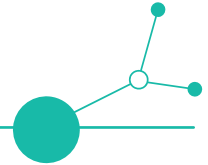


02.1.

Impact Measurement System for cycling tourism product



Version 7
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1. About the Document 02.1

1.1. The aim of the document

This document has been developed within the framework of Work Package 2 - Creating an Impact Measurement System for Climate-Neutral Travel of the project *Innovative Participatory Sustainable Business Model for Cycling along the Iron Curtain Trail* (ICTr-CE, CE0100401), co-funded by the INTERREG Central Europe Programme.

The purpose of this document, Output 2.1 - Impact Measurement System for cycling tourism products, is to present the concept, methodology and development process of the Impact Measurement System (hereinafter referred to as IMS) developed and implemented under Work Package 2. In accordance with the project Application Form (Activities 2.2-2.4 and Output 2.1), the document provides a transparent, operational and transferable description of the IMS, ensuring its applicability beyond the project lifetime.

As defined in the Application Form, Output 2.1 is required to deliver a developed, functional and transferable Impact Measurement System that enables booking centres to quantify, assess and communicate the environmental, social and economic impacts of innovative cycling tourism products along the Iron Curtain Trail. The IMS is conceived as a practical instrument supporting climate-neutral travel, sustainable product development and informed decision-making at product and customer level.

These requirements form the backbone of the structure and content of this document. Each chapter is aligned with the Application Form to ensure that the IMS is not only methodologically robust, but also operationally feasible and relevant for booking centres acting within the ICTr business model. Particular emphasis is placed on replicability, scalability and long-term usability in line with Interreg objectives.

To fulfil this purpose, Output 2.1 is structured around the following core elements:

- Context and rationale, outlining the need for an IMS within the ICTr project, its role in supporting sustainable cycling tourism, and its contribution to European climate, mobility and sustainability objectives.
- Methodological framework, describing the development of the IMS based on two complementary components: the CO₂ footprint calculation method (Activity 2.2) and the indicator-based sustainability assessment system (Activity 2.3). This section explains the indicator structure, weighting logic and aggregation principles underlying the IMS.
-

Through this structure, the document presents the IMS in a holistic and coherent manner, positioning it not merely as a technical assessment tool, but as a core component of the innovative ICTr value chain. The IMS links sustainable cycling product design with transparent communication of environmental, social and economic impacts, thereby supporting behavioural change, market uptake and long-term sustainability.

In summary, this document fulfils the requirements defined in the Application Form by delivering a complete, operational and transferable IMS. It serves as a reference framework for booking centres, project partners and external stakeholders seeking to implement, replicate or adapt the IMS for other cycling routes or comparable tourism contexts within Europe.

Additional technical documentation, detailed indicator lists and operational tools supporting the implementation of the IMS are provided in the annexes to this document.



1.2. What is the Impact Measurement System?

The IMS developed within the ICTr-CE project is a structured, indicator-based assessment framework designed to measure, aggregate and communicate the environmental, social and economic impacts of cycling tourism products. Unlike many existing sustainability assessment tools that primarily operate at destination level, the IMS focuses on the level of bookable tourism products, where concrete tourism-related decisions are planned, implemented and managed.

This product-based approach responds to a key challenge identified in the ICTr-CE Application Form: long-distance cycling routes such as EuroVelo 13 - Iron Curtain Trail cross multiple regions, destinations and national borders, each with different governance structures, data availability and sustainability frameworks. Applying destination-level IMS in such a context could fail to reflect the actual impacts generated by individual cycling tourism products. The IMS therefore shifts the focus from destinations to cycling tour packages, enabling an operational and transferable assessment of sustainability impacts.

The IMS measures impact at the level of guided and self-guided cycling tour packages offered through official booking centres. It captures sustainability-relevant aspects across the full value chain of a cycling tourism product, including booking centre services, accommodation, food and beverages, on-site transportation, activities, and tour operation or guiding services. By focusing on this operational level, the IMS provides a practical solution that can be directly embedded into day-to-day tourism operations.

From a methodological perspective, the IMS is built on two complementary components. First, a CO₂ footprint calculation quantifies greenhouse gas emissions associated with the main components of the cycling tourism product, such as accommodation, food, activities and on-site mobility. Second, an indicator-based sustainability assessment evaluates broader environmental, social and economic impacts using a structured set of qualitative and quantitative indicators. This combined approach ensures that climate impacts are addressed explicitly, while avoiding an exclusive focus on emissions alone.

Importantly, the IMS was intentionally designed to go beyond a pure carbon accounting tool. While CO₂ emissions remain an important measurable dimension, sustainability performance is assessed through a structured indicator framework reflecting three core pillars: environmental impacts (including resource use), economic impacts (such as local spending and support for local businesses), and social impacts (including community benefits, fair labour practices and cultural engagement). This integrated design reflects the understanding that responsible tourism can be achieved when environmental, economic and social dimensions are addressed together at product level.

The IMS is designed as an operational tool for professional use by booking centre staff. Data collection, validation and scoring are carried out by trained personnel based on information provided by tourism service providers and tour operators, supported by standardised templates, declaration forms and guidance documents. The system is not intended as a self-assessment tool for individual tourists, nor as an open-access destination monitoring instrument. Instead, it is embedded within the operational workflows of booking centres, ensuring consistency, data reliability and comparability of results.

At the same time, the IMS supports transparent communication towards tourists and other stakeholders. Complex indicator-level results are translated into aggregated global indicator scores, allowing the level of sustainability performance to be communicated in a clear, comparable and user-friendly manner without overloading users with technical detail.

Within the ICTr-CE project, the IMS plays a central role in demonstrating sustainable tourism performance and operationalising the innovative ICTr business model. The results generated by the IMS form the quantitative basis for the Good Impact Programme (O2.3), enabling the conversion of measured impacts into concrete contributions that support nature conservation, community development and climate action along the Iron Curtain Trail (Figure 1).



In this way, the IMS functions not only as a measurement tool, but as an enabling mechanism that links impact assessment, cycling product development, transparent communication and impact valorisation into a coherent system supporting the development and promotion of more sustainable cycling tourism.

