrieved.

- **Best for**: Users who need specific quantities of data and want predictable pricing based on the number of results, such as those collecting product details, reviews, or business listings.

- **Advantages**: This model is beneficial when you only need to scrape a fixed amount of data, making costs easy to control since you only pay for the actual data received.

- **Example**: Scraping 1,000 listings from a real estate site may cost $0.05 per listing, so you would pay $50 for 1,000 results.

2. Pay per Usage

This model charges based on the Actor's resource usage during its run, typically measured in **Compute Units (CUs).** The fee is for the actual amount of processing power the Actor consumes during the task, regardless of the results.

- **How it works**: You are billed based on how long the Actor runs, how many resources (CUs) it uses, or the amount of data it processes. Compute Unit consumption is tied to the complexity of the task, such as the size of the website being scraped or the amount of data being processed.

- **Best for**: Users with unpredictable or fluctuating workloads, such as those needing to scrape dynamic websites or handle large datasets where results are not the primary focus but rather the intensity of the task.

- **Advantages**: This model suits users with larger-scale operations where the amount of data retrieved may vary, and pricing is tied to resource consumption, providing more flexibility in complex tasks.

- **Example**: Running an Actor that scrapes a website for a few hours might use 3 Compute Units (CUs), and if each CU costs $1, the total cost $3 for the run.

3. Rental

In the rental model, users essentially "rent" the Actor for a specific period (e.g., daily, weekly, or monthly) and can use it without limitations during that time. A flat fee is paid for access to the Actor during the rental period, regardless of how often or how much it is used. However, it must be noted that most of the actors that actors that are offered under this model require additional payment for the usage according to the second pricing model.

- **How it works**: A fixed fee is charged for a defined period, typically granting unlimited or extensive access to the Actor for the duration. The Actor can be run as many times as needed without worrying about per-run costs or resource usage.

- **Best for**: Users who have frequent or regular scraping tasks and prefer a predictable, all-inclusive cost structure. This model works well for companies that need to collect data consistently over time, such as daily monitoring or competitive intelligence scraping.

- **Advantages**: Predictable, fixed costs make budgeting easier, especially for businesses that rely on regular scraping or automation workflows.

- **Example**: Renting a social media scraper for $100/month, allows to scrape posts or profiles multiple times during the month without additional charges.

4.2.2.   Gathering data from web APIs

Web APIs are essential for developing effective decision support systems in the tourism industry, specifically for professionals managing operations and planning. By integrating weather forecasting APIs, tourism managers can access real-time weather data, which aids in making informed decisions about scheduling tours, staffing, and resource allocation. For example, if a severe weather alert is issued, managers can quickly adjust itineraries or inform clients, ensuring safety and enhancing customer satisfaction.

Furthermore, APIs that provide information about the areas of interest can be invaluable for tourism professionals. These APIs can offer data on visitor statistics, maintenance schedules, and cultural significance, enabling managers to assess demand and optimize marketing strategies. By combining insights from weather forecasts and further information, a platform can help tourism operators identify trends, allocate resources efficiently, and enhance overall operational effectiveness. This data-driven approach leads to more strategic decision-making and improved service delivery in the tourism sector.

Windy

Windy.com is a weather forecasting and visualization platform that provides users with detailed information about weather conditions worldwide. It features interactive maps displaying various meteorological data, including wind speed and direction, temperature, precipitation, and cloud cover. Users can customize the visualizations by selecting different layers and parameters to suit their needs.

Furthermore, Windy also provides three APIs for incorporating its data to third party applications: These APIs are:

- **Point forecast API:** Point forecast enables the user to obtain machine-readable data regarding the weather forecast for a specified set of coordinates (e.g.: temperature for 49.123 / 15.008 or wind for -18.321 / 20 at the altitude of 250h). Point forecast returns exclusively the most recent forecast values. It is not possible to retrieve historical forecasts with past data. The response always contains all specified parameters (e.g., temperature, pressure etc.) from a specified forecast model, along with the entire available forecast for the following days.

- **Map forecast API:** Map Forecast API is a simple-to-use library based on Leaflet[2] 1.4.x. It allows developers to use everything Leaflet or JavaScript offers, along with the Windy map visualizations used at Windy.com. The Map Forecast API lets developers customize Windy map visualizations with their own content and imagery for display on web pages and mobile devices. The Map Forecast API features layers, particles, legend, picker, and isolines, as well as basic controls and the map. Everything displayed can be chosen and modified using styles, controls and events, and various libraries.

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[2] https://leafletjs.com/

- **Webcams API:** Webcams API provides access to the largest repository of webcams worldwide. The webcams can be filtered based on criteria such as country, category, location, and more. Each webcam includes information about its location, preview images, timelapses, and more.

Wikimedia

The Wikimedia API is a set of APIs provided by the Wikimedia Foundation that allows developers to access and interact with the vast amount of content hosted on Wikimedia projects, such as Wikipedia, Wikimedia Commons, and Wiktionary.

The Wikimedia API has multiple endpoints, including:

- **Action API**: For retrieving and modifying content, as well as performing specific actions like search or upload.

- **Query API**: For retrieving specific data sets, such as page content, user contributions, and more.

- **Sitemaps and feeds**: For accessing structured data about pages and media.

These endpoints offer a plethora of features and functionalities. These are summarized and categorized in the following list:

- **Content Retrieval**: The API enables users to retrieve articles, images, and other media from Wikimedia projects. Developers can query specific pages, extract text, and access structured data.

- **Search Functionality**: The API includes search capabilities, allowing users to find articles, media files, and categories based on keywords or other criteria.

- **Metadata Access**: Developers can access metadata for articles, including page views, edit history, and contributor information, which can be useful for analytics and research purposes.

- **Edit and Contribution Tools**: The API supports editing capabilities, enabling authenticated users to contribute to Wikipedia and other projects programmatically. This includes creating, updating, and deleting content.

- **Structured Data**: The API provides access to structured data from Wikimedia Commons and Wikidata, making it easier for developers to incorporate detailed and interlinked information into their applications.

- **Language Support**: The Wikimedia API supports multiple languages, allowing users to retrieve content in various linguistic versions of articles.

It is important to note that the API has rate limits to ensure fair usage and prevent abuse. Developers must adhere to the Wikimedia Foundation usage policies when utilizing the API.

4.2.3.   Web data availability for the Tourism section

Due to the nature of web scraping, queries that are confined in smaller geographical areas are more effective. This practically means that all the gathered data are at a city

level at most and need to be aggregated to acquire information at a regional or national level.

The following table depicts the available information that can be collected by scraping actors from the most popular platforms in the tourism section. The potential information that can be collected from the web extends to the initial TIDSS dataset. In the table below, the new information is highlighted with purple and with orange are the data that has been adapted to the current data schema of the web sites.

It must be noted that scraping information about prices or availability (whenever this is possible) mandates the specification of a specific period for booking. This requires normalization of prices and availability requests to pre-defined time periods that will provide valuable statistical information reducing retrieval task complexity and cost. Furthermore, these scraping tasks need to be run periodically to detect changes related to the establishments. The frequency of the runs depends on the nature of the information that must be retrieved (e.g.: the room availability changes constantly whereas the description of an establishment is scarcely updated).

Table 12 Available dataset from web scraping

Booking.com
♦Number of establishments
* Of which, hotel
* Of which, in apartments
♦Description
* Of which, hotel
* Of which, in apartments
♦Adress
* Of which, hotel
* Of which, in apartments
♦Stars rating
* Of which, hotel
♦Average Score
* Of which, hotel
* Of which, in apartments
♦Number of reviews
* Of which, hotel
* Of which, in apartments
♦Category reviews
* Of which, hotel
* Of which, in apartments
♦Price
* Of which, hotel
* Of which, in apartments
♦Availability
* Of which, hotel
* Of which, in apartments

Tripadvisor.com
♦Number of establishments
* Of which, hotel
* Of which, vacation rentals
♦ Food and beverage serving activities
♦ Attractions
♦Contact details (address, telephone number)
* Of which, hotel
* Of which, restaurants
* Of which, in vacation rental
* Of which, in attractions
♦Price level (in classes e.g., "cheap," "expensive")
* Of which, hotel
* Of which, restaurants
* Of which, in vacation rental
* Of which, in attractions
♦Average Score
* Of which, hotel
* Of which, restaurants
* Of which, in vacation rental
* Of which, in attractions
♦Number of reviews
* Of which, hotel
* Of which, restaurants
* Of which, in vacation rental
* Of which, in attractions
♦Ranking
* Of which, hotel
* Of which, restaurants
* Of which, in vacation rental
* Of which, in attractions
AirB&B.com
♦Number of establishments
* Of which, sharing rooms
* Of which, full apartments
♦Number of reviews
* Of which, sharing rooms
* Of which, full apartments
♦Average Rating
* Of which, sharing rooms
* Of which, full apartments
♦Description
* Of which, sharing rooms

*   Of which, full apartments
♦Price
*   Of which, sharing rooms
*   Of which, full apartments
♦Location (coordinates)
*   Of which, sharing rooms
*   Of which, full apartments
Google Places
♦Number of places
*   Of which, hotels
*   Of which, restaurants
*   Of which, museums
*   Of which, other[3]
♦Number of reviews
*   Of which, hotels
*   Of which, restaurants
*   Of which, museums
*   Of which, other
♦Average Rating
*   Of which, hotels
*   Of which, restaurants
*   Of which, museums
*   Of which, other
♦ Contact details (address, telephone number)
*   Of which, hotels
*   Of which, restaurants
*   Of which, museums
*   Of which, other
♦Website
*   Of which, hotels
*   Of which, restaurants
*   Of which, museums
*   Of which, other
Windy.com (or another meteorological site)
♦Weather forecast
*   Temperature
*   Humidity
*   Wind
*   Rain
♦Weather historical data
*   Temperature

[3] complete list: https://developers.google.com/maps/documentation/places/web-service/supported_types

* Humidity	
* Wind	
* Rain	
Wikimedia	
♦Demographics	
* Area	
* Population	
* Human Development Index (HDI)	
* Coordinates	
* Municipality	
* Gross domestic product (GDP)	

4.3. Sustainability Data Availability

Following the same methodology as in 4.1, the availability of the additional to TIDSS information was estimated by a combined effort of all the partners that will lead a use-case in the pilots. For each of the geographical/administrative categorisation (local, regional, national), the availability of the data was examined in each pilot, forming a clustering of each data parameters to the four – color ranking. The results are depicted in the following tables.

