Carrying capacity methodology for tourism

Targeted Analysis

Methodology Handbook

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1 Methodological framework for carrying capacity

1.1 Introduction to the methodological framework

Throughout the European Union (EU), tourism is a major economic activity relevant equally to large, densely populated cities and peripheral, sparsely populated mountain areas, as well as many other types of regions. While it already contributes to a considerable degree to Gross Domestic Product (GDP) at the EU level, single regions in many cases can be completely dependent on tourism as the largest factor of regional GDP. On the one hand, this can ensure the "survival" of regions which could not sustain their population and their livelihood through other economic activities. A high inflow of tourists into a region however can lead to numerous problems, especially related to the social and the environmental dimensions. What the critical thresholds for such an inflow of tourists are, is an intensively discussed topic relevant to policy makers, practitioners and academia at the same time and in general is linked to one specific concept – "carrying capacity".

While numerous methodologies exist for addressing the question what these critical thresholds are, how many tourists a region (or a destination) can receive in a sustainable manner, without compromising their economic development and their social and ecological quality, many are specific to a type of region and not flexible enough to be used in other contexts.

The definition of a carrying capacity

Already for decades, the carrying capacity has been at the core of sustainable tourism and aims at offering "time/space-specific answers" at the individual localities (Saarinen, 2006: 1125). There are many definitions of this concept, arguably the most prominent one being the one of the United Nations World Tourism Organization (UNWTO, 2018). Here, tourism's carrying capacity is defined as:

"the maximum number of people that may visit a tourist destination at the same time, without causing destruction of the physical, economic and sociocultural environment and an unacceptable decrease in the quality of visitors' satisfaction" (UNWTO, 2018: 3).

The reality is that the calculation of this "magic number" is often not feasible for reasons such as differences in threshold established by tourists and residents, ecological limits, multitude of resources, and so on (Saarinen, 2006; Jurado et al., 2012). However, in spite of not measuring an absolute limit, one can still use it for identifying critical thresholds and for examining changes over time (O'Reilly, 1986). Thus, the goal of the application of the methodology is to provide a set of relevant information for policy makers, rather than one concrete "magic number".

The definition of a destination

The European Tourism Indicator System (ETIS) defines a destination as (European Commission 2016):

- "a geographic area that is currently or potentially attractive to visitors/tourists;
- A place or area which is recognised and can easily be defined as a visitor destination and has a range of facilities and products in place for tourism purposes;

- A place or area which is promoted as a destination;
- A place or area where it is possible to measure the supply of and demand for tourism services, i.e. the visitor economy;
- A place or area where the visitor management process usually includes a range of public and private-sector stakeholders together with the host community."

However, in the project the destination is pre-defined by the destinations themselves. For analytical purposes the destination will be broken down to the LAU2 (Local Administration Unit) or NUTS 3 level. The same approach applies to defining cross-border destinations.

Moreover, there are several terms which are used in this handbook and should be clarified:

- Stakeholder- refers to identified stakeholders *in the examined destination*. There are different types of stakeholders that should be consulted at different stages. These can be local, regional or national authorities, representatives of tourism organisations/destination management organisations, tourism operators, representatives of statistical offices and other relevant types of stakeholders.
- Facilitator- refers to the facilitator applying the carrying capacity methodology in a specific destination.

Assumptions of the methodology

The development of the methodology in the project is rooted in the review of existing methodologies, and their strengths and weaknesses. Deducted from the literature analysis and the related methods to assess carrying capacity, the following main points can be outlined:

- **There is no single denominator for carrying capacity** – a multitude of aspects in the socio-economic context of destinations are touched upon and carrying capacity is strongly related to the dimensions of sustainability and its conceptual components (i.e. economy, society and the environment). Still the challenge is to establish a causality between tourism as a sub-sector of the economy and spatial phenomena (flows and concentration) and all these multiple aspects. These causal loops, which in the methodology will be captured via a **systemic picture,** are to be kept transparent and simple enough for decision makers to understand and sufficiently robust to actually reflect the impact of tourism in the territorial context. The way to establish this link is by intertwining context related territorial information (as expressed by indicators) with tourist related information. In accordance, one step will be to establish a set of territorial specific indicators, which will be tailored to the circumstances of each of the destinations/regions and compare them with tourist related indicators expressing both stocks and flows of tourists and their concentration in the territory of the destination.
- There is **no single way of capturing the carrying capacity** along the different dimensions (social, economic and environmental). The methodological approach meets this challenge by allowing for different ways to assess normative borders for carrying capacities. While for some indicators carrying capacity is to be understood as staying within a limit or getting closer to it (e.g. economic growth induced by tourism), for other indicators it would mean to stay within a corridor of an "optimal" condition (e.g. biodiversity within a tourist destination), while getting closer to the limit would indicate a critical condition. In other words, the method will have to be able to deal with various ways to describe and measure the target values of carrying capacity. The decision about whether carrying capacity in a specific context should be understood as threshold or corridor, as well as its value, will be done also based on a broad consultation process with the stakeholders and their assumed strategies in the destinations.