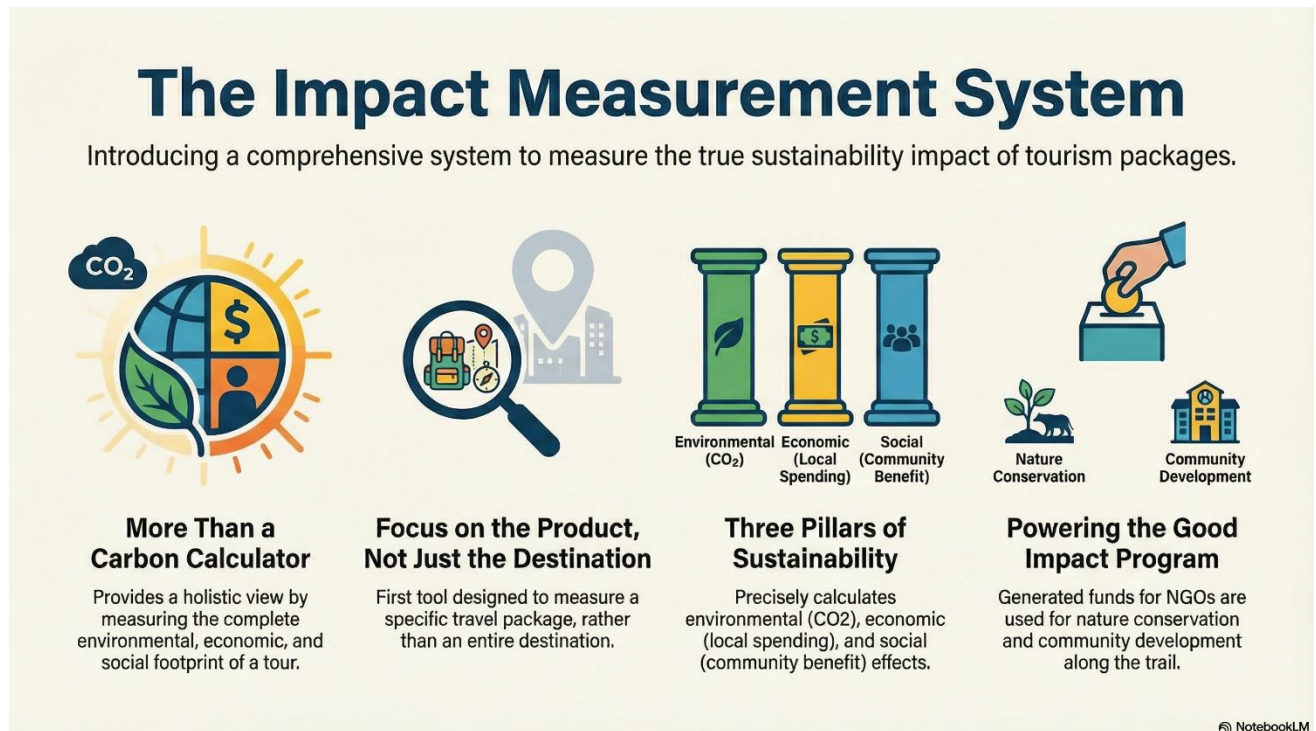


Figure 1: Conceptual overview of the IMS, illustrating its product-based approach, the integration of CO₂ calculation with environmental, economic and social indicators, and its role within the Good Impact Programme.



2. The IMS Methodology

2.1. Adaptation of the environmental footprint calculator (Carmacal)

In accordance with the requirements set out in the ICTr-CE Application Form, during the first 18 months of the project implementation phase the partnership was required to identify, evaluate and select the most suitable technological solution for calculating the carbon footprint of cycling tourism products. Furthermore, the Application Form explicitly requires the development of a tailor-made IMS, built on the integration of the selected environmental footprint calculator into a wider, automated system capable of measuring the environmental, social and economic impacts of tourists booking ICTr cycling products. This integrated system must be based on a clearly defined set of indicators and must support the innovative ICTr business model.

Considering the requirements stated in the application form, the WP2 activity leaders agreed on the key principles how to develop the IMS:

1. Selection of the most suitable carbon footprint calculator based on systematic evaluation and testing
2. Parallel development of a tailor-made impact measurement system based on socio-economic and environmental indicators (see all details in chapter 2.2)
3. Integration of the selected environmental footprint calculator into the IMS tool
4. Development of a joint and harmonised methodology for testing the tools and their functionality (described in D2.4.1)
5. Pilot testing of both tools in the selected pilot regions (results presented in O2.2)
6. Refinement of the IMS based on pilot feedback
7. Integration of the final IMS into the ICTr booking software (see Chapter 5)

As a first step, PP2 Crost as Activity 2.2 leader, coordinated a partnership-wide screening process aimed at identifying and collecting existing carbon footprint calculators potentially suitable for cycling tourism products. In the initial selection round, partners were requested to identify and pre-evaluate as many relevant tools as possible. Based on this collection, a shortlist of approximately 5-10 calculators were created.

Following an intensive testing and evaluation phase, the selection process was narrowed down to two candidate tools. The final decision was based on usability, available functions, relevance for cycling tourism products, data transparency, and the possibility of integration into the ICTr business model, in line with the Application Form requirements.

Based on these criteria, the **Carmacal online carbon footprint calculator** was selected as the most suitable solution for the ICTr cycling products. A detailed description of the selection and evaluation process is provided in D2.2.1.

2.2.1 Why Carmacal?

Carmacal was selected primarily due to its user-friendly interface and its suitability for practical application by booking centre staff. The calculator allows users to create and setting cycling tourism products by defining the number of days, daily stages, locations, route length, transport modes, and additional services such as luggage transfer. Furthermore, the tool enables the inclusion of additional activities (e.g. museums, sightseeing, shopping or outdoor activities), accommodation types and dining options, allowing the carbon



footprint calculation to reflect the specific characteristics of each cycling package. While Carmacal relies on generated average emission data for most of the components (e.g. transport modes or activities), its open-source database also enables accommodation providers to use their own, real emission data, whether verified or non-verified. This functionality significantly increases the accuracy of the calculated carbon footprint results.

2.2. The Impact Measurement System

The IMS represents the qualitative and semi-quantitative core of the project's impact assessment approach, integrating indicator-based sustainability assessment with quantitative climate impact calculations. While the CO₂ footprint calculation focuses on climate-related impacts, the indicator-based IMS component addresses the broader environmental, social and economic dimensions of sustainability relevant to cycling tourism products.

2.2.1 The way of creation

The IMS was developed using a participatory and iterative approach. In an initial phase, project partners jointly identified sustainability aspects that are particularly relevant for cycling tourism products along long-distance routes such as the EuroVelo 13 - Iron Curtain Trail. This process drew on existing sustainability frameworks, certification schemes and good practices, as well as on the project's impact logic and objectives as defined in the ICTr-CE impact framework and related impact documents.

Based on partner input and methodological considerations, a set of indicators was defined that are directly linked to bookable cycling tourism products, can be influenced by booking centres and service providers, and can be assessed using realistic and verifiable data sources, with the explicit objective of ensuring comparability of results across the pilot areas.

The indicator framework was subsequently refined through internal testing and pilot implementation in the project regions (Central and South) allowing feedback from practical application to be incorporated into the final design.

The IMS was deliberately designed to apply to organised cycling tourism products, including guided and self-guided tour packages offered through booking centres. This scope definition represents a methodological decision aimed at ensuring reliable, verifiable and comparable data across the full value chain of a cycling tourism product. For non-organised or fully independent travel, key sustainability-relevant elements, such as accommodation selection, activities or transport choices, cannot be systematically captured or validated in a consistent manner. Focusing the IMS on organised products therefore supports methodological robustness, operational feasibility and comparability of results across pilot regions, in line with the requirements of the Application Form.

2.2.2 Core components of the IMS

The IMS is structured around a set of global indicators, each representing a key component of a cycling tourism value chain (Annex I). These global indicators serve as clusters for several individual indicators that capture specific sustainability aspects.

The global indicators included in the IMS are:

- **Booking centre services:** Indicators in this group assess the sustainability practices of the booking centre itself, including certifications, quality management and organisational responsibility.



- **Accommodation:** This group covers sustainability aspects related to accommodation providers, such as environmental certifications, fair labour practices, inclusivity and local ownership.
- **Food and beverages:** Indicators assess food sourcing, dietary options, waste reduction and the use of local and sustainable products.
- **Transportation on-site and related services:** This group focuses on mobility during the trip, including the use of sustainable transport modes, logistics and safety-related aspects.
- **Activities:** Indicators capture the extent to which activities included in the cycling product support cultural exchange, heritage preservation and local economic benefits.
- **Tour operator / tour guide:** This group assesses sustainability-related practices of tour operators and guides, including working conditions, safety, cultural knowledge and responsible guiding.

2.2.3 Indicator structure and weighting

Each global indicator consists of several individual indicators formulated as clearly defined assessment questions or statements. Depending on the indicator, data may be qualitative, quantitative or semi-quantitative.