Table 13: Additional data for sustainability availability in destination level

6	Sustainability related data
6.1	Air quality alert
6.2	Average duration of contamination events
6.3	Average waste volume per visitor
6.4	Energy Consumption
6.5	Energy Consumption per Accomodation
6.6	Fire alert
6.7	Georeferenced data (GIS digital data) including accessible infrastructure (beaches, parks, and public facilities) and accommodations (coordinates, type of accessible facility).
6.8	Georeferenced data (GIS digital data) including cycling routes, pedestrian paths, and bike parking locations.
6.9	Marine water temperature
6.10	Number of active conservation projects
6.11	Percentage of separated waste
6.12	Recycling volumes
6.13	Snow alert
6.14	Tourist feedback on accessibility
6.15	Tourist satisfaction with enviromental practices
6.16	Water Consuption
6.17	Water Consuption per Accomodation
6.18	Water quality alert
6.19	Water quality indicators

Table 14: Additional data for sustainability availability in regional level

6	Sustainability related data
6.1	Air quality alert
6.2	Average duration of contamination events
6.3	Average waste volume per visitor
6.4	Energy Consumption
6.5	Energy Consumption per Accomodation
6.6	Fire alert
6.7	Georeferenced data (GIS digital data) including accessible infrastructure (beaches, parks, and public facilities) and accommodations (coordinates, type of accessible facility).
6.8	Georeferenced data (GIS digital data) including cycling routes, pedestrian paths, and bike parking locations.
6.9	Marine water temperature
6.10	Number of active conservation projects
6.11	Percentage of separated waste
6.12	Recycling volumes
6.13	Snow alert
6.14	Tourist feedback on accessibility
6.15	Tourist satisfaction with enviromental practices
6.16	Water Consuption
6.17	Water Consuption per Accomodation
6.18	Water quality alert
6.19	Water quality indicators

Table 15: Additional data for sustainability availability in national level

6	Sustainability related data
6.1	Air quality alert
6.2	Average duration of contamination events
6.3	Average waste volume per visitor
6.4	Energy Consumption
6.5	Energy Consumption per Accomodation
6.6	Fire alert
6.7	Georeferenced data (GIS digital data) including accessible infrastructure (beaches, parks, and public facilities) and accommodations (coordinates, type of accessible facility).
6.8	Georeferenced data (GIS digital data) including cycling routes, pedestrian paths, and bike parking locations.
6.9	Marine water temperature
6.10	Number of active conservation projects
6.11	Percentage of separated waste
6.12	Recycling volumes
6.13	Snow alert
6.14	Tourist feedback on accessibility

6.15	Tourist satisfaction with enviromental practices	
6.16	Water Consuption	
6.17	Water Consuption per Accomodation	
6.18	Water quality alert	
6.19	Water quality indicators	

The data availability for monitoring accessibility is robust at both the local and regional levels. At the local level, comprehensive information is available on municipal transport systems and pedestrian infrastructure, allowing detailed analysis of specific urban areas. Similarly, at the regional level, data is accessible for larger geographical areas, offering insights into interconnectivity and transport standards across multiple municipalities. However, at the national level, the lack of integrated data presents a challenge, limiting the ability to perform broad, country-wide accessibility assessments.

Data availability for sustainable mobility is well-documented at the local level, with detailed records of municipal cycling and pedestrian pathways. This enables policymakers to evaluate the density and quality of infrastructure within specific communities. At the regional level, aggregated data helps assess broader trends and infrastructure gaps. However, at the national level, there is currently no centralized database, which hinders the capacity to evaluate sustainable mobility comprehensively across the country

For assessing social sustainability, data is widely available at the local level, particularly regarding accessible accommodations and public amenities. Municipalities often maintain detailed records, which serve as a critical resource for evaluating inclusivity within their boundaries. At the regional level, data aggregation offers a broader perspective on accessibility trends across multiple areas. However, at the national level, the absence of a centralized accessibility database limits the ability to perform overarching analyses and benchmark inclusivity across the country.

Energy and water consumption data is readily available at the local level, enabling targeted analysis of individual accommodations. This granular data is crucial for identifying opportunities for efficiency improvements. At the regional level, data aggregation provides insights into consumption patterns across broader areas, informing regional conservation strategies. Unfortunately, at the national level, data integration remains incomplete, which hampers the ability to develop nationwide conservation policies.

The availability of data on marine resources is strong at the local level, where municipalities often monitor specific conservation projects and water quality indicators. At the regional level, aggregated data helps track broader trends, such as biodiversity health and pollution levels across coastal areas. However, at the national level, integrated data on marine resources is not yet established, creating challenges for comprehensive marine management.

Data on mountain resources is well-documented at the local level, with municipalities tracking conservation efforts and ecosystem health. Regional data further enhances understanding by providing a broader view of trends and challenges in mountain areas. Unfortunately, at the national level, the lack of integrated data limits the ability to implement cohesive strategies for preserving mountain ecosystems.

Tourist flow data is available at the local level, with specific sites tracking visitor numbers and density. Regional aggregation helps identify broader patterns and supports the implementation of measures to distribute visitors more evenly. However, at the national level, the lack of a centralized tourist flow database hinders comprehensive planning and management.

Data for interregional comparisons is accessible at both the local and regional levels, allowing for meaningful benchmarking and the identification of areas for improvement. However, at the national level, the absence of centralized sustainability data limits the capacity to perform comprehensive analyses and adopt national-level best practices

The economic impact of tourism is well-documented at the local level, where municipalities often track tourism's contribution to employment and GDP. Regional data aggregation provides a broader perspective, helping to evaluate trends and identify areas for investment. However, at the national level, the lack of comprehensive data limits the ability to assess the full economic impact of sustainable tourism policies.

5. DMSS Data Model for the new services

5.1. DMSS Available Data

Based on the preliminary data availability check, as described in this report, a tourism data indices screening is performed. Data indices with no or extremely low availability are excluded from the data entry system, as there is no potential for information harvesting from these indicators. Based on this approach, a new reduced set of data indices is selected for use with the statistical and machine learning tools that will be integrated in the platform. All data indices with no availability per geographical level have been removed. Since there is a different level of data availability across several indices between different partner territories, the DMSS platform will offer a selection of results to each partner, tailored to their available raw data. A subtotal of integrated services will be presented to partner areas with low data availability, whereas the full potential of the platform will be available for areas with more available indices.

The complete data model is presented in detail in Appendix B.

5.2. Mapping indices to new DMSS services

The up-scaled DMSS platform will serve users with new features via modules that can offer predictive capabilities and present valuable insights that can help decision makers operate in a data-driven, informed way. The new DMSS services are targeted at two different stakeholder groups: policy makers involved in tourism industry governance and decision-makers regarding their commercial planning, service quality and marketing actions. The platform modules will offer the following services to policy makers:

- Monitoring accessibility of tourist destinations via public transport and sustainable travel options
- Supporting sustainable mobility and infrastructure for cycling and walking
- Assessing social sustainability: accessibility for disabled persons and families
- Monitoring energy and water consumption in accommodation facilities
- Managing and monitoring waste separation
- Monitoring and managing the blue economy and marine resources
- Analyzing tourist flows to prevent overcrowding and resource degradation
- Measuring tourist satisfaction and loyalty with environmental practices
- Interregional Comparison of Sustainability Data
- Measuring the Economic Impact of Sustainable Tourism Policies

The DMSS will offer the following services to decision makers to assist them in their commercial and marketing planning:

- Visitor arrival predictions
- Visitor segmentation analysis
- Visitor feedback and reviews
- Destination feedback and Sentiment analysis

To facilitate the further development of the up-scaled DMSS platform, a grouping of the selected tourism data indices is performed. All data indicators are grouped into 4 data

pools that are related to the new modules mentioned above. This grouping aims to organize data into groups that can be analyzed together in a structured manner and provide the required information for the users. This grouping of data is presented in the following sections.

5.2.1.   Data related to new services for policy makers

The following table presents the dataset from the set of available indicators that will facilitate the analysis required for the policy maker services of the enhanced DMSS.

Table 16 Policy maker services dataset

POLICY MAKER SERVICES DATASET		
Monitoring accessibility of tourist destinations via public transport and sustainable travel options	**1.**	**DESTINATION OVERVIEW**
	1.14	International Airports
	1.18	Seaports
	1.21	Number of establishments ***accessible for people with disabilities***
	1.26	* Of which, number of accessible Airports
	1.27	* Of which, number of accessible Train Stations
	1.28	* Of which, number of accessible Coaches Stations
	1.29	* Of which, number of accessible Seaports
Supporting sustainable mobility and infrastructure for cycling and walking	**5.**	**ETIS**
	5.23	Tourists and same day visitors using different modes of transport to arrive at the destination
	5.24	Tourists and same day visitors using local/soft mobility/public transport services to get around the destination
Assessing social sustainability: accessibility for disabled persons and families	**1.**	**DESTINATION OVERVIEW**
	1.21	Number of establishments ***accessible for people with disabilities***
	1.26	* Of which, number of accessible Airports
	1.27	* Of which, number of accessible Train Stations
	1.28	* Of which, number of accessible Coaches Stations
	1.29	* Of which, number of accessible Seaports
	2.	**TOURISM INDUSTRY**
		Number of establishments accessible for people with disabilities
	2.12	Total
	2.13	* Of which, Hotel and similar accommodations
	2.14	* Of which, Holiday and other short-stay accommodation
	2.15	* Of which, Camping grounds, recreational vehicle parks and trailer parks

	2.16	* Of which, Food and beverage serving activities
	2.17	* Of which, Museums
	2.18	* Of which, Themes Parks
	2.19	* Of which, Archaeological sites
	2.20	* Of which, other tourism attractions
	5.	**ETIS**
	5.2	Tourists that are satisfied with their overall experience in the destination
	5.13	Residents who are satisfied with tourism in the destination (per month/season)
	5.20	Public transport that is accessible to people with disabilities and with specific access requirements
Monitoring energy and water consumption in accommodation facilities and sources of energy	**1.**	**DESTINATION OVERVIEW**
		Water consumption
	1.48	♦ Total
		Energy consumption
	1.50	♦ Total
	2.	**TOURISM INDUSTRY**
		Accommodation for visitors in hotels and similar establishments
		Hotel and similar accommodations
	2.21	♦ Total
	5.	**ETIS**
	5.25	Tourism enterprises involved in climate change mitigation schemes—such as: CO2 offset, low energy systems, etc.—and "adaptation" responses and actions
	5.28	Water consumption per tourist night compared to general population water consumption per resident night
	5.29	Tourism enterprises taking actions to reduce water consumption
	5.30	Energy consumption per tourist night compared to general population energy consumption per resident night
	5.31	Tourism enterprises that take actions to reduce energy consumption
	5.32	Annual amount of energy consumed from renewable sources (Mwh) compared to overall energy consumption at destination level per year
Managing and monitoring waste separation	**1.**	**DESTINATION OVERVIEW**
		Waste production
	1.45	♦ Total
	1.47	* Of which, from recycling
	2.	**TOURISM INDUSTRY**

		Number of establishments
	2.1	Total
		Number of establishments accessible for people with disabilities
	2.13	* Of which, Hotel and similar accommodations
	5.	**ETIS**
	5.26	Waste production per tourist night compared to general population waste production per person
	5.27	Tourism enterprises separating different types of waste
Monitoring and managing the Blue Economy and marine resources	**2.**	**TOURISM INDUSTRY**
		Number of establishments
	2.11	* Of which, other tourism industries
Analyzing tourist flows to prevent overcrowding and resource degradation	**2.**	**TOURISM INDUSTRY**
		Number of establishments
	2.11	* Of which, other tourism industries
	2.40	Tourists / population
	5.	**ETIS**
	5.12	Number of tourists per resident
Measuring tourist satisfaction and loyalty	**5.**	**ETIS**
	5.2	Tourists that are satisfied with their overall experience in the destination
Interregional comparison of sustainability data	**1.**	**DESTINATION OVERVIEW**
	1.6	Gross Value-added Total
	1.7	Gross Value added per capita
	1.8	Total tourism expenditure over GDP
Measuring the economic impact of sustainable tourism policies	**1.**	**DESTINATION OVERVIEW**
	1.9	Number of Employees
	1.10	* Of which, number of direct jobs in tourism
	1.11	* Of which, number of women employed in tourism

5.2.2. Data related to new services for decision makers

Data related to visitor arrival predictions

Visitor arrival predictions module aims to utilize existing arrival data, trends, calendar events, weather data, bookings data, occupancy and accommodation capacity data and quality characteristics like tourist satisfaction to predict visitor arrival fluctuations in short-, medium- and long-term seasonality increments. The following selection of tourism indices has been made, coupled with web data, to enable accurate predictions on visitor arrivals.