- There is **no unified way to take territorial specifics of tourist destinations into account** when assessing their carrying capacity. Not only will carrying capacity be different in different regional circumstances, but there is also no one-size-fits-all approach for assessing carrying capacity of tourist destinations. The consequence for the methodology to be developed will be that the method suggested will have to provide a guidance and procedure rather than a single measurement approach. The ultimate decision on the methodology to be applied will have to be made by the facilitator based on their expertise as well as findings with regards to the destination. The methodology developed sets the overall frame and will thus be universally applicable, but the single elements of measurement (the indicators to be selected to describe territorial context) will have to be tailored to the territorial specifics, i.e. picked from suggested and available context indicators.

This means when capturing carrying capacities for tourism, multidimensional issues that depict the territorial characteristics and the external influence on this territory should be captured:

- Tourism intensity and concentration in territorial terms and in time
- Tourism flows into and within the destination
- The consequence in terms of causal loops that refer to user conflicts, opportunity costs connected to it – on the territorial conditions of the destination – economic, social and environmental.

The outline of the methodology

The following figure depicts these interrelations and the consequential approach which will be developed for the destination.

Figure 1.1: Carrying capacity assessment
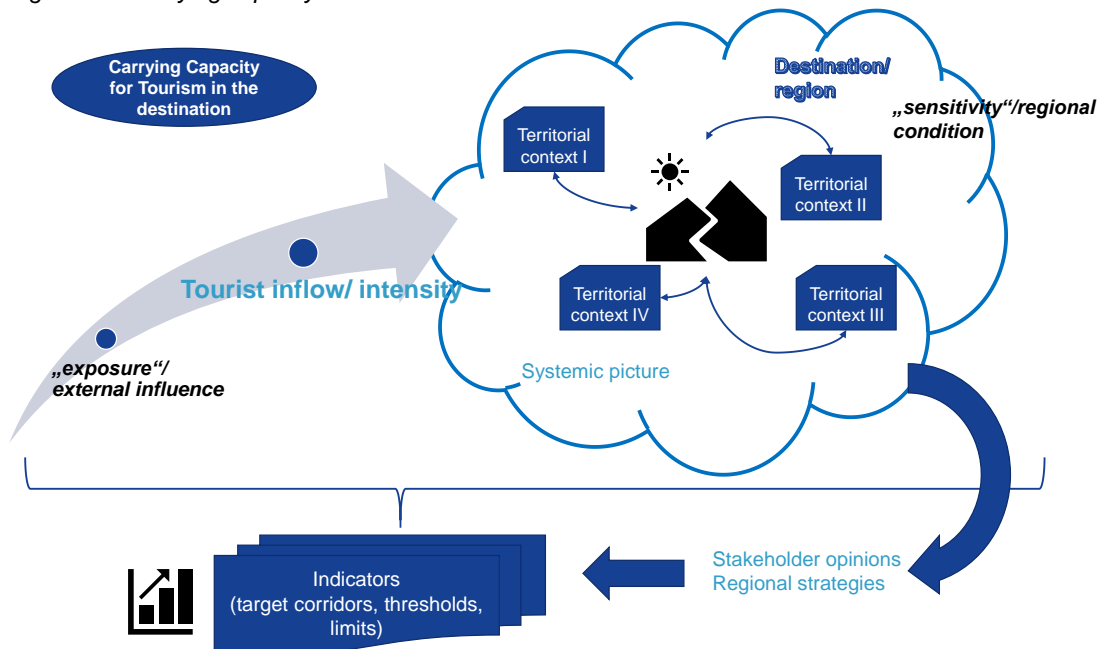
Source: Consortium, 2020.