Individual indicator scores are aggregated at global indicator level using predefined weighting rules. Weighting reflects the relative importance of different sustainability aspects within the cycling tourism context, while ensuring balanced representation across environmental, social and economic dimensions.

For each global indicator, a structured set of information is defined to ensure transparency, consistency and applicability across pilot regions. Specifically, the IMS defines:

- **a global indicator**, representing a broader sustainability category and serving as a cluster for related aspects of the tour package (e.g. booking centre services, accommodation, food and beverages);
- **individual indicators**, each identified by a unique indicator ID and describing a specific sustainability-related aspect to be measured;
- **a description of each indicator**, explaining what is measured and its relevance in the context of sustainable cycling tourism;
- **a data specification**, defining the type of evidence required for assessment (e.g. certification records, structured declarations or statements, quantitative information, or tour-script-based documentation);
- **the data source**, indicating where the information is obtained from (e.g. booking centres, tour operators, accommodation providers, tour scripts or certification records); and
- **a scoring scale and weighting**, defining how individual indicators are scored and how they contribute to the corresponding global indicator score.

2.2.4 Data sources and assessment responsibility

The IMS is designed as a professional assessment tool operated by booking centres. Responsibility for data collection, validation and scoring lies with trained booking centre staff, ensuring consistency, transparency and comparability of results.

Data used for the IMS originates from two main sources. First, booking centre-internal data are used for indicators related to the booking centre's own organisational practices, certifications, management standards



and operational procedures. This data is documented and maintained directly by the booking centre as part of its regular business operations.

Second, externally provided data is collected through standardised declaration forms and supporting documentation from tour operators and tourism service providers, including accommodation providers. In addition, the tour script, understood as a structured document describing the itinerary, daily programme, services and key operational elements of a cycling tourism product, serves as a key documentary source for itinerary-based indicators, cultural and heritage-related activities, safety planning and route characteristics.

All externally provided information is reviewed and validated by booking centre staff before being entered into the IMS. This combined approach ensures that both internal operational data and externally supplied evidence are consistently assessed within a single, transparent scoring framework.



3. The Development of the Impact Measurement System Online Tool

The development of the IMS focused on translating the methodological framework described in Chapter 2 into a functional, reliable and user-friendly digital solution that can be integrated into the operational workflows of booking centres. The system was designed to support consistent data handling, automated calculation and clear visualisation of results.

3.1. Timeline and evolution of the IMS

The development of the IMS was carried out progressively throughout the project implementation period.

Initial methodological work, including the definition of the IMS concept, sustainability logic and indicator framework, was undertaken in the early phase of the project and reported in PR1 and PR2. This phase focused on establishing the conceptual foundations of the IMS, drawing on existing sustainability frameworks, partner input and the project's impact logic.

The subsequent phase, reported mainly in PR3 and PR4, focused on the technical development of the IMS. During this period, the Excel-based IMS database was developed as the methodological and technical backbone of the system, and the environmental footprint calculator component was adapted to the needs of cycling tourism products. The underlying data structures, scoring logic and aggregation mechanisms were defined and tested internally.

Pilot implementation and testing of the IMS were carried out in PR4 and PR5 in the Central and South pilot regions. During this phase, booking centre staff and project partners applied the IMS to concrete cycling tourism packages, conducted indicator scoring and CO₂ calculations, and tested both the Excel-based logic and the online, form-based implementation of the system. Structured feedback from these pilot activities was used to further refine indicator definitions, data requirements, workflows and usability.

This phased development approach ensured that the IMS evolved from a conceptual framework into a tested and operational tool, fully meeting the requirements of Output 2.1 and supporting its practical application by booking centres.

3.2. System components

The IMS consists of two interlinked components:

- **The indicator-based IMS component**, which translates the methodological framework into a digital assessment system operated by booking centres. This component is implemented as an online tool with form-based interfaces, based on an underlying Excel-based data model. It supports structured data entry, scoring, aggregation and visualisation of sustainability-related indicator data derived from booking centre records, service provider declarations and tour scripts;
- **The environmental footprint calculation component (Carmacal)**, which calculates greenhouse gas emissions related to travel and on-site mobility. Carmacal is primarily operated as an online calculation tool, but a simplified Excel-based version for offline use was created as a complement.

Although these two components are methodologically distinct, they are linked within the IMS workflow. This ensures that climate-related impacts and indicator-based sustainability performance are assessed within a single, coherent assessment framework, while allowing flexibility in how calculations are carried out.



3.3. Technical development and system architecture

The IMS was developed using a modular architecture to ensure transparency, flexibility and ease of use for booking centre staff. The indicator-based component was originally designed as a structured Excel-based system defining the full data model, indicator logic, scoring rules and an aggregation mechanism. This Excel-based structure served as the technical and methodological backbone of the system.

Based on this structure, the IMS was subsequently translated into an online tool using form-based interfaces, before the field-testing took place. These forms replicate the logic of the Excel sheets and guide users through the required declarations, data entry and scoring steps, ensuring consistency between the methodological framework and its digital implementation. The online tool enables structured data input, automated scoring and aggregation, and clear visualisation of results, while maintaining the underlying Excel logic.

The Carmacal operates as a dedicated online calculation tool based on predefined parameters and recognised carbon accounting approaches. In addition, a simplified Excel-based version of the CO₂ calculator was developed to allow calculations to be carried out offline where needed. The resulting CO₂ values, calculated either via the online Carmacal tool or the Excel-based version, are manually entered into designated fields within the IMS online tool. This approach ensures that climate-related results are consistently incorporated into the IMS alongside indicator-based sustainability scores.

The development process followed a step-by-step approach, including:

- definition of data structures and indicator logic;
- development of Excel-based scoring and aggregation formulas;
- translation of the Excel logic into an online, form-based system;
- testing of calculation consistency and data flows; and
- refinement based on feedback from pilot users.

This approach ensured that methodological requirements were correctly translated into technical functionality.

An overview of the IMS Excel-based tools, including their role within the system and the main sheet structure, is provided in Annex II.

3.4. Visibility and presentation of results

A key requirement of the IMS development was to ensure that results are accessible, understandable and meaningful for different target groups, including booking centres, tourists and external stakeholders. The IMS therefore follows a multi-level results presentation approach, allowing information to be displayed at varying levels of detail depending on the intended use.

For internal use by booking centres, the IMS provides a detailed and structured presentation of results that supports operational decision-making, quality management and continuous improvement. In particular, the system provides:

- Scores for individual indicators, enabling booking centres to identify strengths and weaknesses within specific components of a cycling tourism product;
- Aggregated scores for each global indicator, allowing an assessment of performance across the main sustainability dimensions (environmental, social and economic);



- An overall IMS sustainability score for the cycling tourism product, providing a concise summary of overall performance and facilitating internal benchmarking over time.

RESULTS PRESENTATION LOGIC

The IMS applies a tiered results presentation logic to ensure that impact information is accessible, comparable and fit for purpose for different target groups.

- **Operational level (booking centres)**
Detailed indicator-level and aggregated scores support internal monitoring, benchmarking and continuous improvement of cycling tourism products.
- **Communication level (tourists and external stakeholders)**
Simplified and aggregated results focus on global indicator scores and an overall sustainability score, enabling informed decision-making without technical complexity.
- **Climate impact transparency**
CO₂ footprint results are presented separately but in a complementary manner, ensuring clarity between quantitative emissions data and the qualitative and semi-quantitative sustainability assessment.
- **Visual clarity and comparability**
Standardised visual elements (tables, rating scales, icons and graphics) enhance interpretability, comparability and communication across products, regions and target groups.