Table 17 Visitor arrival prediction dataset

VISITOR ARRIVAL PREDICTION DATASET

1.	DESTINATION OVERVIEW	2.	TOURISM INDUSTRY
	Destination Profile		**Number of establishments**
1.14	International Airports	2.1	♦ Total
1.15	♦ Number of daily flights	2.2	* Of which, Accommodation for visitors
1.16	* Of which, charter flights	2.3	* Of which, Food and beverage serving activities
	* Of which, low-cost flights	2.4	* Of which, Passenger transportation
1.14	Train Stations	2.5	* Of which, Travel agencies and other reservation services activities
1.15	♦ Number of daily stops	2.6	* Of which, Convention bureau/congress facilities services activities
1.16	Coaches' stations	2.7	* Of which, Museums
1.17	♦ Number of daily departures	2.8	* Of which, Themes Parks
1.18	Seaports	2.9	* Of which, Archaeological sites
1.19	♦ Number of daily departures	2.10	* Of which, other tourism attractions
1.21	Number of establishments _**accessible for people with disabilities**_	2.11	* Of which, other tourism industries
1.26	* Of which, number of accessible Airports		**Number of establishments accessible for people with disabilities**
1.27	* Of which, number of accessible Train Stations	2.12	♦ Total
1.28	* Of which, number of accessible Coaches Stations	2.13	* Of which, Hotel and similar accommodations
1.29	* Of which, number of accessible Seaports	2.14	* Of which, Holiday and other short-stay accommodation
	Sunshine hours	2.15	* Of which, Camping grounds, recreational vehicle parks and trailer parks
1.32	♦ Total	2.16	* Of which, Food and beverage serving activities
1.33	* Of which, in winter	2.17	* Of which, Museums
1.34	* Of which, in summer	2.18	* Of which, Themes Parks
	Precipitation:	2.19	* Of which, Archaeological sites
1.35	♦ Total	2.20	* Of which, other tourism attractions
1.36	* Of which, in winter		**Accommodation for visitors in hotels and similar establishments**
1.37	* Of which, in summer		**Hotel and similar accommodations**
	Temperature:	2.21	♦ Total
1.38	♦ Average of maximum temperature	2.22	* Of which seasonal

1.39	* Of which, in winter	2.23	♦ Number of rooms
1.40	* Of which, in summer	2.24	♦ Number of beds
1.41	♦Average of minimum temperature		**Holiday and other short-stay accommodation**
1.42	* Of which, in winter	2.25	♦ Total
1.43	* Of which, in summer	2.26	* Of which seasonal
		2.27	♦ Number of rooms
		2.28	♦ Number of beds
			Camping grounds, recreational vehicle parks and trailer parks
		2.29	♦ Total
		2.30	* Of which seasonal
		2.31	♦ Number of rooms
		2.32	♦ Number of beds
			Overall Satisfaction
		2.33	♦Total
		2.34	* Of which, domestic
		2.35	* Of which, non-Domestic
			Indicators
		2.36	Occupancy rate / rooms
		2.37	Occupancy rate / beds
		2.38	Average length of stay
		2.39	Capacity ratio (beds per 1000 inhabitants)
		2.40	Tourists / population
3.	**TOURISM FLOW**	**4.**	**Web Data**
	Flow		**Booking.com**
3.1	♦ Total Arrivals		♦Number of establishments
3.2	* Of which, domestic		* Of which, hotel
3.3	♦ Overnight visitors (tourists)		* Of which, in apartments
3.4	* Of which, domestic		♦Stars rating
3.5	♦Daily visitors (no overnights)		* Of which, hotel

#	Category		Category
3.6	* Of which, cruise passengers		♦ Average Score
	Arrivals by region		* Of which, hotel
3.7	♦ Total Arrivals		* Of which, in apartments
3.8	* Of which from Africa		♦ Price
3.9	* Of which from Americas		* Of which, hotel
3.10	* Of which from Asia		* Of which, in apartments
3.11	* Of which from Europe		♦ Availability
3.12	* Of which, domestic		* Of which, hotel
3.13	* Of which from Oceania		* Of which, in apartments
	Arrivals by main purpose		**Tripadvisor.com**
3.14	Total		♦ Number of establishments
3.15	♦ Personal		* Of which, hotel
3.16	* Holidays, leisure, and recreation		* Of which, vacation rentals
3.17	* Other personal purposes		♦ Food and beverage serving activities
3.18	♦ Business and professional		♦ Attractions
	Arrivals by mode of transport		♦ Price level (in classes e.g., "cheap," "expensive")
3.19	♦ Total		* Of which, hotel
3.20	* Of which from by Air		* Of which, restaurants
3.21	* Of which from by Sea		* Of which, in vacation rental
3.22	* Of which from by Railway		* Of which, in attractions
3.23	* Of which from by Private car		♦ Average Score
3.24	* Of which from by Other not classified		* Of which, hotel
	Accommodation		* Of which, restaurants
	Hotel and similar accommodations		* Of which, in vacation rental
3.25	♦ Arrivals		* Of which, in attractions
3.26	* Of which, domestic		**AirB&B.com**
3.27	♦ Overnights		♦ Number of establishments
3.28	* Of which, domestic		* Of which, sharing rooms

	Holiday and other short-stay accommodation		* Of which, full apartments
3.29	♦ Arrivals		♦ Average Rating
3.30	* Of which, domestic		* Of which, sharing rooms
3.31	♦ Overnights		* Of which, full apartments
3.32	* Of which, domestic		♦ Price
	Camping grounds, recreational vehicle parks and trailer parks		* Of which, sharing rooms
3.33	♦ Arrivals		* Of which, full apartments
3.34	* Of which, domestic		♦ Number of places
3.35	♦ Overnights		* Of which, hotels
3.36	* Of which, domestic		* Of which, restaurants
	Overall Satisfaction		* Of which, museums
3.40	Total		* Of which, other
3.41	♦ Domestic		♦ Average Rating
3.42	♦ non-domestic		* Of which, hotels
3.43	Intention to return		* Of which, restaurants
			* Of which, museums
			* Of which, other
5.	**ETIS**		
	Destination management		
5.2	♦ Tourists that are satisfied with their overall experience in the destination		
	Economic Value		
5.4	♦ Number of tourist nights		
5.5	♦ Number of same day visitors		
5.7	♦ Daily spending per overnight tourist		
5.8	♦ Average length of stay of tourists (nights)		
5.9	♦ Occupancy rate in commercial accommodation establishments per month and average for the year		

5.11	♦ Local producer of food, drink, goods, and services		
	Social and Cultural Impact		
5.14	♦ Number of beds available in commercial accommodation		
5.18	♦ Rooms in commercial accommodation establishments accessible for people with disabilities		
5.20	♦ Public transport that is accessible to people with disabilities and with specific access requirements		
5.21	♦ Tourist attractions that are accessible to people with disabilities and/or participating in recognized accessibility information schemes		

Data related to visitor segmentation analysis

Visitor segmentation analysis refers to the understanding of specific needs of different groups of visitors to each destination and answering to these needs through specific service deployment and targeted marketing actions, as well as specific infrastructure improvement. Visitor demographic data, satisfaction indices and quality characteristics of tourist groups, together with web data that can highlight tourist preferences compose the following selected dataset.

Table 18 Visitor segmentation analysis dataset

VISITOR SEGMENTATION ANALYSIS DATASET			
1.	**DESTINATION OVERVIEW**	**2.**	**TOURISM INDUSTRY**
	Destination Profile		**Number of establishments**
1.1	Dominant habitats (place an X against all that apply)	2.1	♦ Total
1.2	Top five most popular tourist attractions (including environmental and cultural attractions).	2.2	* Of which, Accommodation for visitors
1.12	Quality of life index	2.3	* Of which, Food and beverage serving activities
1.13	Criminality index	2.4	* Of which, Passenger transportation
		2.5	* Of which, Travel agencies and other reservation services activities

		2.6	* Of which, Convention bureau/congress facilities services activities
		2.7	* Of which, Museums
		2.8	* Of which, Themes Parks
		2.9	* Of which, Archaeological sites
		2.10	* Of which, other tourism attractions
		2.11	* Of which, other tourism industries
			Number of establishments accessible for people with disabilities
		2.12	♦ Total
		2.13	* Of which, Hotel and similar accommodations
		2.14	* Of which, Holiday and other short-stay accommodation
		2.15	* Of which, Camping grounds, recreational vehicle parks and trailer parks
		2.16	* Of which, Food and beverage serving activities
		2.17	* Of which, Museums
		2.18	* Of which, Themes Parks
		2.19	* Of which, Archaeological sites
		2.20	* Of which, other tourism attractions
			Accommodation for visitors in hotels and similar establishments
			Hotel and similar accommodations
		2.21	♦ Total
		2.22	* Of which seasonal
		2.23	♦ Number of rooms
		2.24	♦ Number of beds
			Holiday and other short-stay accommodation
		2.25	♦ Total
		2.26	* Of which seasonal
		2.27	♦ Number of rooms

		2.28	♦ Number of beds	
			Camping grounds, recreational vehicle parks and trailer parks	
		2.29	♦ Total	
		2.30	* Of which seasonal	
		2.31	♦ Number of rooms	
		2.32	♦ Number of beds	
			Overall Satisfaction	
		2.33	♦Total	
		2.34	* Of which, domestic	
		2.35	* Of which, non-Domestic	
			Indicators	
		2.36	Occupancy rate / rooms	
		2.37	Occupancy rate / beds	
		2.38	Average length of stay	
		2.39	Capacity ratio (beds per 1000 inhabitants)	
		2.40	Tourists / population	
3.	**TOURISM FLOW**	**4.**	**Web Data**	
	Flow		**Booking.com**	
3.1	♦ Total Arrivals		♦Description	
3.2	* Of which, domestic		* Of which, hotel	
3.3	♦ Overnight visitors (tourists)		* Of which, in apartments	
3.4	* Of which, domestic		♦Stars rating	
3.5	♦Daily visitors (no overnights)		* Of which, hotel	
3.6	* Of which, cruise passengers		♦Average Score	
	Arrivals by region		* Of which, hotel	
3.7	♦ Total Arrivals		* Of which, in apartments	
3.8	* Of which from Africa		♦Category reviews	
3.9	* Of which from Americas		* Of which, hotel	
3.10	* Of which from Asia		* Of which, in apartments	

3.11	* Of which from Europe		♦Price
3.12	* Of which, domestic		* Of which, hotel
3.13	* Of which from Oceania		* Of which, in apartments
	Arrivals by main purpose		**Tripadvisor.com**
3.14	Total		♦ Food and beverage serving activities
3.15	♦ Personal		♦ Attractions
3.16	* Holidays, leisure, and recreation		♦Price level (in classes e.g., "cheap," "expensive")
3.17	* Other personal purposes		* Of which, hotel
3.18	♦ Business and professional		* Of which, restaurants
	Arrivals by mode of transport		* Of which, in vacation rental
3.19	♦ Total		* Of which, in attractions
3.20	* Of which from by Air		♦Average Score
3.21	* Of which from by Sea		* Of which, hotel
3.22	* Of which from by Railway		* Of which, restaurants
3.23	* Of which from by Private car		* Of which, in vacation rental
3.24	* Of which from by Other not classified		* Of which, in attractions
	Accommodation		**AirB&B.com**
	Hotel and similar accommodations		♦Average Rating
3.25	♦ Arrivals		* Of which, sharing rooms
3.26	* Of which, domestic		* Of which, full apartments
3.27	♦ Overnights		♦Description
3.28	* Of which, domestic		* Of which, sharing rooms
	Holiday and other short-stay accommodation		* Of which, full apartments
3.29	♦ Arrivals		♦Price
3.30	* Of which, domestic		* Of which, sharing rooms
3.31	♦ Overnights		* Of which, full apartments
3.32	* Of which, domestic		**Google Places**
	Camping grounds, recreational vehicle parks and trailer parks		♦Average Rating