The framework of the carrying capacity methodology implies a step-by-step approach, whereby each individual step can be considered as an individual vertebra, together forming a unified methodological backbone (*universal approach*), but with enough flexibility at each step for adaptation to destination- or region-specific conditions and circumstances (*tailor-made approach*).

Moreover, it is possible to further adapt in situations where an external shock such as the COVID-19 pandemic necessitates re-orientation and recovery (*resilience approach*). This makes the methodology an attractive tool since destinations and regions experience and learn about their carrying capacity based on their own destination- and region-specific understanding and knowledge. This case-specific knowledge is needed since there is no single universally accepted definition and measure of carrying capacity. The methodology has with this step-wise approach a strong process orientation and thus it is recommended to have the process accompanied by external moderation and expertise, which may open rooms for reflection and decision making, which would be more difficult, if the actors in the region do that themselves.

Figure 1.2 summarizes the five steps of the methodology and starts with the destination overview (Step 1), followed by the identification of relevant causal loops between tourism and the territorial context (Step 2) before explicitly focusing on the measurement of tourism flows (Step 3) as well as tourism impacts in conjunction with the territorial context (Step 4). Steps 3 and 4 are conducted with the support of a visualisation tool (ESPON Carrying Capacity Dashboard). Step 5 has to be understood as the identification of the destination specific carrying capacity (based on the measurement in Step 4) and the derived policy recommendations. This final step allows a feedback loop to the needs assessment in Step 1 and the developed systemic picture in Step 2 in order to reflect upon needed adjustments due to external shocks such as the COVID-19 pandemic. Therefore, stakeholders are requested at the carrying capacity workshop (Step 5) to adjust the systemic picture on the basis of changing needs.

Figure 1.2: Overview of methodological steps, including contents and methods
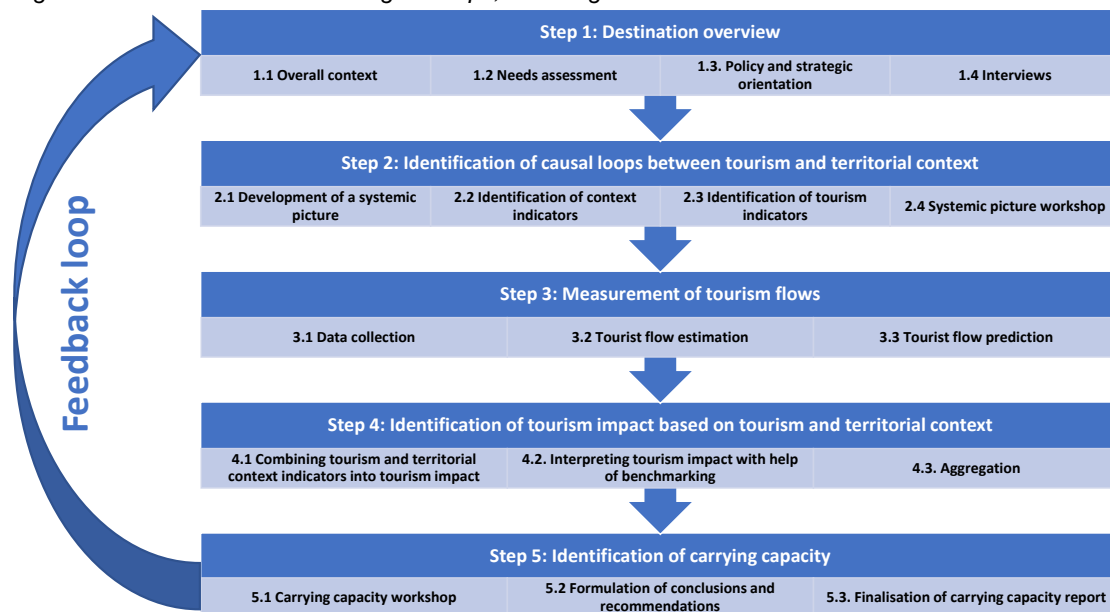
Source: Consortium, 2020.

The methodology is process oriented and designed as an advisory tool for destinations, which trains stakeholders to understand, analyse and monitor the destination's carrying capacity. Thus, an external facilitator (ideally accompanied by a small group of experts) for incorporating

the methodology is needed. The role of the facilitator is to support the destination from Step 1 to Step 5 as an external moderator in a neutral position.