For communication towards tourists and external stakeholders, results are presented in a more aggregated and simplified form. This approach ensures clarity and avoids unnecessary technical complexity, while still conveying the essential sustainability performance of the product. Communication focuses primarily on:

- Global indicator scores, highlighting the main sustainability dimensions;
- The overall IMS sustainability score, serving as an easily understandable reference point for comparison and decision-making.

The CO₂ footprint results are presented separately but in a complementary manner. This separation ensures transparency and visibility of climate-related impacts, while avoiding the conflation of purely quantitative emissions data with the broader qualitative and semi-quantitative sustainability assessment provided by the IMS.

To further enhance visibility and usability, the IMS makes systematic use of visual representations, such as summary tables, icons, rating scales and graphical elements. These visual tools support intuitive interpretation of results, enable comparison between products or options, and facilitate clear communication across language and cultural contexts.

Overall, the presentation logic of the IMS ensures that impact results are not only technically robust, but also communicable, comparable and actionable, thereby supporting informed choices by tourists, effective management by booking centres, and transparency towards external stakeholders in line with Interreg objectives.



3.5. Integration into the BookYourTrail® booking system

A specific requirement of the IMS development was its alignment with the existing BookYourTrail® booking software, form used by the official ICTr booking centres to design, manage and sell cycling tourism products. The IMS was therefore designed to be compatible with the data structures, product logic and operational workflows of the booking platform, without requiring direct technical integration at system level.

This alignment enables sustainability assessment to be embedded into booking centre workflows, particularly in relation to product development, pricing decisions and booking preparation. Relevant information generated through booking centre operations (e.g. product characteristics, itineraries and service provider information) is used as input for the IMS assessment, while sustainability scores and CO₂ calculation results are assigned to the corresponding cycling tourism products within the booking centre's internal processes.

This approach ensures that the IMS functions as an integral component of the ICTr business model rather than as a standalone assessment tool. By being embedded in booking centre workflows and aligned with the BookYourTrail® system logic, the IMS supports long-term usability, scalability and transferability beyond the project lifetime.

Following the completion of the technical development and system setup described in Chapter 3, the IMS reached a level of maturity that allowed it to be applied in practice. The system was therefore ready for pilot testing and final refinements under real operational conditions. Chapter 4 describes the testing methodology, key lessons learned and adjustments made based on feedback from the pilot activities.



4. The testing process of the Impact Measurement System and results of testing

In line with Activity 2.4 of the ICTr-CE Application Form, the IMS was tested through pilot implementation in the two participating project regions. The objective of the testing phase was to verify the operational feasibility, methodological robustness and practical usability of the IMS when applied to real cycling tourism products developed and sold by booking centres.

Testing focused on assessing whether the IMS could be applied consistently by booking centres, whether data requirements were realistic for tourism service providers, and whether calculated results were meaningful for both internal use and external communication.

4.1. Methodology

The testing of the IMS was carried out using real guided and self-guided cycling tourism products developed and piloted within the project framework. Testing focused on the application of the indicator-based sustainability assessment and the CO₂ footprint calculation at tour package level, as implemented in the pilot regions.

The IMS testing was conducted by project partners, following joint training and methodological guidance. The methodological application of the IMS was supervised and supported through dedicated online training sessions and guidance materials. Partners applied the IMS using the developed Excel-based tools, standardised declaration forms and tour scripts, based on data collected from booking centres, tour operators and accommodation providers during the pilot phase.

The testing methodology followed a structured sequence:

- collection of sustainability-relevant data during the product development and pilot preparation phase, including service provider declarations and the preparation of tour scripts (Annex III).
- application and scoring of indicators based on service provider declarations, tour scripts and booking-centre-related information;
- calculation of CO₂ footprints using the Carmacal tool (online or Excel-based) and insertion of results into the IMS; and
- comparison of results across pilot regions to assess consistency, feasibility and usability of the system.

The Individual Tourist Scoring component of the IMS, including the survey structure and scoring logic, was developed and documented separately in Deliverable D.2.3.1 (Individual tourist scoring and survey responses) and the corresponding IMS guidelines. While this component was methodologically defined and integrated into the overall IMS framework, it was not tested during the pilot phase.

Its primary role at this stage is to provide a validated structure for future post-tour data collection, enabling the comparison and cross-checking of booking-centre-based sustainability assessments with tourists' post-tour perceptions and experiences, thereby supporting triangulation of sustainability assessments.

This methodology ensured that the IMS was practically tested at tour package level, while clearly distinguishing between tested components and those prepared for future implementation.



4.2. Key lessons learned from the pilot activity

The pilot activity demonstrated that IMS can be applied consistently across different regions and cycling tourism products when supported by clear methodological guidance and structured tools. Based on the pilot implementation and partner feedback collected through evaluation forms for both the IMS and the CO₂ footprint calculator, the following key lessons were identified:

- **Consistency and applicability across contexts:** The pilots confirmed that the IMS can be applied in a consistent and comparable way across different regions and cycling tourism products when supported by standardised methodology and guidance;
- **Operational feasibility:** The IMS is feasible to apply within booking-centre-related workflows when clear guidance, structured templates and defined responsibilities are in place;
- **Data availability:** Most required data can be obtained through standardised declarations and tour scripts; however, clear indicator definitions are essential to ensure consistent interpretation;
- **Aggregation and communication:** Aggregation of individual indicators into global indicators is crucial for clear interpretation and effective communication of sustainability performance;
- **Training needs:** Initial training and methodological support are important to ensure consistent application of the IMS by project partners.

4.3. Adjustments based on pilot feedback

Based on feedback collected from project partners during the pilot phase and through the structured evaluation forms for the IMS and the CO₂ footprint calculator, a set of targeted adjustments was implemented to improve both methodological clarity and practical usability. These adjustments focused on:

- Clarifying and refining indicator definitions and scoring logic, including improved handling of multiple service providers within a single tour;
- Simplifying data entry and validation processes to reduce administrative burden and prevent common user errors;
- Enhancing system guidance and transparency, through clearer workflows, explanatory tooltips and improved support materials;
- Improving result visualisation and reporting, to ensure clearer interpretation and comparability of sustainability performance; and
- Strengthening the separation between internal assessment results and externally communicated sustainability information, supporting consistent and credible communication.

Together, these refinements ensured that the IMS fulfils the intended scope of Output 2.1 as a tested, functional and transferable assessment tool. You can see the details in Annex 5.



5. The integrated Impact Measurement System

The IMS presented in this document is the consolidated outcome of a structured and participatory development process within the ICTr-CE project. Following conceptual design, indicator development, technical integration and pilot application, the IMS is now established as a fully developed, operational and ready-to-use tool embedded in the ICTr business model.

The IMS was developed using an iterative and partner-driven approach. Sustainability aspects relevant for cycling tourism products along long-distance routes such as the Iron Curtain Trail were jointly identified, drawing on existing sustainability frameworks, certification schemes and good practices, as well as on the ICTr-CE impact logic and objectives. Based on this process, a coherent set of product-level indicators was defined that can be directly influenced by booking centres and tourism service providers and assessed using realistic and verifiable data sources.

The indicator framework and system logic were subsequently refined through internal validation and pilot implementation in the North, Central and South project regions. Feedback from this process was systematically integrated, resulting in a robust and practical system applicable across different regional contexts.