3.33	♦ Arrivals		* Of which, hotels
3.34	* Of which, domestic		* Of which, restaurants
3.35	♦ Overnights		* Of which, museums
3.36	* Of which, domestic		* Of which, other
	Expenditure		
3.37	Total		
3.38	♦ Domestic		
3.39	♦ non-domestic		
	Overall Satisfaction		
3.40	Total		
3.41	♦ Domestic		
3.42	♦ non-domestic		
3.43	Intention to return		
	Indicators		
3.45	Average size of travel group		
3.46	Average length of stay		
5.	**ETIS**		
	Destination management		
5.1	♦ Tourism enterprises/establishments in the destination using a voluntary certification/labelling for environmental/quality/sustainability and/or Corporate Social Responsibility measures		
5.2	♦ Tourists that are satisfied with their overall experience in the destination		
	Economic Value		
5.4	♦ Number of tourist nights		
5.5	♦ Number of same day visitors		
5.6	♦ Daily spending per overnight tourist		
5.7	♦ Average length of stay of tourists (nights)		

5.8	♦ Local producer of food, drink, goods, and services		
5.9	**Social and Cultural Impact**		
5.10	♦ Number of tourists per residents		
5.11	♦ Number of beds available in commercial accommodation		
	♦ Rooms in commercial accommodation establishments accessible for people with disabilities		
5.12	♦ Commercial accommodation establishments participating in recognized accessibility information schemes		
5.13	♦ Public transport that is accessible to people with disabilities and with specific access requirements		
5.14	♦ Tourist attractions that are accessible to people with disabilities and/or participating in recognized accessibility information schemes		
5.15	**Environmental Impact**		
5.16	♦ Tourism enterprises involved in climate change mitigation schemes—such as: CO2 offset, low energy systems, etc.—and "adaptation" responses and actions		
5.17	♦Tourism enterprises separating different types of waste		
5.18	♦ Tourism enterprises taking actions to reduce water consumption		
5.19	♦ Tourism enterprises that take actions to reduce energy consumption		
5.20	♦ Annual amount of energy consumed from renewable sources (Mwh) compared to overall energy consumption at destination level per year		

Data related to visitor feedback and reviews

Visitor feedback and its subsequent analysis is critical for maintaining a high level of satisfaction and therefore a high return rate and new visitor rate for any tourist

destination. Analysis of satisfaction-related indicators and online data like reviews and destination scoring leads to the following dataset for this module.

Table 19 Visitor feedback and reviews dataset

	VISITOR FEEDBACK AND REVIEWS DATASET			
1.	**DESTINATION OVERVIEW**		**2.**	**TOURISM INDUSTRY**
	Destination Profile			**Number of establishments**
				Overall Satisfaction
		2.33	♦Total	
		2.34	* Of which, domestic	
		2.35	* Of which, non-Domestic	
3.	**TOURISM FLOW**		**4.**	**WEB DATA**
	Flow			**Booking.com**
	Overall Satisfaction			♦Average Score
3.40	Total			* Of which, hotel
3.41	♦ Domestic			* Of which, in apartments
3.42	♦ non-domestic			♦Number of reviews
3.43	Intention to return			* Of which, hotel
				* Of which, in apartments
				♦Category reviews
				* Of which, hotel
				* Of which, in apartments
				Tripadvisor.com
				♦Average Score
				* Of which, hotel
				* Of which, restaurants
				* Of which, in vacation rental
				* Of which, in attractions
				♦Number of reviews
				* Of which, hotel

			* Of which, restaurants	
			* Of which, in vacation rental	
			* Of which, in attractions	
			♦Ranking	
			* Of which, hotel	
			* Of which, restaurants	
			* Of which, in vacation rental	
			* Of which, in attractions	
			AirB&B.com	
			♦Number of reviews	
			* Of which, sharing rooms	
			* Of which, full apartments	
			♦Average Rating	
			* Of which, sharing rooms	
			* Of which, full apartments	
			Google Places	
			♦Number of reviews	
			* Of which, hotels	
			* Of which, restaurants	
			* Of which, museums	
			* Of which, other	
			♦Average Rating	
			* Of which, hotels	
			* Of which, restaurants	
			* Of which, museums	
			* Of which, other	
5.	**ETIS**			
	Destination management			
5.2	♦ Tourists that are satisfied with their overall experience in the destination			

Data related to destination feedback and sentiment analysis

This final module aims to utilize web data from online sources like reviews and feedback channels for destinations to extract information on the sentiment of visitors for a particular destination and the quality of services offered. The dataset from the previous section (Table 19) can also be utilized as a complementary source of useful information for visitor satisfaction on a particular destination.

6. DMSS proposed architecture and technical specifications

6.1. Concept

The DMSS system needs to provide comprehensive data processing and analytics pipeline designed to integrate multiple components for data ingestion, processing, storage and visualization. Figure 7 illustrates the conceptual design of the proposed system. At the top, users interact with the system through a Visual Analytics GUI, powered by Grafana, which provides a graphical interface for data exploration, analysis and visualization.
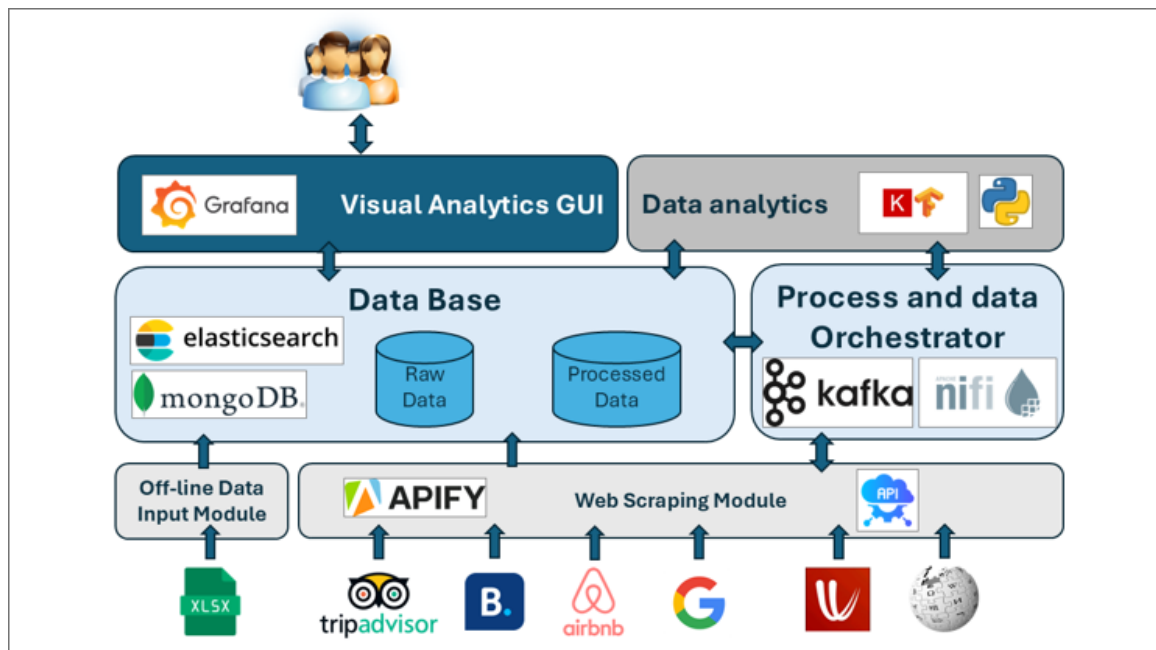
Figure 7 Concept

The core system comprises several interconnected components. First, the **Visual Analytics GUI** serves as the primary interaction point for users, offering insights derived from the data. Complementing this is the Data Analytics module, leveraging tools like Keras and Python to perform machine learning, statistical analysis and other computational processes.

Data management is centralized in the Database layer, which is divided into two parts: raw data storage and processed data storage. This ensures a clear separation between unprocessed input and cleaned, transformed, or analyzed datasets. The database uses Elasticsearch and MongoDB for efficient indexing and data management.

The **Process and Data Orchestrator** forms the backbone of the system, potentially utilizing tools like Kafka and NiFi. Kafka facilitates distributed messaging across the data pipeline, while NiFi manages workflows and orchestrates data transfer among components.

Data collection and input occur at the bottom of the architecture. An **offline data input module** supports external file uploads, such as XLSX spreadsheets or uploading data

manually using web forms. Simultaneously, the system incorporates a **web scraping module**, powered by Apify, which gathers data from various online platforms, including TripAdvisor, Booking.com, Airbnb, Google, Windy and Wikipedia. Additionally, the system supports API integration for seamless data exchange and further enrichment.

The flow of data begins with collection from raw sources, such as web scraping, APIs, or offline inputs. It then moves through the Process and Data Orchestrator, which processes and routes the data to the appropriate database. From there, the processed data becomes accessible to the Visual Analytics GUI and is also utilized for advanced analytics in the Data Analytics module. This integrated system ensures a scalable, user-friendly pipeline for collecting, processing and analyzing diverse data sets.

6.2. Modular architecture

The system is designed for collecting, processing, analyzing and presenting large volumes of data from various sources (APIs, web scraping and manual inputs). It employs a modular approach, with distinct components for each task:

- **Data Collection:** The system gathers data from external APIs (via API harvesting actors), web scraping (via Apify actors) and manual input (via forms-based UI).
- **Data Storage:** Raw data is stored centrally, where it is processed and transformed into analyzed data for further use.
- **Data Analysis:** The system processes the raw data through statistical methods or machine learning techniques to generate insights.
- **Data Presentation:** These insights are presented to users via Grafana dashboards, allowing them to visualize and interact with the results.
- **Orchestration:** The orchestrator ensures smooth data flow and processing, managing task scheduling and data dependencies and ensuring components work in tandem.

The architecture depicted in the diagram below emphasizes modularity and scalability, allowing the system to handle multiple data sources and processes while keeping each component focused on its role.
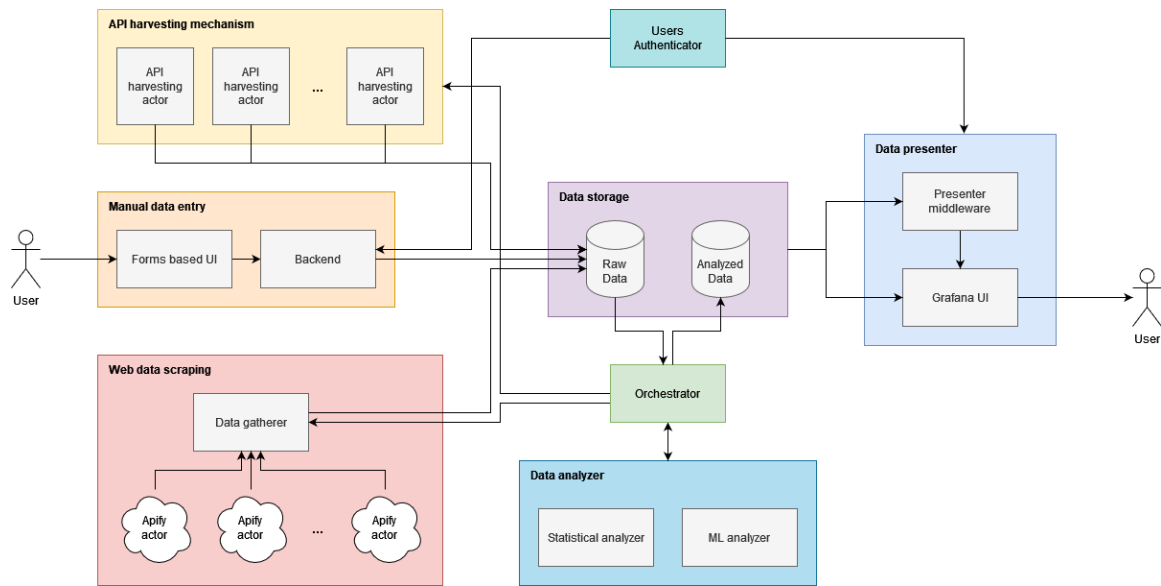
Figure 8 Modular architecture

At the top left is the "API Harvesting Mechanism", which focuses on gathering data from external APIs. Each "API harvesting actor" operates independently, pulling data from various APIs that may provide structured information such as financial metrics or social media trends. These actors are modular, allowing the system to scale as more APIs are added. The data harvested by these actors is sent to the "Data Storage" for further processing while the "Orchestrator" is responsible for scheduling when the data will be retrieved.