1.2 Step 1: Destination overview

According to this set-up, the destination- and region-specific conditions need to be evaluated carefully. This is covered in **Step 1** of the developed methodology, where the facilitator works closely together with the stakeholders in the destinations with the aim of collecting information about the overall context **(Sub-step 1.1),** conducting a needs assessment **(Sub-step 1.2),** reporting about the policy and strategic orientation **(Sub-step 1.3),** and validating and complementing the findings in a round of telephone or face-to-face interviews **(Sub-step 1.4).** Overall destinations would need to provide access to relevant policy documents as well as statistical data and nominate stakeholders for the interviews. The number of interviewees depends on the size of the destination but on average three to four stakeholders would need to be interviewed. In order to capture the carrying capacity relevant aspects, ideally stakeholders from the municipality, the local Destination Management Organization (DMO) and the regional economic development agency should be included.

1.2.1 Sub-step 1.1: Overall context

Beginning with a description of the destination's definition and its justification, the overall context of the destination has to be understood as defining the system's scope and describing the status quo. Socio-economic context data and tourism-related data helps to understand the destination's overall situation. This Sub-step is based on the existing documents, reports, and statistical data.

Instructions

The facilitator should define the destination in terms of territorial units (LAU – Local Administrative Unit, NUTS3 names and codes). In the absence of clear indications in policy documents or literature, the decision on delineating the destination should be made by the facilitator, ideally in consultation with the local or regional stakeholders. Justifications for the delineation should be given.

Cross-border perspective: It is especially important to provide a clear understanding of a destination in case of a cross-border destination. If the locations on both sides of the border are not understood uniformly as one destination by some stakeholders, the facilitator is advised to reflect this but provide as much data and context information from the cross-border perspective as possible.

The overall context of the destination by means of a literature review as well as a collection of context data on the general socio-economic situation, ideally benchmarked to the national or EU context, should be provided. The data should be provided in tables and if applicable in visualisations (graphs, charts, etc.) according to the delineation of the destination. In the optimal case, data is available at LAU level for the respective destinations participating in the project.

Data should also be collected for neighbouring municipalities at LAU level for benchmarking purposes (see also Sub-step 3.1).

The indicators can be, for example:

- *Demographic indicators (population size and structure)*
- *General socio-economic situation (disposable income, GDP per capita, poverty rates, accessibility, depopulation)*
- *Economic specialisations of the area (share of GDP and employment in different economic sectors, including share of GDP and employment in tourism (%))*
- *Employment and unemployment indicators (including unemployment per age group)*
- *Environmental quality and pollution indicators*

Types of sources to be reviewed:

- *Policy-relevant documents (e.g. development strategies, tourism strategies, socio-economic analyses available from authorities, public regional development observatories, statistical offices);*
- *Academic literature;*
- *Statistical data.*

1.2.2   Sub-step 1.2: Needs assessment

Sub-step 1.2 provides an overview of the destination's needs in terms of tourism development, socio-economic development, and issues related to the destination's carrying capacity and is finalized with a detailed needs assessment.

Instructions

General overview of destination's needs

Based on the review of literature concerning the destination as well as the review of socio-economic context indicators, the most important needs should be identified. The needs should be relevant to the destination's tourism development and the overall socio-economic development. Clear justifications with reference to the respective strengths and opportunities as well as challenges and threats should be noted. This information can be found or deduced from respective policy documents and analyses as well as stakeholder interviews.

If applicable and relevant, these considerations could be differentiated with regards to the three sustainability pillars (environmental, social, economic).

Cross-border perspective: If the locations on both sides of the border are not understood uniformly as one destination by some stakeholders, the facilitator is advised to reflect this by providing a needs assessment for both destinations, however, with strong inclusion of a cross-border aspect in these considerations.

Summary of carrying capacity needs

Based on the general needs assessment above, as well as conducted interviews, please pro-vide conclusions on understanding the destination's needs with regards to carrying capacity specifically. What are the specific challenges and needs with regards to carrying capacity?

1.2.3   Sub-step 1.3: Policy and strategic orientation

Sub-step 1.3 is characterised as a full-fledged analysis of existing relevant policies and strate-gies relevant to the destination. This includes local, regional and national level policies and strategies.

Instructions

Based on a review of strategic documents, as well as interviews, the most relevant aspects of the overall strategic and policy orientation with regards to tourism and socio-economic devel-opment aspects and issues identified in Sub-step 1.2 should be recorded.