As a result, the IMS functions as an **integrated operational system** linking data collection, impact calculation, product development, communication and valorisation within a single, coherent workflow managed by booking centres in cooperation with tourism service providers. Sustainability assessment is thus embedded in the core operational processes of the ICTr business model rather than treated as a standalone activity.

5.1. The operation of the system

This section describes the operational use of the IMS by booking centres following the pilot phase and finalisation of the system. The IMS is designed as a structured, repeatable and scalable process that accompanies the full lifecycle of a cycling tourism product, from initial design and configuration through booking, communication and post-booking adjustment.

The operational logic of the IMS ensures that sustainability assessment is embedded in routine business processes and does not depend on ad hoc project conditions or external expert input. Clear role allocation, standardised tools and automated calculation mechanisms allow booking centres to apply the IMS consistently across different products and regional contexts.

a. Collection of data (IMS)

Sustainability-relevant data are collected using standardised IMS tools, including declaration forms, tour scripts and internal booking centre records. Data are provided by booking centres, tour operators and accommodation providers and cover all global indicator categories of the IMS.



Figure 2: The input datasheet of accommodations

The data collection process is designed to balance robustness with operational feasibility. Only data that can be realistically provided by market actors and verified through existing documentation or self-declaration are required. Clear guidance, predefined data formats and indicator-specific explanations ensure consistency, comparability and traceability of information across products, providers and regions.

Responsibility for data completeness and plausibility lies with the booking centre, while service providers remain responsible for the accuracy of the information supplied. This clear allocation of roles reduces administrative burden and enables efficient integration into existing workflows.

b. Cycling product development (booking centre)

Based on the collected data, booking centre staff develop or refine cycling tourism products in line with the ICTr sustainability objectives and the IMS indicator framework. Sustainability considerations are systematically integrated into decisions related to service provider selection, itinerary design, accommodation choice, transport options and included activities.

The IMS supports evidence-based product development by enabling booking centres to assess sustainability implications already at the design stage. This allows potential trade-offs between availability, cost and sustainability performance to be identified early and addressed transparently. The system thus shifts sustainability from a retrospective evaluation to a proactive design criterion within the ICTr business model.

Figure 3: Creation of a cycling package and integration of the involved accommodations



Over time, this approach supports continuous improvement, as booking centres can adjust product components to enhance sustainability performance while maintaining market attractiveness.

c. Calculation in IMS and Carmacal

Once data have been validated, sustainability scores are calculated using the indicator-based IMS and the CO₂ footprint calculation tool (Carmacal). Indicator scoring and aggregation are automated within the IMS, ensuring methodological consistency and reducing the risk of manual errors.

The IMS provides a qualitative and semi-quantitative sustainability assessment based on predefined indicators and weighting logic, while Carmacal delivers a quantitative CO₂ footprint value. CO₂ results are calculated either through an online interface or an Excel-based version and are subsequently integrated into the IMS for combined presentation.

The calculation output includes:

- individual indicator scores;
- aggregated global indicator scores;
- an overall IMS sustainability score;
- and a CO₂ footprint value.

Together, these outputs provide a comprehensive and transparent overview of the sustainability performance of the cycling tourism product, clearly distinguishing between broader sustainability dimensions and climate-related impacts.



Figure 4: The result overview of the IMS

d. Promotion, inquiry management and re-calculation

IMS results are used to support product promotion and customer communication in an aggregated and comprehensible form. Booking centre staff can respond to customer inquiries regarding sustainability performance using global indicator scores and CO₂ information, enabling transparent and credible communication without excessive technical detail.



The IMS also supports comparability between different products, allowing customers to make informed choices based on sustainability performance alongside traditional criteria such as price or itinerary.

When changes occur in product configuration—such as alternative accommodation, modified transport options or adjustments in group size—the IMS allows rapid re-calculation of results. This ensures that communicated sustainability information remains accurate, up to date and aligned with the actual product configuration at all times.

e. Feeding the Good Impact Programme and conversion into surcharge

The calculated IMS scores and CO₂ footprint values form the quantitative and qualitative basis for the Good Impact Programme (Output 2.3). Based on predefined conversion rules, sustainability performance is translated into contribution levels or surcharges that can be used to support environmental protection, community development or climate-related actions along the Iron Curtain Trail.

This step closes the operational loop between impact measurement and impact valorisation. By linking measured impacts to concrete financial contributions, the IMS creates a direct connection between tourism consumption and positive local effects. At the same time, it introduces behavioural incentives for booking centres, service providers and tourists to improve sustainability performance.

Through this integrated operational logic, the IMS functions not only as an assessment instrument, but as a core management and valorisation tool within the ICTr business model, providing a solid foundation for transferability and further development as outlined in Chapters 6 and 7.

5.2. The involved partners

The effective operation of the IMS relies on clearly defined roles and responsibilities among the partners involved.

5.2.1. Booking centre staff

Booking centre staff play a central role in operating the IMS. Their responsibilities include:

- collection and validation of sustainability-related data.
- development and adaptation of cycling tourism products.
- calculation of CO₂ footprints and IMS sustainability scores.
- storage, update and management of IMS data.
- use of results for product communication and quality management; and
- reporting aggregated results towards the ICTr-CE Alliance and the EuroVelo 13 Partnership.

Through this role, booking centres act as intermediaries between service providers, tourists and project-level governance structures.

5.2.2. Tourism service providers

Tourism service providers, including accommodation providers, tour operators, guides and transport services, contribute essential data to the IMS through standardised declaration forms and documentation.



The standardised data inquiry forms used to collect information from tourism service providers are provided in Annex IV.

- Participation in the IMS offers several advantages for service providers:
- visibility as part of a sustainability-oriented cycling tourism network.
- opportunity to benchmark their practices against IMS criteria and other providers.
- structured feedback on strengths and areas for improvement; and
- incentive to progressively improve sustainability performance through clear and transparent criteria.

Service providers supply data related to their services in a structured and verifiable manner, enabling booking centres to assess sustainability performance consistently across products and regions.



6. Transferability

6.1. Rationale and scope of transferability

The IMS developed within the ICTr-CE project was deliberately conceived as a modular, criteria-based and indicator-driven system, responding to the need for practical, implementable sustainability tools in transnational cycling tourism. Its evolution from an initially discussed destination-oriented approach towards a product- and tour-package-based application has significantly enhanced its applicability and transferability across Europe, as it is now clearly tailored to the operational level where tourism decisions are made and managed.

This shift represents a key innovation in the context of Interreg projects, as it enables direct implementation by market-facing actors while remaining compatible with strategic destination frameworks. By decoupling the IMS from complex destination governance requirements, the system can be applied in regions with varying institutional capacities, governance models and levels of tourism maturity, without compromising its methodological robustness.

Transferability is therefore understood primarily at the European scale, reflecting the territorial scope of European cycling tourism, the EuroVelo network, and the shared regulatory, policy and sustainability frameworks of the European Union. At the same time, transferability is not geographically restrictive within countries: the IMS can be applied to long-distance cycling routes, regional routes, thematic cycling trails, and non-long-distance cycling products, provided that the core logic of product-level impact measurement is respected.

In this sense, the IMS is designed as a scalable and replicable instrument, supporting both transnational harmonisation and local flexibility. It enables regions and organisations to apply a shared sustainability logic while adapting implementation modalities to their specific contexts.

The IMS is transferable in three complementary dimensions:

- Institutional transferability, allowing different types of public, private and civil-society organisations to adopt and operate the system according to their roles and capacities.
- Geographical transferability, enabling application across European regions, countries and route typologies, including cross-border and transnational routes.
- Functional transferability, permitting adaptation to different tourism products, operational scales and implementation contexts without altering the core sustainability framework.