Beneath the API harvesting mechanism is the "Manual Data Entry" module. This component allows users to manually input data through a "Forms-based UI", which is connected to a "Backend" that processes the input. The backend handles data validation, transformation and storage preparation, ensuring that the data is properly structured before moving it into the system. The user input flows into the "Raw Data" storage, where it awaits further analysis or processing. Access to the manual data entry interface is controlled by the "User Authentication" system, ensuring only authorized users can submit data.

Directly below the manual entry module, the "Web Data Scraping" component automates the process of gathering data from websites. This module consists of a "Data Gatherer" that coordinates multiple "Apify actors". Each Apify actor is a scraping script that pulls data from various web pages, consolidating the information for use in the system. The collected data is passed back to the "Data Gatherer", which organizes it for storage. The scraped data, like the API and manual inputs, flows into the "Raw Data" store for further processing.

At the center of the diagram is the "Data Storage" module, which is split into two main sections: "Raw Data" and "Analyzed Data". The "Raw Data" store holds the original, unprocessed information collected from the APIs, web scraping and manual entry. Once the data has been processed and analyzed, it is stored in the "Analyzed Data" section, which contains structured and refined information ready for presentation to the end users. This way the raw data might be reprocessed as new insights or analyses are applied.

The system's data processing is handled by the "Data Analyzer", located at the bottom center of the diagram. This component is responsible for transforming raw data into actionable insights. It has two key submodules: the "Statistical Analyzer" and the "Machine Learning (ML) Analyzer". The "Statistical Analyzer" handles traditional statistical techniques such as calculating averages, medians, or regression analysis. Meanwhile, the "ML Analyzer" applies more advanced techniques like predictive modeling, clustering, or classification to uncover deeper patterns in the data. The output from both analyzers is stored in the "Analyzed Data" store for later use.

Coordinating the flow of data between these components is the "Orchestrator", which acts as the system's central controller. The orchestrator ensures that data is processed at the correct times, moves between modules as needed and that workloads are balanced across different components. It is crucial for maintaining the system's flow, directing raw data to the analyzers and returning processed data to the storage. Additionally, it manages error handling, ensuring data collection or analysis processes are retried or adjusted if something goes wrong, such as an API failure.

Once the data has been processed and stored, the "Data Presenter" module is responsible for displaying it to users. The "Presenter Middleware" prepares the data for display, transforming it into the required format for user-facing interfaces. The processed data is then presented to users through a "Grafana UI", a powerful tool for visualizing data in dynamic dashboards. The Grafana UI allows users to view and interact with the analyzed data, providing a rich, user-friendly experience through graphs, charts, or tables. Like the manual data entry system, access to the Grafana UI is controlled through the "User Authentication" system to prevent unauthorized users from accessing the data.

User interaction with the system happens at two main points: manual data entry and data presentation. Users input data via the "Forms-based UI", which is then processed and stored. Later, users can view the results of the data analysis through the "Grafana UI", where they can explore the insights generated by the system's statistical and machine learning analyzers.

In summary, this architecture is designed to handle diverse data sources (APIs, web scraping and manual input), process them through both traditional and advanced analytical methods and present the results to users clearly and interactively. The "Orchestrator" ensures seamless communication between the components, managing the data flow and coordinating the system's operations. The "Data Storage" serves as the central repository for both raw and processed data, while the "Data Presenter" delivers insights to the users in a visually compelling way. By breaking down each function into modular components, the system is highly scalable, adaptable, and efficient in handling a variety of data-related tasks.

6.2.1. API Harvesting Mechanism

The API harvesting mechanism is a crucial component for gathering structured data from external systems. It employs multiple **API harvesting actors**, each configured to connect to and extract data from specific APIs. These actors enable seamless integration with various data sources, ensuring that data can be ingested in a standardized format for further processing.

This mechanism is highly scalable, as new API actors can be added to accommodate additional data sources as needed. It is particularly useful for accessing real-time or regularly updated data, such as weather, financial metrics, or user behaviour data from third-party systems.

Requirement	Specifications
API Integration	Connect to and extract data from external APIs
Data Transformation	Convert API responses into system-compatible formats
Scalability	Allow the addition of new APIs with minimal reconfiguration
Monitoring	Track API performance and log errors

6.2.2. Manual Data Entry

The manual data entry module allows users to input data that may not be available through automated means. It includes a **forms-based UI** where users can submit structured data directly into the system. This data is then sent to the backend, where it undergoes validation and integration into the pipeline.

This component is particularly valuable in scenarios where small-scale or highly customized data is required, such as specific survey results, unique business metrics, or temporary datasets. By connecting seamlessly with other system components, it ensures that user-submitted data can be processed alongside other sources without requiring manual intervention.

Requirement	Specifications
Form Submission	Allow users to input and submit data via the UI
Input Validation	Validate data before submission to ensure accuracy and completeness
Error Handling	Notify users of input errors and provide corrective feedback
Backend Integration	Send validated data to the backend for storage and processing

6.2.3. Web Data Scraping

The web data scraping module automates the collection of unstructured or semi-structured data from online platforms. It is powered by a **data gatherer**, which employs multiple scraping actors, each specialized to extract information from targeted websites.

For example, these actors might gather reviews from TripAdvisor, lodging data from Airbnb etc.

This component plays a vital role in obtaining data that is not available through APIs or traditional methods. The system is designed to handle dynamic and diverse websites, using scraping tools like Apify to navigate and extract data effectively. This module enables the system to harness large amounts of web-based data for integration into the pipeline.

Requirement	Specifications
Data Gathering	Extract data from targeted websites
Automation	Schedule and automate scraping tasks
Data Cleaning	Remove irrelevant or redundant data from scraped results
Error Handling	Handle website changes (e.g., DOM structure) gracefully

6.2.4. Orchestrator

The orchestrator is the backbone of the system, managing the flow of data across various components. It acts as a central hub, routing data from input modules (e.g., API harvesting, manual entry, web scraping) to storage and processing layers. Tools like **Kafka** handle distributed messaging, ensuring that data flows are efficient and scalable, while **NiFi** manages workflows and data pipelines.

The orchestrator is crucial for maintaining the system's modularity and flexibility. It enables real-time processing, batch workflows and seamless integration of new components. By centralizing control, the orchestrator ensures that data is processed in an organized and efficient manner.

Requirement	Specifications
Data Routing	Manage the flow of data between components
Workflow Orchestration	Automate and schedule workflows
Fault Tolerance	Retry and re-route failed processes
Scalability	Handle increasing data volumes without performance degradation

6.2.5.   Data Storage

The data storage module provides a structured repository for all incoming data, divided into two categories: **raw data** and **analyzed data**. Raw data serves as a primary archive, preserving the original form of the collected information. This is particularly useful for auditing, debugging, or re-processing the data at a later stage.

Analyzed data, on the other hand, is the result of cleaning, transformation and processing. This data is indexed and managed using tools like **Elasticsearch** and **MongoDB**, ensuring quick retrieval and efficient storage management. By separating raw and processed data, the system maintains data integrity while supporting multiple stages of analytics.

Requirement	Specifications
Data Storage	Store raw and processed data
Data Retrieval	Enable quick access and querying of stored data
Data Indexing	Index data for efficient retrieval
Backup and Recovery	Ensure data is backed up and recoverable

6.2.6.   Data Analyzer

The data analyzer module processes stored data to generate insights. It comprises two key components: a **statistical analyzer** for traditional descriptive and inferential analysis and an **ML analyzer** for advanced machine learning tasks. The statistical analyzer identifies trends, correlations and key metrics, while the ML analyzer performs tasks such as clustering, classification and predictive modeling.

This module uses tools like **Python** and **Keras** for flexible and scalable analysis, catering to both structured and unstructured data. By supporting diverse analytical techniques, the data analyzer enables the system to address a wide range of business and research needs.

Requirement	Specifications
Statistical Analysis	Perform descriptive and inferential analytics
ML Analysis	Train and deploy machine learning models
Custom Algorithms	Support user-defined analytics workflows
Model Integration	Save and deploy models for future use

6.2.7.   Data Presenter

The data presenter module prepares data for visualization by employing **presenter middleware**. It ensures that the processed data is compatible with the Visual Analytics GUI, translating raw analytics outputs into structured formats suitable for user consumption.

The Visual Analytics GUI, powered by **Grafana**, provides an interactive interface for users to explore and visualize processed data. It supports customizable dashboards, enabling users to track KPIs, visualize trends and drill down into specific datasets. Grafana's versatility ensures that users can tailor their experience to meet their unique requirements.

This GUI bridges the gap between raw data and actionable insights, presenting complex analytics in a user-friendly format. Its interactivity and flexibility make it accessible to both technical and non-technical users, fostering data-driven decision-making.

Requirement	Specifications
Data Formatting	Convert raw analytics outputs into display-friendly formats
Middleware Optimization	Ensure smooth integration between backend and frontend
Data Validation	Validate data before presentation
Error Handling	Log and resolve errors in data preparation
Dashboard Creation	Allow users to create and customize dashboards
Real-Time Visualization	Display live updates of data
Export Options	Support exporting dashboards and charts
Data Interaction	Enable users to users to filter and drill down into visualizations, input data, query datasets and view visualizations
Dashboard Customization	Allow users to create, modify and save dashboards for specific needs

6.2.8.   User Authenticator

The user authenticator secures the system by verifying user credentials before granting access. It ensures that only authorized personnel can interact with sensitive data and system functionalities.

This component is essential for maintaining data privacy and security, particularly in multi-user environments. By integrating robust authentication protocols, it safeguards the system against unauthorized access.

Requirement	Specifications
User Verification	Authenticate users before granting access
Session Control	Manage active sessions securely
Access Restrictions	Enforce role-based permissions
Audit Logging	Record authentication attempts

7. Appendixes

7.1. Appendix A: ROSS 1000

ROSS 1000 is the Italian management system at the national level for territorial analysis that monitors the trend of tourist demand and supply and observes the tourist under a magnifying glass, collecting their socio-demographic characteristics at the time of check-in.

Interchange record

LENGTH	GUY	Field	Type Accommodated (16-17-18) REQUIRED (YES, NO, BLANK)	Type Accommodated (19-20) REQUIRED (YES, NO)	If >< IT, = EU
2	Numeric	Type Housed	YES	YES	
10	Alphanumeric	Arrival date (dd/mm/yyyy)	YES	YES	
1	Numeric	Gender (1=male; 2=female)	YES	YES	
10	Alphanumeric	Date of birth dd / mm / yyyy)	YES	YES	
9	Numeric	State of birth code	YES	YES	
9	Numeric	Citizenship code	YES	YES	
9	Numeric	Municipality code of residence	YES (if IT)	YES (if IT)	
2	Alphanumeric	Initials province of residence	YES (if IT)	YES (if IT)	NUTS2 residence region
9	Numeric	State of residence code	YES	YES	
10	Alphanumeric	Departure date (dd/mm/yyyy)	YES (Mode 2)	YES (mode 2)	
30	Alphanumeric	Tourism type	YES	YES	
30	Alphanumeric	Means of Transport	YES	YES	
3	Numeric	Occupied rooms	YES	YES	total number of rooms
3	Numeric	Rooms available	YES	NO	number of rooms

4	Numeric	Available beds	YES	NO	number of beds
10	Alphanumeric	Position identification code	YES	YES	
1	Numeric	Mode (1=New; 2=Variation; 3=Deletion)	YES	YES	

Type Housed		
	16	Single Guest
	17	Householder
	18	Group Leader
	19	Family
	20	Group Member

7.2. Appendix B: DMSS Data Indices

This new set of indices is presented in the following tables. Selected web data is presented in section 4 of the following table.

Table 20 Reduced dataset for municipal level

					MUNICIPAL LEVEL				
1.	**DESTINATION OVERVIEW**	**2.**	**TOURISM INDUSTRY**	**3.**	**TOURISM FLOW**	**4.**	**WEB DATA**	**5.**	**ETIS**
	Data		*Data*		*Data*		Data		*Data*
	Destination Profile		**Number of establishments**		**Flow**		**Booking.com**		**Destination management**
1.1	Dominant habitats (place an X against all that apply)	2.1	♦ Total	3.1	♦ Total Arrivals		♦Number of establishments	5.1	♦ Tourism enterprises/establishments in the destination using a voluntary certification/labelling for environmental/quality/sustainability and/or Corporate Social Responsibility measures
1.2	Top five most popular tourist attractions (including environmental and cultural attractions).	2.2	* Of which, Accommodation for visitors	3.2	* Of which, domestic		* Of which, hotel	5.2	♦ Tourists that are satisfied with their overall experience in the destination

1.3	Area	2.3	* Of which, Food and beverage serving activities	3.3	♦ Overnight visitors (tourists)		* Of which, in apartments		**Economic Value**
1.4	Population	2.4	* Of which, Passenger transportation	3.4	* Of which, domestic		♦Description	5.4	♦ Number of tourist nights
1.5	Density	2.5	* Of which, Travel agencies and other reservation services activities	3.5	♦Daily visitors (no overnights)		* Of which, hotel	5.5	♦ Number of same day visitors
1.6	Gross Value-added Total	2.6	* Of which, Convention bureau/congress facilities services activities	3.6	* Of which, cruise passengers		* Of which, in apartments	5.6	♦ Relative contribution of tourism to the destination's economy (% GDP)
1.7	Gross Value added per capita	2.7	* Of which, Museums		**Arrivals by region**		♦Adress	5.7	♦ Daily spending per overnight tourist
1.9	Number of Employees	2.8	* Of which, Themes Parks	3.7	♦ Total Arrivals		* Of which, hotel	5.8	♦ Average length of stay of tourists (nights)
1.10	* Of which, number of direct jobs in tourism	2.9	* Of which, Archaeological sites	3.8	* Of which from Africa		* Of which, in apartments	5.9	♦ Occupancy rate in commercial accommodation establishments per month and average for the year
1.11	* Of which, number of women employed in tourism	2.10	* Of which, other tourism attractions	3.9	* Of which from Americas		♦Stars rating	5.10	♦ Direct tourism employment as percentage of total employment in the destination
1.12	Quality of life index	2.11	* Of which, other tourism industries	3.10	* Of which from Asia		* Of which, hotel	5.11	♦ Local producer of food, drink, goods, and services
1.13	Criminality index		**Number of establishments accessible for people with disabilities**	3.11	* Of which from Europe		♦Average Score		**Social and Cultural Impact**
1.14	International Airports	2.12	♦ Total	3.12	* Of which, domestic		* Of which, hotel	5.12	♦ Number of tourists per residents
1.15	♦ Number of daily flights	2.13	* Of which, Hotel and similar accommodations	3.13	* Of which from Oceania		* Of which, in apartments	5.13	♦Residents who are satisfied with tourism in the destination (per month/season)
1.16	* Of which, charter flights	2.14	* Of which, Holiday and other short-stay accommodation		**Arrivals by main purpose**		♦Number of reviews	5.14	♦ Number of beds available in commercial accommodation

		2.15	* Of which, Camping grounds, recreational vehicle parks and trailer parks	3.14	Total		* Of which, hotel		
1.14	Train Stations							5.15	♦ Number of second homes
1.15	♦ Number of daily stops	2.16	* Of which, Food and beverage serving activities	3.15	♦ Personal		* Of which, in apartments	5.16	♦ Percentage of men and women employed in the tourism sector
1.16	Coaches' stations	2.17	* Of which, Museums	3.16	* Holidays, leisure and recreation		♦Category reviews	5.17	♦ Tourism enterprises where the general manager position is held by a woman
1.17	♦ Number of daily departures	2.18	* Of which, Themes Parks	3.17	* Other personal purposes		* Of which, hotel	5.18	♦ Rooms in commercial accommodation establishments accessible for people with disabilities
1.18	Seaports	2.19	* Of which, Archaeological sites	3.18	♦ Business and professional		* Of which, in apartments	5.20	♦ Public transport that is accessible to people with disabilities and with specific access requirements
1.19	♦ Number of daily departures	2.20	* Of which, other tourism attractions		**Arrivals by mode of transport**		♦Price	5.21	♦ Tourist attractions that are accessible to people with disabilities and/or participating in recognized accessibility information schemes
1.21	Number of establishments *accessible for people with disabilities*		**Accommodation for visitors in hotels and similar establishments**	3.19	♦ Total		* Of which, hotel		**Environmental Impact**
1.26	* Of which, number of accessible Airports		**Hotel and similar accommodations**	3.20	* Of which from by Air		* Of which, in apartments	5.23	♦ Tourists and same day visitors using different modes of transport to arrive at the destination
1.27	* Of which, number of accessible Train Stations	2.21	♦ Total	3.21	* Of which from by Sea		♦Availability	5.25	♦ Tourism enterprises involved in climate change mitigation schemes—such as: CO2 offset, low energy systems, etc.—and "adaptation" responses and actions

1.28	* Of which, number of accessible Coaches Stations	2.22	* Of which seasonal	3.22	* Of which from by Railway	* Of which, hotel	5.27	♦Tourism enterprises separating different types of waste
1.29	* Of which, number of accessible Seaports	2.23	♦ Number of rooms	3.23	* Of which from by Private car	* Of which, in apartments	5.30	♦ Energy consumption per tourist night compared to general population energy consumption per resident night
	Sunshine hours	2.24	♦ Number of beds	3.24	* Of which from by Other not classified	**Tripadvisor.com**	5.31	♦ Tourism enterprises that take actions to reduce energy consumption
1.32	♦ Total		**Holiday and other short-stay accommodation**		**Accommodation**	♦Number of establishments	5.32	♦ Annual amount of energy consumed from renewable sources (Mwh) compared to overall energy consumption at destination level per year
1.33	* Of which, in winter	2.25	♦ Total		**Hotel and similar accommodations**	* Of which, hotel		
1.34	* Of which, in summer	2.26	* Of which seasonal	3.25	♦ Arrivals	* Of which, vacation rentals		
	Precipitation:	2.27	♦ Number of rooms	3.26	* Of which, domestic	♦ Food and beverage serving activities		
1.35	♦ Total	2.28	♦ Number of beds	3.27	♦ Overnights	♦ Attractions		
1.36	* Of which, in winter		**Camping grounds, recreational vehicle parks and trailer parks**	3.28	* Of which, domestic	♦Contact details (address, telephone number)		
1.37	* Of which, in summer	2.29	♦ Total		**Holiday and other short-stay accommodation**	* Of which, hotel		
	Temperature:	2.30	* Of which seasonal	3.29	♦ Arrivals	* Of which, restaurants		
1.38	♦ Average of maximum temperature	2.31	♦ Number of rooms	3.30	* Of which, domestic	* Of which, in vacation rental		
1.39	* Of which, in winter	2.32	♦ Number of beds	3.31	♦ Overnights	* Of which, in attractions		
1.40	* Of which, in summer		**Overall Satisfaction**	3.32	* Of which, domestic	♦Price level (in classes e.g., "cheap," "expensive")		

							* Of which, hotel
1.41	♦Average of minimum temperature	2.33	♦Total		**Camping grounds, recreational vehicle parks and trailer parks**		
1.42	* Of which, in winter	2.34	* Of which, domestic	3.33	♦ Arrivals		* Of which, restaurants
1.43	* Of which, in summer	2.35	* Of which, non-Domestic	3.34	* Of which, domestic		* Of which, in vacation rental
1.44	Number of environmental certifications			3.35	♦ Overnights		* Of which, in attractions
	Waste production		**Indicators**	3.36	* Of which, domestic		♦Average Score
1.45	♦ Total	2.36	Occupancy rate / rooms		**Expenditure**		* Of which, hotel
1.46	* Of which, from tourism sector	2.37	Occupancy rate / beds	3.37	Total		* Of which, restaurants
1.47	* Of which, from recycling	2.38	Average length of stay	3.38	♦ Domestic		* Of which, in vacation rental
	Water consumption	2.39	Capacity ratio (beds per 1000 inhabitants)		**Overall Satisfaction**		* Of which, in attractions
1.48	♦ Total	2.40	Tourists / population	3.40	Total		♦Number of reviews
1.49	* Of which, from tourism sector			3.41	♦ Domestic		* Of which, hotel
	Energy consumption			3.42	♦ non-domestic		* Of which, restaurants
1.50	♦ Total			3.43	Intention to return		* Of which, in vacation rental
							* Of which, in attractions
					Indicators		♦Ranking
				3.44	Average size of travel party		* Of which, hotel
				3.45	Average size of travel group		* Of which, restaurants
				3.46	Average length of stay		* Of which, in vacation rental
							* Of which, in attractions
							AirB&B.com

	♦Number of establishments
	* Of which, sharing rooms
	* Of which, full apartments
	♦Number of reviews
	* Of which, sharing rooms
	* Of which, full apartments
	♦Average Rating
	* Of which, sharing rooms
	* Of which, full apartments
	♦Description
	* Of which, sharing rooms
	* Of which, full apartments
	♦Price
	* Of which, sharing rooms
	* Of which, full apartments
	♦Location (coordinates)
	* Of which, sharing rooms
	* Of which, full apartments
	Google Places
	♦Number of places
	* Of which, hotels
	* Of which, restaurants
	* Of which, museums

	* Of which, <u>other</u>[4]
	♦Number of reviews
	* Of which, hotels
	* Of which, restaurants
	* Of which, museums
	* Of which, <u>other</u>
	♦Average Rating
	* Of which, hotels
	* Of which, restaurants
	* Of which, museums
	* Of which, <u>other</u>
	♦ Contact details (address, telephone number)
	* Of which, hotels
	* Of which, restaurants
	* Of which, museums
	* Of which, <u>other</u>
	♦Website
	* Of which, hotels
	* Of which, restaurants
	* Of which, museums
	* Of which, <u>other</u>
	Windy.com (or another meteorological site)
	♦Weather forecast
	* Temperature
	* Humidity