6.2. Transferability within the project consortium

Within the ICTr-CE consortium, transferability is ensured through a shared conceptual framework, harmonised indicator logic, and a common scoring methodology. This common foundation allows the IMS to be applied consistently across partner regions while acknowledging their diversity in legal frameworks, tourism governance structures and data availability.

Each partner region operates within distinct institutional and territorial conditions; however, the IMS accommodates these differences by allowing flexible assignment of responsibilities and locally adjusted indicator thresholds, while maintaining a shared methodological backbone. This approach reflects a core Interreg principle: combining comparability at transnational level with contextual relevance at local and regional level.



Key elements supporting transferability within the consortium include:

- **Standardised core structure:** The IMS defines a common set of sustainability dimensions (environmental, social, economic and cultural) and a shared logic for mandatory and voluntary indicators. This ensures comparability of results across partner regions and supports joint monitoring, evaluation and communication at project level.
- **Decentralised operational responsibility:** By assigning implementation primarily to booking centres rather than destination management organisations, the IMS reduces dependency on public administrative capacities. This is particularly relevant in regions where DMOs have limited mandates, limited resources, or are not yet established. At the same time, the system allows voluntary integration of destination-level actors where such structures are functional.
- **Scalable data requirements:** The system allows for different levels of data availability, ranging from direct booking data and client self-reporting to destination-level reference data. This enables partners with varying levels of data maturity to participate without creating exclusion effects or excessive administrative burdens.
- **Learning and replication effects:** The consortium framework enables partners to exchange practical experiences, indicator refinements and communication approaches. This structured learning process supports adaptive management and prepares the IMS for replication beyond the pilot areas and beyond the project lifetime.

Through these mechanisms, the IMS contributes to capacity building within the consortium and strengthens the long-term durability of project results.

6.3. Transferability to other organisations

Beyond the ICTr-CE consortium, the IMS is explicitly designed to be transferable to a wide range of organisations active in cycling tourism and sustainable mobility across Europe. These include, but are not limited to:

- European and national cycling organisations;
- Route management bodies and associations, including EuroVelo route coordinators.
- Tour operators and booking platforms specialising in cycling tourism.
- Regional and local tourism organisations.
- Protected area administrations and landscape parks.
- NGOs active in sustainable tourism, mobility, biodiversity and community development.

The product-level orientation of the IMS is particularly advantageous for these organisations, as it allows adoption without requiring comprehensive destination-wide data infrastructures or formal destination governance mandates. Tour operators and booking platforms can integrate IMS indicators directly into product design, booking processes and customer communication, thereby embedding sustainability considerations at the operational core of tourism services.

From an Interreg perspective, this broad organisational transferability enhances the upscaling potential of the IMS. The system can be replicated by actors operating across borders and within different national contexts, fostering harmonised sustainability practices across European cycling tourism networks.

Furthermore, the IMS is compatible with existing European sustainability frameworks, including the Sustainable Development Goals (SDGs), the GSTC principles, and EU tourism and mobility strategies. This



compatibility lowers adoption barriers, supports policy coherence, and facilitates alignment with existing certification schemes, reporting requirements and funding mechanisms at European and national levels.

6.4. Adaptation possibilities and use cases

The IMS offers multiple adaptation possibilities while maintaining its core integrity, transparency and comparability:

- **Adaptation to different route types:** Although developed for long-distance cycling routes, the IMS can be applied to regional loops, cross-border thematic routes, urban-rural connectors and short-distance cycling products. Indicator weighting and thresholds can be adjusted to reflect route length, intensity of use and environmental sensitivity.
- **Adaptation to organisational capacity:** Smaller organisations may initially apply a reduced set of high-impact indicators, while more advanced organisations can implement the full scoring system. This staged approach supports gradual uptake and reduces entry barriers, while maintaining a clear pathway towards more comprehensive application.
- **Adaptation to operational formats:** The IMS is designed to cover both guided tours and self-guided individual travel. Within this structure, it can accommodate variations in product design, booking models and levels of service provision without introducing additional user categories or increasing system complexity.
- **Integration with digital tools:** The IMS can be linked to booking systems, environmental footprint calculators, mobility applications and customer feedback platforms. This enhances automation, improves data quality, reduces administrative effort and increases transparency towards users and stakeholders.

These adaptation options ensure that the IMS remains both practical and future-proof, capable of evolving alongside technological developments and changing market conditions.

6.5. Limits and safeguards of transferability

While the IMS is highly transferable, certain safeguards are necessary to preserve its credibility, consistency and policy relevance:

- Core sustainability principles and minimum indicator sets must remain intact to avoid dilution of objectives.
- Transparency in scoring logic, data sources and assumptions must be ensured to maintain trust and comparability.
- Local adaptation should not undermine European-level coherence and benchmarking.
- Governance arrangements must clearly define responsibilities for data collection, validation and communication.

Within these boundaries, the IMS represents a robust, scalable and transferable instrument that supports sustainable cycling tourism development across Europe. It delivers clear transnational added value by combining operational feasibility with strategic alignment, thereby contributing to the long-term impact and durability of the ICTr-CE project results.



7. Further development opportunities

7.1. Strategic perspective for further development

The IMS has been intentionally developed as a living system rather than a static assessment or reporting tool. Its current focus on product-level impact measurement provides a solid, pragmatic and operational foundation that can be applied immediately by market actors, while deliberately leaving room for future expansion and refinement.

From an Interreg perspective, the IMS is designed to evolve incrementally, ensuring durability of results beyond the project lifetime. Future development should therefore follow a phased and needs-oriented approach, prioritising functional expansion, progressive digitalisation and structured integration with broader mobility, tourism and sustainability ecosystems at European level.

This development logic ensures that the IMS remains adaptable to changing policy frameworks, technological progress and market expectations, while safeguarding methodological consistency and comparability. Rather than aiming for a single, comprehensive system from the outset, the IMS is positioned as a scalable framework that can grow in complexity and scope in line with organisational capacities and stakeholder demand.

7.2. IMS as a tool for individual tourists

One key development pathway lies in strengthening the IMS as an empowerment, awareness-raising and decision-support tool for individual tourists. Building on the existing self-assessment and scoring logic, future versions of the IMS could evolve into a personalised sustainability companion for cyclists, supporting informed choices before, during and after their journey.

Potential developments include:

- **Pre-trip decision support:** Individual tourists receive comparative sustainability information and scores for alternative tour packages, accommodation options, transport modes or service providers prior to booking. This transparency enables informed decision-making at the point of purchase, where behavioural influence is most effective.
- **Real-time feedback during the trip:** Through mobile applications or web-based platforms, tourists could track key aspects of their environmental and social footprint, receive context-sensitive information, and be guided towards more sustainable behaviour through non-intrusive nudges and recommendations.
- **Post-trip impact reporting:** Personalised impact reports summarise the tourist's contribution to local economies, emissions reduction, biodiversity protection or community support. Such feedback reinforces awareness, increases satisfaction and strengthens the perceived value of sustainable choices.
- **Incentive and reward mechanisms:** A crucial development dimension concerns incentives for individual tourists who actively choose more sustainable options. The IMS can support differentiated pricing, rewards or benefits linked to sustainability performance, such as reduced booking fees, access to exclusive services, vouchers, or contributions to local impact or conservation funds. These incentive mechanisms translate abstract sustainability goals into tangible personal benefits, thereby strengthening behavioural change and market uptake.

By combining transparency, feedback and incentives, the IMS can move beyond measurement and become a behavioural change instrument aligned with European sustainability, climate and mobility objectives. This



approach supports the Interreg ambition of creating lasting change by influencing individual behaviour at scale.