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[4] complete list: https://developers.google.com/maps/documentation/places/web-service/supported_types

	* Wind
	* Rain
	♦Weather historical data
	* Temperature
	* Humidity
	* Wind
	* Rain
	Wikimedia
	♦Demographics
	* Area
	* Population
	* Human Development Index (HDI)
	* Coordinates
	* Municipality
	* Gross domestic product (GDP)

Table 21 Reduced dataset for provincial level

				PROVINCIAL LEVEL			
1.	**DESTINATION OVERVIEW**	**2.**	**TOURISM INDUSTRY**	**3.**	**TOURISM FLOW**	**5.**	**ETIS**
	Data		*Data*		*Data*		*Data*
	Destination Profile		**Number of establishments**		**Flow**		**Destination management**
1.1	Dominant habitats (place an X against all that apply)	2.1	♦ Total	3.1	♦ Total Arrivals	5.1	♦ Tourism enterprises/establishments in the destination using a voluntary certification/labelling for environmental/quality/sustainability and/or Corporate Social Responsibility measures
1.2	Top five most popular tourist attractions (including environmental and cultural attractions).	2.2	* Of which, Accommodation for visitors	3.2	* Of which, domestic	5.2	♦ Tourists that are satisfied with their overall experience in the destination

1.3	Area	2.3	* Of which, Food and beverage serving activities	3.3	♦ Overnight visitors (tourists)	5.3	♦ Repeat/return visitors (within 5 years)
1.4	Population	2.4	* Of which, Passenger transportation	3.4	* Of which, domestic		**Economic Value**
1.5	Density	2.5	* Of which, Travel agencies and other reservation services activities	3.5	♦Daily visitors (no overnights)	5.4	♦ Number of tourist nights
1.6	Gross Value-added Total	2.6	* Of which, Convention bureau/congress facilities services activities	3.6	* Of which, cruise passengers	5.5	♦ Number of same day visitors
1.7	Gross Value added per capita	2.7	* Of which, Museums		**Arrivals by region**	5.6	♦ Relative contribution of tourism to the destination's economy (% GDP)
1.9	Number of Employees	2.8	* Of which, Themes Parks	3.7	♦ Total Arrivals	5.7	♦ Daily spending per overnight tourist
1.10	* Of which, number of direct jobs in tourism	2.9	* Of which, Archaeological sites	3.8	* Of which from Africa	5.8	♦ Average length of stay of tourists (nights)
1.11	* Of which, number of women employed in tourism	2.10	* Of which, other tourism attractions	3.9	* Of which from Americas	5.9	♦ Occupancy rate in commercial accommodation establishments per month and average for the year
1.12	Quality of life index	2.11	* Of which, other tourism industries	3.10	* Of which from Asia	5.10	♦ Direct tourism employment as percentage of total employment in the destination
1.13	Criminality index		**Number of establishments accessible for people with disabilities**	3.11	* Of which from Europe	5.11	♦ Local producer of food, drink, goods, and services
1.14	International Airports	2.12	♦ Total	3.12	* Of which, domestic		**Social and Cultural Impact**
1.15	♦ Number of daily flights	2.13	* Of which, Hotel and similar accommodations	3.13	* Of which from Oceania	5.12	♦ Number of tourists per residents
1.16	* Of which, charter flights	2.14	* Of which, Holiday and other short-stay accommodation		**Arrivals by main purpose**	5.13	♦Residents who are satisfied with tourism in the destination (per month/season)

	* Of which, low-cost flights	2.15	* Of which, Camping grounds, recreational vehicle parks and trailer parks	3.14	Total	5.14	♦ Number of beds available in commercial accommodation
1.14	Train Stations	2.16	* Of which, Food and beverage serving activities	3.15	♦ Personal	5.15	♦ Number of second homes
1.15	♦ Number of daily stops	2.17	* Of which, Museums	3.16	* Holidays, leisure, and recreation	5.16	♦ Percentage of men and women employed in the tourism sector
1.16	Coaches' stations	2.18	* Of which, Themes Parks	3.17	* Other personal purposes	5.17	♦ Tourism enterprises where the general manager position is held by a woman
1.17	♦ Number of daily departures	2.19	* Of which, Archaeological sites	3.18	♦ Business and professional	5.18	♦ Rooms in commercial accommodation establishments accessible for people with disabilities
1.18	Seaports	2.20	* Of which, other tourism attractions		**Arrivals by mode of transport**	5.20	♦ Public transport that is accessible to people with disabilities and with specific access requirements
1.19	♦ Number of daily departures		**Accommodation for visitors in hotels and similar establishments**	3.19	♦ Total	5.22	♦ Residents that are satisfied with the impacts of tourism on destination's identity
1.21	Number of establishments *accessible for people with disabilities*			3.20	* Of which from by Air		
			Hotel and similar accommodations				**Environmental Impact**
1.26	* Of which, number of accessible Airports	2.21	♦ Total	3.21	* Of which from by Sea	5.23	♦ Tourists and same day visitors using different modes of transport to arrive at the destination
1.27	* Of which, number of accessible Train Stations	2.22	* Of which seasonal	3.22	* Of which from by Railway	5.24	♦ Tourists and same day visitors using local/soft mobility/public transport services to get around the destination
1.28	* Of which, number of accessible Coaches Stations	2.23	♦ Number of rooms	3.23	* Of which from by Private car		
1.29	* Of which, number of	2.24	♦ Number of beds	3.24	* Of which from by Other not classified		

	accessible Seaports				
1.30	Total EU Funds received		**Holiday and other short-stay accommodation**		**Accommodation**
	Sunshine hours	2.26	* Of which seasonal	3.25	♦ Arrivals
1.32	♦ Total	2.27	♦ Number of rooms	3.26	* Of which, domestic
1.33	* Of which, in winter	2.28	♦ Number of beds	3.27	♦ Overnights
1.34	* Of which, in summer		**Camping grounds, recreational vehicle parks and trailer parks**	3.28	* Of which, domestic
	Precipitation:	2.29	♦ Total		**Holiday and other short-stay accommodation**
1.35	♦ Total	2.30	* Of which seasonal	3.29	♦ Arrivals
1.36	* Of which, in winter	2.31	♦ Number of rooms	3.30	* Of which, domestic
1.37	* Of which, in summer	2.32	♦ Number of beds	3.31	♦ Overnights
	Temperature:		**Overall Satisfaction**	3.32	* Of which, domestic
1.38	♦ Average of maximum temperature	2.33	♦Total		**Camping grounds, recreational vehicle parks and trailer parks**
1.39	* Of which, in winter	2.34	* Of which, domestic	3.33	♦ Arrivals
1.40	* Of which, in summer	2.35	* Of which, non-Domestic	3.34	* Of which, domestic
1.41	♦Average of minimum temperature			3.35	♦ Overnights
1.42	* Of which, in winter		**Indicators**	3.36	* Of which, domestic
1.43	* Of which, in summer	2.36	Occupancy rate / rooms		**Expenditure**
1.44	Number of environmental certifications	2.37	Occupancy rate / beds	3.37	Total
	Waste production	2.38	Average length of stay	3.38	♦ Domestic

1.45	♦ Total	2.39	Capacity ratio (beds per 1000 inhabitants)	3.39	♦ non-domestic
1.46	* Of which, from tourism sector	2.40	Tourists / population		**Overall Satisfaction**
1.47	* Of which, from recycling			3.40	Total
	Water consumption			3.41	♦ Domestic
1.48	♦ Total			3.42	♦ non-domestic
	Energy consumption			3.43	Intention to return
1.50	♦ Total				
					Indicators
				3.44	Average size of travel party
				3.45	Average size of travel group
				3.46	Average length of stay
				3.47	Average expenditure per day

Table 22 Reduced dataset for regional level

REGIONAL LEVEL							
1.	**DESTINATION OVERVIEW**	**2.**	**TOURISM INDUSTRY**	**3.**	**TOURISM FLOW**	**5.**	**ETIS**
	Data		*Data*		*Data*		*Data*
	Destination Profile		**Number of establishments**		**Flow**		**Destination management**
1.1	Dominant habitats (place an X against all that apply)	2.1	♦ Total	3.1	♦ Total Arrivals	5.1	♦ Tourism enterprises/establishments in the destination using a voluntary certification/labelling for environmental/quality/sustainability and/or Corporate Social Responsibility measures
1.2	Top five most popular tourist attractions (including environmental	2.2	* Of which, Accommodation for visitors	3.2	* Of which, domestic	5.2	♦ Tourists that are satisfied with their overall experience in the destination

	and cultural attractions).						
1.3	Area	2.3	* Of which, Food and beverage serving activities	3.3	♦ Overnight visitors (tourists)		**Economic Value**
1.4	Population	2.4	* Of which, Passenger transportation	3.4	* Of which, domestic	5.4	♦ Number of tourist nights
1.5	Density	2.5	* Of which, Travel agencies and other reservation services activities	3.5	♦Daily visitors (no overnights)	5.5	♦ Number of same day visitors
1.6	Gross Value-added Total	2.6	* Of which, Convention bureau/congress facilities services activities	3.6	* Of which, cruise passengers	5.6	♦ Relative contribution of tourism to the destination's economy (% GDP)
1.7	Gross Value added per capita	2.7	* Of which, Museums		**Arrivals by region**	5.7	♦ Daily spending per overnight tourist
1.8	Total tourism expenditure over GDP	2.8	* Of which, Themes Parks	3.7	♦ Total Arrivals	5.8	♦ Average length of stay of tourists (nights)
1.9	Number of Employees	2.9	* Of which, Archaeological sites	3.8	* Of which from Africa	5.9	♦ Occupancy rate in commercial accommodation establishments per month and average for the year
1.10	* Of which, number of direct jobs in tourism	2.10	* Of which, other tourism attractions	3.9	* Of which from Americas	5.10	♦ Direct tourism employment as percentage of total employment in the destination
1.11	* Of which, number of women employed in tourism	2.11	* Of which, other tourism industries	3.10	* Of which from Asia	5.11	♦ Local producer of food, drink, goods, and services
1.12	Quality of life index		**Number of establishments accessible for people with disabilities**	3.11	* Of which from Europe		**Social and Cultural Impact**
1.13	Criminality index	2.12	♦ Total	3.12	* Of which, domestic	5.12	♦ Number of tourists per residents
1.14	International Airports	2.13	* Of which, Hotel and similar accommodations	3.13	* Of which from Oceania	5.13	♦Residents who are satisfied with tourism in the destination (per month/season)

1.15	♦ Number of daily flights	2.14	* Of which, Holiday and other short-stay accommodation		**Arrivals by main purpose**	5.14	♦ Number of beds available in commercial accommodation
1.16	* Of which, charter flights	2.15	* Of which, Camping grounds, recreational vehicle parks and trailer parks	3.14	Total	5.15	♦ Number of second homes
	* Of which, low-cost flights	2.16	* Of which, Food and beverage serving activities	3.15	♦ Personal	5.16	♦ Percentage of men and women employed in the tourism sector
1.14	Train Stations	2.17	* Of which, Museums	3.16	* Holidays, leisure, and recreation	5.17	♦ Tourism enterprises where the general manager position is held by a woman
1.15	♦ Number of daily stops	2.18	* Of which, Themes Parks	3.17	* Other personal purposes	5.18	♦ Rooms in commercial accommodation establishments accessible for people with disabilities
1.16	Coaches' stations	2.19	* Of which, Archaeological sites	3.18	♦ Business and professional	5.20	♦ Public transport that is accessible to people with disabilities and with specific access requirements
1.17	♦ Number of daily departures	2.20	* Of which, other tourism attractions		**Arrivals by mode of transport**	5.22	♦ Residents that are satisfied with the impacts of tourism on destination's identity
1.18	Seaports		**Accommodation for visitors in hotels and similar establishments**	3.19	♦ Total		**Environmental Impact**
1.19	♦ Number of daily departures		**Hotel and similar accommodations**	3.20	* Of which from by Air	5.25	♦ Tourism enterprises involved in climate change mitigation schemes—such as: CO2 offset, low energy systems, etc.—and "adaptation" responses and actions
1.21	Number of establishments *accessible for people with disabilities*	2.21	♦ Total	3.21	* Of which from by Sea	5.27	♦Tourism enterprises separating different types of waste
1.26	* Of which, number of accessible Airports	2.22	* Of which seasonal	3.22	* Of which from by Railway	5.30	♦ Energy consumption per tourist night compared to general population energy consumption per resident night

1.27	* Of which, number of accessible Train Stations	2.23	♦ Number of rooms	3.23	* Of which from by Private car	5.31	♦ Tourism enterprises that take actions to reduce energy consumption
1.28	* Of which, number of accessible Coaches Stations	2.24	♦ Number of beds	3.24	* Of which from by Other not classified	5.32	♦ Annual amount of energy consumed from renewable sources (Mwh) compared to overall energy consumption at destination level per year
1.29	* Of which, number of accessible Seaports		**Holiday and other short-stay accommodation**		**Accommodation**		
1.30	Total EU Funds received	2.25	♦ Total		**Hotel and similar accommodations**		
	Sunshine hours	2.26	* Of which seasonal	3.25	♦ Arrivals		
1.32	♦ Total	2.27	♦ Number of rooms	3.26	* Of which, domestic		
1.33	* Of which, in winter	2.28	♦ Number of beds	3.27	♦ Overnights		
1.34	* Of which, in summer		**Camping grounds, recreational vehicle parks and trailer parks**	3.28	* Of which, domestic		
	Precipitation:	2.29	♦ Total		**Holiday and other short-stay accommodation**		
1.35	♦ Total	2.30	* Of which seasonal	3.29	♦ Arrivals		
1.36	* Of which, in winter	2.31	♦ Number of rooms	3.30	* Of which, domestic		
1.37	* Of which, in summer	2.32	♦ Number of beds	3.31	♦ Overnights		
	Temperature:		**Overall Satisfaction**	3.32	* Of which, domestic		
1.38	♦ Average of maximum temperature	2.33	♦Total		**Camping grounds, recreational vehicle parks and trailer parks**		
1.39	* Of which, in winter	2.34	* Of which, domestic	3.33	♦ Arrivals		
1.40	* Of which, in summer	2.35	* Of which, non-Domestic	3.34	* Of which, domestic		
1.41	♦Average of minimum temperature			3.35	♦ Overnights		

1.42	* Of which, in winter		**Indicators**	3.36	* Of which, domestic
1.43	* Of which, in summer	2.36	Occupancy rate / rooms		**Expenditure**
1.44	Number of environmental certifications	2.37	Occupancy rate / beds	3.37	Total
	Waste production	2.38	Average length of stay	3.38	♦ Domestic
1.45	♦ Total	2.39	Capacity ratio (beds per 1000 inhabitants)	3.39	♦ non-domestic
1.47	* Of which, from recycling	2.40	Tourists / population		**Overall Satisfaction**
	Water consumption			3.40	Total
1.48	♦ Total			3.41	♦ Domestic
	Energy consumption			3.42	♦ non-domestic
1.50	♦ Total			3.43	Intention to return
					Indicators
				3.45	Average size of travel group
				3.46	Average length of stay
				3.47	Average expenditure per day

Table 23 Reduced dataset for national level

NATIONAL LEVEL							
NATIONAL LEVEL							
1.	**DESTINATION OVERVIEW**	**2.**	**TOURISM INDUSTRY**	**3.**	**TOURISM FLOW**	**5.**	**ETIS**
	Data		*Data*		*Data*		*Data*
	Destination Profile		**Number of establishments**		**Flow**		**Destination management**
1.1	Dominant habitats (place an X against all that apply)	2.1	♦ Total	3.1	♦ Total Arrivals	5.1	♦ Tourism enterprises/establishments in the destination using a voluntary certification/labelling for environmental/quality/sustainability and/or Corporate Social Responsibility measures

1.2	Top five most popular tourist attractions (including environmental and cultural attractions).	2.2	* Of which, Accommodation for visitors	3.2	* Of which, domestic	5.2	♦ Tourists that are satisfied with their overall experience in the destination
1.3	Area	2.3	* Of which, Food and beverage serving activities	3.3	♦ Overnight visitors (tourists)		**Economic Value**
1.4	Population	2.4	* Of which, Passenger transportation	3.4	* Of which, domestic	5.4	♦ Number of tourist nights
1.5	Density	2.5	* Of which, Travel agencies and other reservation services activities	3.5	♦Daily visitors (no overnights)	5.5	♦ Number of same day visitors
1.6	Gross Value-added Total	2.6	* Of which, Convention bureau/congress facilities services activities	3.6	* Of which, cruise passengers	5.6	♦ Relative contribution of tourism to the destination's economy (% GDP)
1.7	Gross Value added per capita	2.7	* Of which, Museums		**Arrivals by region**	5.7	♦ Daily spending per overnight tourist
1.8	Total tourism expenditure over GDP	2.8	* Of which, Themes Parks	3.7	♦ Total Arrivals	5.8	♦ Average length of stay of tourists (nights)
1.9	Number of Employees	2.9	* Of which, Archaeological sites	3.8	* Of which from Africa	5.9	♦ Occupancy rate in commercial accommodation establishments per month and average for the year
1.10	* Of which, number of direct jobs in tourism	2.10	* Of which, other tourism attractions	3.9	* Of which from Americas	5.10	♦ Direct tourism employment as percentage of total employment in the destination
1.11	* Of which, number of women employed in tourism	2.11	* Of which, other tourism industries	3.10	* Of which from Asia	5.11	♦ Local producer of food, drink, goods, and services
1.12	Quality of life index		**Number of establishments accessible for people with disabilities**	3.11	* Of which from Europe		
1.13	Criminality index	2.12	♦ Total	3.12	* Of which, domestic		**Social and Cultural Impact**
						5.12	♦ Number of tourists per residents

1.14	International Airports	2.13	* Of which, Hotel and similar accommodations	3.13	* Of which from Oceania	5.13	♦Residents who are satisfied with tourism in the destination (per month/season)
1.15	♦ Number of daily flights	2.14	* Of which, Holiday and other short-stay accommodation		**Arrivals by main purpose**	5.14	♦ Number of beds available in commercial accommodation
1.16	* Of which, charter flights	2.15	* Of which, Camping grounds, recreational vehicle parks and trailer parks	3.14	Total	5.15	♦ Number of second homes
1.16	* Of which, low-cost flights	2.16	* Of which, Food and beverage serving activities	3.15	♦ Personal	5.16	♦ Percentage of men and women employed in the tourism sector
1.14	Train Stations	2.17	* Of which, Museums	3.16	* Holidays, leisure, and recreation	5.17	♦ Tourism enterprises where the general manager position is held by a woman
1.15	♦ Number of daily stops	2.18	* Of which, Themes Parks	3.17	* Other personal purposes	5.18	♦ Rooms in commercial accommodation establishments accessible for people with disabilities
1.16	Coaches' stations	2.19	* Of which, Archaeological sites	3.18	♦ Business and professional	5.19	♦ Commercial accommodation establishments participating in recognized accessibility information schemes
1.17	♦ Number of daily departures	2.20	* Of which, other tourism attractions		**Arrivals by mode of transport**	5.20	♦ Public transport that is accessible to people with disabilities and with specific access requirements
1.18	Seaports		**Accommodation for visitors in hotels and similar establishments**	3.19	♦ Total	5.21	♦ Tourist attractions that are accessible to people with disabilities and/or participating in recognized accessibility information schemes
1.19	♦ Number of daily departures		**Hotel and similar accommodations**	3.20	* Of which from by Air	5.22	♦ Residents that are satisfied with the impacts of tourism on destination's identity
1.21	Number of establishments *__accessible for people with disabilities__*	2.21	♦ Total	3.21	* Of which from by Sea		**Environmental Impact**

1.26	* Of which, number of accessible Airports	2.22	* Of which seasonal	3.22	* Of which from by Railway	5.25	♦ Tourism enterprises involved in climate change mitigation schemes—such as: CO2 offset, low energy systems, etc.—and "adaptation" responses and actions
1.27	* Of which, number of accessible Train Stations	2.23	♦ Number of rooms	3.23	* Of which from by Private car	5.26	♦ Waste production per tourist night compared to general population waste production per person
1.28	* Of which, number of accessible Coaches Stations	2.24	♦ Number of beds	3.24	* Of which from by Other not classified	5.27	♦Tourism enterprises separating different types of waste
1.29	* Of which, number of accessible Seaports		**Holiday and other short-stay accommodation**		**Accommodation**	5.29	♦ Tourism enterprises taking actions to reduce water consumption
1.30	Total EU Funds received	2.25	♦ Total		**Hotel and similar accommodations**	5.30	♦ Energy consumption per tourist night compared to general population energy consumption per resident night
	Sunshine hours	2.26	* Of which seasonal	3.25	♦ Arrivals	5.31	♦ Tourism enterprises that take actions to reduce energy consumption
1.32	♦ Total	2.27	♦ Number of rooms	3.26	* Of which, domestic	5.32	♦ Annual amount of energy consumed from renewable sources (Mwh) compared to overall energy consumption at destination level per year
1.33	* Of which, in winter	2.28	♦ Number of beds	3.27	♦ Overnights		
1.34	* Of which, in summer		**Camping grounds, recreational vehicle parks and trailer parks**	3.28	* Of which, domestic		
	Precipitation:	2.29	♦ Total		**Holiday and other short-stay accommodation**		
1.35	♦ Total	2.30	* Of which seasonal	3.29	♦ Arrivals		
1.36	* Of which, in winter	2.31	♦ Number of rooms	3.30	* Of which, domestic		
1.37	* Of which, in summer	2.32	♦ Number of beds	3.31	♦ Overnights		

	Temperature:		**Overall Satisfaction**	3.32	* Of which, domestic
1.38	♦ Average of maximum temperature	2.33	♦Total		**Camping grounds, recreational vehicle parks and trailer parks**
1.39	* Of which, in winter	2.34	* Of which, domestic	3.33	♦ Arrivals
1.40	* Of which, in summer	2.35	* Of which, non-Domestic	3.34	* Of which, domestic
1.41	♦Average of minimum temperature			3.35	♦ Overnights
1.42	* Of which, in winter		**Indicators**	3.36	* Of which, domestic
1.43	* Of which, in summer	2.36	Occupancy rate / rooms		**Expenditure**
1.44	Number of environmental certifications	2.37	Occupancy rate / beds	3.37	Total
	Waste production	2.38	Average length of stay	3.38	♦ Domestic
1.45	♦ Total	2.39	Capacity ratio (beds per 1000 inhabitants)	3.39	♦ non-domestic
1.46	* Of which, from tourism sector	2.40	Tourists / population		
1.47	* Of which, from recycling				**Overall Satisfaction**
	Water consumption			3.40	Total
1.48	♦ Total			3.41	♦ Domestic
	Energy consumption			3.42	♦ non-domestic
1.50	♦ Total			3.43	Intention to return
					Indicators
				3.45	Average size of travel group
				3.46	Average length of stay