7.3. IMS for destinations

Although the IMS has deliberately shifted away from a purely destination-level approach, future development may re-integrate destination-related functions in a complementary, targeted and demand-driven manner. Rather than reverting to comprehensive destination management systems, the IMS can function as a bridge between product-level data and destination strategies.

This bridge function is particularly relevant where destination-driven data needs exist, but full destination-level monitoring systems are not yet feasible. In such cases, aggregated IMS data can provide valuable insights without creating additional administrative burdens.

Future opportunities include:

- **Aggregation of product-level data:** Destination authorities and route managers can use anonymised and aggregated IMS data to identify spatial patterns, pressure points, visitor flows and sustainability hotspots, supporting strategic decision-making.
- **Support for destination certification and reporting:** IMS outputs can complement existing destination sustainability labels, certifications and reporting obligations, providing product-level evidence to substantiate destination claims.
- **Evidence-based planning and management:** Destination-level insights derived from IMS data can inform infrastructure planning, visitor management measures, zoning approaches and community engagement strategies.
- **Market-driven incentives for service providers:** By publishing and communicating IMS results, destinations can demonstrate that tourists increasingly prefer environmentally friendly and sustainable offers. This creates a positive feedback loop, encouraging service providers such as hotels, restaurants, guides and transport operators to invest in more sustainable practices in response to market demand rather than regulation alone.

Importantly, this development pathway remains optional and scalable. Destinations can engage with IMS-based data according to their institutional capacity, governance structure and strategic priorities, ensuring flexibility while preserving coherence.

7.4. European partnerships and network integration

The further development and upscaling of the IMS will strongly benefit from strategic European partnerships. Organisations such as the European Cyclists' Federation, EuroVelo route coordinators, sustainable tourism networks, mobility platforms and environmental NGOs represent key multipliers for dissemination, harmonisation and long-term anchoring.

Future cooperation opportunities include:

Joint development of harmonised sustainability benchmarks and minimum standards for cycling tourism products across Europe;

Integration of IMS logic into European cycling route guidelines and quality standards;

Alignment with EU-funded programmes on sustainable mobility, tourism, biodiversity and regional development;



Development of shared digital infrastructures, interoperable tools and open data standards to facilitate cross-border application.

Such partnerships are not limited by national borders and can support both transnational and intra-national applications of the IMS, reinforcing its role as a European reference framework rather than a project-specific tool.

7.5. Long-term vision

In the long term, the IMS can evolve into a recognised reference framework for sustainable cycling tourism in Europe. By combining product-level precision with European-level comparability, it offers a unique contribution to responsible tourism, sustainable mobility and balanced regional development.

Its continued development should focus on:

- Maintaining scientific credibility, transparency and methodological robustness.
- Enhancing user-friendliness and digital integration.
- Strengthening behavioural impact among tourists and service providers.
- Supporting European, national and regional policy objectives.

Within this vision, the IMS is not an end, but a catalyst for more sustainable, resilient and competitive cycling tourism across Europe, delivering long-lasting value beyond the lifetime of the ICTr-CE project.



8. Annexes

Annex I - List of indicators

Global Indicator	Indicator
1. Booking Centre Services	Proof of relevant certification:
	Certified by recognised sustainability standards
2 Accommodation	Certified sustainable accommodations
	Locally owned and operated accommodations
	Fair Labour practices in accommodations
	Inclusivity in accommodations
	Local staffing in accommodations
3 Food and Beverages	Plastic-free accommodations:
	Diverse dietary options
	Local food sourcing
4 Transportation On-Site and Related Services	Safety of bicycles
	Reusable bottles



5 Activities	Cultural exchange activities
	Heritage preservation initiatives
	Economic contribution to local communities
	Promotion of local cultural heritage
	Consideration of traffic conditions
	Availability of emergency services
6 Tour Operator / Tour Guide	Local staffing
	Fair labour practices for tour operators
	Cultural orientation by guides
	Fair compensation for guides
	First aid certification for guides
	Local knowledge of guides



Annex II - Excel sheets (IMS)



ICTr-CE D.2.3.1_IMS
scoring system – Gro



Annex III - Tour Script document



Tour script.xlsx



Annex IV - Data inquiry forms (for service providers)

<https://docs.google.com/forms/d/e/1FAIpQLSeqNj1KOM23vzsTnMsusC2EOIMh-ntvvVTapQTE0DOvu1ytWw/viewform?usp=header>



Annex V - Refinement of the IMS based on pilot action activity

This chapter provides a comprehensive overview of the refinement process of the Impact Measurement System (IMS), which was developed and tested within the framework of the ICTr-CE project. The refinement activities were directly informed by the key findings of the pilot action implemented under Output 2.2, during which project partners and selected ICTr-CE stakeholders tested the IMS in real operational conditions.

The pilot testing phase demonstrated that the IMS was methodologically sound and suitable for purpose of the ICTr-CE project; however, it also opened several technical, usability-related and workflow-related shortcomings that could hinder its effective long-term use by the selected booking centres (responsible for the daily operation of the IMS system). Addressing these issues was therefore a crucial step in transforming the IMS from a tested prototype into user-friendly and operational tool that can be embedded into booking centre workflows beyond the project lifetime.

The refinement process focused on three main objectives:

- improving system usability,
- ease data filling,
- strengthening the practical applicability of the IMS for booking centres in a real market environment.

In the following, the document will present what were the key shortcomings of the IMS prototype, and how the IMS was improved to enhance the operation of the system.

Improvement of system validation and error handling

One of the most frequently reported technical issues during pilot testing was the occurrence of so-called “500 Server Error” messages. These errors typically appeared when mandatory fields were missing or incorrectly filled, without providing users with any indication of what needed to be corrected - this significantly affected on the general usability of the system.

As part of the refinement process, comprehensive validation mechanisms were introduced. The system now actively indicates missing or incomplete data already on the main interface, guiding users before save. In addition, during data entry and saving attempts, incomplete or incorrectly filled fields are visually highlighted (with red color), allowing users to immediately identify and correct possible errors. This preventive validation logic substantially reduces system failure and supports smoother data entry workflows.

3.3 To what extent does your accommodation source food from local producers?

I commit to sourcing at least 30% of the food provided by the accommodation from local producers within the timeframe of:

Fájl kiválasztása Nincs fájl kiválasztva

Harmonisation of decimal value handling regarding CO2 value



Another issue identified during testing related to the incorrect insert of decimal values generated from the carbon footprint calculator. Differences in national decimal notation (comma versus dot) caused inconsistencies in numerical values.

To address this, the system was refined to automatically standardise decimal formatting. Regardless of the input format, numerical values are now consistently interpreted and stored using a unified decimal notation. This adjustment ensures data integrity and prevents calculation errors.

Streamlining data collection from service providers

Pilot testing confirmed that booking centres often face practical difficulties when collecting accurate and complete data from tourism service providers. In response, a standardised pre-validation data collection tool was developed in the form of an online Google Form. This tool supports structured and guided data collection from service providers and reduces the administrative burden on booking centre staff. The use of standardised input formats also improves data quality and comparability across different regions and service provider types.

Enhanced search and filtering functions

As the number of registered service providers increased during testing, users reported difficulties in finding service providers within the system. To improve navigation and efficiency, additional provider attributes (such as country, city and website) were introduced during the registration process. Based on these attributes, an enhanced search function was implemented, allowing users to quickly identify service providers by name, location or other key parameters. This improvement significantly supports transparency and ease of use, especially in regions with a high density of service providers.

The screenshot shows a web interface titled "New Accommodation". At the top left, there is a dropdown menu set to "10". To its right is a search bar with the placeholder text "Search...". Below these elements is a table with the following columns: ID, Accommodation name, Country, City, Website, Calculated points, and Actions. The table contains five rows of data, with red boxes highlighting the search bar and the first four columns of the table.

ID	Accommodation name	Country	City	Website	Calculated points	Actions
1	Savaria Hotel				53	[Icons: eye, check, trash, edit]
3	Savaria szálló				41	[Icons: eye, check, trash, edit]
4	Kecskegida Panzió				26	[Icons: eye, check, trash, edit]
5	Holaludjak Hotel				43	[Icons: eye, check, trash, edit]

Improved PDF export and visual presentation of IMS performance

The pilot phase also highlighted some issues related to technical bottleneck during PDF exports and the overall visual presentation of results. These were addressed by refining the export functionality so that result reports are now generated reliably in a new browser window (in .pdf format). Furthermore, the visual identity of the reports (in case of accommodation providers, tour guides and cycling packages) was improved by integrating the “Good Impact Cycling” and “Official booking centre of the EuroVelo 13 - Iron Curtain Trail” brand elements (introduced and developed in the frame of ICTr-CE project) into the result pages. It is important to highlight here, that communicating with the tourists is not primary aim with this so-called result page, the aim of it is to give clear and reliable data to the booking center staff about the IMS score of a cycling package. Based on this the dedicated surcharge of the Good Impact Programme could be calculated, and the final price of the package can be precisely defined by the booking center.



Indicator ID	Indicator	Global Indicator	Scoring	Max scoring
2.1	Certified sustainable accommodations	Tour operator gets from accommodation providers	20	20
2.2	Locally owned and operated accommodations	Tour operator gets from accommodation providers	5	5
2.3	Fair Labour practices in accommodations	Tour operator gets from accommodation providers	5	5
2.4	Inclusivity in accommodations	Tour operator gets from accommodation providers	0	5
2.5	Local staffing in accommodations	Tour operator gets from accommodation providers	0	10
3.1	Plastic-free accommodations:	Tour operator gets from accommodation providers	1	2
3.2	Diverse dietary options	Tour operator gets from accommodation providers	3	5
3.3	Local food sourcing	Tour operator gets from accommodation providers	7	10



Total score: **41**

(avg.43.33)

Max scoring: 62

Beyond technical corrections, the refinement process also focused on strengthening the interpretability of results. Scores of service providers are now directly visible in the overview lists, without requiring users to generate reports.

Comparison features and decision support

One of the most significant functional upgrades concerns comparison features. The system now allows booking centres to see the individual provider scores together with the aggregated average values (in the generated report), supporting comparative assessment while respecting data protection principles.

Additionally, when new service providers are added, the system automatically displays the IMS scores of previously registered providers. This feature supports benchmarking and decision-making during product development.

Moreover, when integrating service providers into new tourism packages, their respective scores are displayed directly next to their names, enabling booking centres to consciously design more sustainable products (especially in those areas where several service providers are registered).



ID	Accommodation name	Country	City	Website	Calculated points
65	Hotel Element	Czech Republic	Lipno nad Vltavou	https://www.hotelement.cz/en/	33
66	Biberhof B&B	Austria	Windhaag bei Freistadt	https://biberhof.com/	56
67	Zevlův mlýn	Czech Republic	Nové Hradý	www.zevlulumlyn.cz/	36
68	Sonnenhof B&B	Austria	Litschau	https://www.hotelsonnenhoflitschau.com/	25

User management and database optimisation

Pilot testing feedback also indicated the need for clearer user role separation within booking centres. In response, additional user interfaces were created for the 2 regional booking centres, ensuring operational readiness for them. These interfaces are structurally identical but initially contain the 3-3 tourism packages (and its service providers), allowing a smooth transition to the daily operation of the system.

Finally, database optimisation was carried out to reduce duplication of provider registration. Each newly registered service provider now receives a unique identifier, supporting cleaner data structures and facilitating future import/export functions.

Outlook for further technical development possibilities

In addition to the implemented refinements, the pilot phase helped identify several future IT-development opportunities. These include the potential creation of an API connection:

- between the IMS and the carbon footprint calculator to reduce manual data handling,
- between the IMS and the google form serves as primary source of data collected by the service providers.
- The development of a mobile-friendly interface to support on-site assessments and data entry.

While these elements fall outside the scope of the current project, they demonstrate the scalability and future potential of the IMS.

Potential Role of Artificial Intelligence in the Future Development and Operation of the IMS

Looking beyond the ICTr-CE project scope, artificial intelligence (AI) offers significant potential to further enhance the operation, usability of the Impact Measurement System (IMS). While the IMS developed within the ICTr-CE project already functions as a rule-based and indicator-driven system, selected AI-supported functionalities could complement the existing logic and support more efficient, scalable and user-oriented operation in the long term. Important to mention that AI is not envisaged as a replacement for the methodological framework or expert-based assessment embedded in the IMS.

Supporting Data Collection and Pre-Filling Processes

One of the most resource-intensive aspects of IMS operation is the collection and structuring of data from tourism service providers. In future iterations, AI-based tools could support booking centres by assisting in the pre-filling of data inquiry forms based on publicly available information, such as service provider websites, certification databases or previously submitted declarations.



For example, AI-assisted text analysis could identify relevant sustainability-related information (e.g. certifications, accessibility features or sustainability statements) and suggest pre-filled values, which would then be reviewed and validated by booking centre staff. This approach would not only reduce manual workload, but also increase consistency in data interpretation, while maintaining full human control over final scoring decisions.

Improving Data Quality and Consistency

AI could also play a role in supporting data validation and quality assurance within the IMS. By analysing patterns across previously assessed service providers and tourism packages, AI-based routines could flag potential inconsistencies, missing information or outlier values for further review. Such functionalities would be particularly valuable in regions with a large number of service providers or in cases where data is updated regularly. Rather than automating scoring decisions, AI would act as an intelligent support layer, highlighting cases where additional verification may be needed.

Enhancing Interpretation and Narrative Communication of Results

Another promising application of AI lies in the interpretation and communication of IMS results. While the IMS already translates complex indicator data into aggregated scores, stakeholders (such as DMOs, tourism boards or other interested organizations) often require additional narrative explanations to understand what these results mean in practice.

AI-supported text generation could assist to produce standardised, context-sensitive explanatory texts linked to IMS scores and product results. These narratives could describe strengths, areas for improvement and key sustainability messages in a clear and accessible language, tailored to different target audiences such as service providers or decision makers. Such functionality would support transparent communication without requiring booking centre staff to draft explanatory texts manually for each product.

Supporting Strategic Monitoring and Learning Processes

At a more strategic level, AI-based analytical tools could support long-term monitoring and learning processes once the IMS is applied across multiple years or regions. By analysing aggregated IMS data over time, AI could help identify trends, recurring challenges or improvement trajectories at booking centre or regional level.

This could support evidence-based decision-making related to product development, partner selection or capacity-building needs. In this context, AI would function as an analytical support instrument, helping to interpret large datasets generated by the IMS without altering the underlying indicator logic.

In summary, AI has the potential to enhance the efficiency, scalability and communicative strength of the IMS in the long term. By supporting data collection, quality assurance, result interpretation and strategic analysis, AI could help booking centres focus on their core role: developing and managing high-quality, sustainable cycling tourism products along the EuroVelo 13 - Iron Curtain Trail and beyond.