The policies and strategies should be analysed at all relevant territorial levels, i.e. local, regional and possibly national. The documents to be analysed are development strategies and, if avail-able, local and regional tourism strategies. Tourism strategies at the national level could also be reviewed.

Furthermore, additional information should also be collected via interviews.

Cross-border perspective: This should include an analysis of joint policy documents relevant to cross-border cooperation. If the locations on both sides of the border are not understood uni-formly as one destination by some stakeholders, the facilitator should search for approaches to cross-border cooperation in any available and relevant policies at each side of the border.

Overview of relevant policy and strategic documents

A brief meta-analysis of documents that deal with tourism and socio-economic development should be provided in order to outline the relevance of policies. Differentiation between policies at different governance levels should be maintained.

> - *Cross-border perspective: joint policy documents on cross-border cooperation, other joint tourism related documents referring to cross-border cooperation.*

Analysis of relevant policy and strategic documents and information from interviews

While analysing the strategies and policy documents, the following guiding questions can be used:

- *What are the tourism-related objectives at each governance level? Are there any?*
- *Which needs/problems/challenges do these objectives answer?*
- *Is carrying capacity addressed in the policy and strategic documents?*
- *If yes, which problems about carrying capacity are mentioned and what are the relevant strategic and policy orientations and measure to address them?*
- *Are tourism strategies at all governance level aligned? Are they contradictory? Please explain your answers.*

If applicable and relevant, these considerations could be differentiated with regards to the three sustainability pillars (environmental, social, economic). For better and clearer structuring, division into thematic of document-based headings or sections is recommended.

After the interviews and Step 2 workshop, the information provided here should be complemented with additional findings.

Summary of policy and strategic priorities

Please list here briefly summarize most important priorities based on the analysis above.

1.2.4   Sub-step 1.4: Interviews

Sub-step 1.4 focuses on stakeholders' perceptions and opinions retrieved from interviews along a detailed interview guideline. The guideline focuses on aspects such as the definition of the destination, the perception of the main challenges, and the estimation of the biggest potential in terms of tourism development. As such, the interviews are designed to validate and complement findings from previous Sub-steps.

Instructions

A direct dialogue with stakeholders via interviews enables to gain a deeper insight into the political and territorial context in the destination, therefore they should complement desk research conducted in Sub-step 1.1-1.3. Interviews can be either face-to-face or telephone interviews.

Interview questions are attached in the annex (3.1). The questions cover general questions related to the destination and the sustainable tourism approach, as well as more specific questions related to the carrying capacity dimension and to perceived obstacles. The guideline will also be used for interviews with all other listed destination specific stakeholders in order to gain a broader picture about the perceived and intended destination development. Stakeholders will also be able to provide information on regionally anchored data sources (i.e., "unconventional" data provided by specific scientific studies or collected by regional authorities and organisations, which will not be identified through the review of data from statistical offices).

The destinations need to identify stakeholders who are most capable of answering these questions. If the list of nominated stakeholders is incomplete, the facilitator should identify additional stakeholders via a snowballing technique, i.e. asking stakeholders to suggest further interviewees. The stakeholders to be interviewed should have knowledge about the destination's situation, problems, needs and policies, with regards to tourism and carrying capacity as well as regional development. Relevant stakeholders should be identified by the facilitator. Some examples for stakeholders:

- *Project stakeholders;*
- *Local and regional authorities concerned not only with tourism but also with general issues about regional development;*
- *Destination management organisations (DMO).*

The following table should be used to record interviews.

Table 1.1: Overview of interviewed stakeholders

Interviewee name	Institution/organisation	Position	Contact details

Source: Consortium, 2020

Three to five interviews per destination should be conducted in order to collect additional information on the above issues. Questions should be answered according to the interview guideline (3.1), the minutes should be provided in the annex if the interviewee agrees. In addition, any relevant information obtained should be integrated into Sub-steps 1-3 to complement information collected during desk research.

Cross-border perspective: In a cross-border case, the facilitator should at least include questions referring to the specific cross-border situation; however, it is also advised to enquire about a cross-border perspective whenever possible, in case of other questions.

Result	A profound assessment of the destination's territorial context, its political and strategic objectives in relation to tourism which helps to understand the perceived and intended destination development, which is a carrying capacity-related dimension.

Estimated workload Step 1: 20 working-days

1.3 Step 2: Identification of relevant causal loops between tourism and the territorial context

Following the findings from the destination's overview, **Step 2** focuses on defining causal loops and interlinkages between regional development aspects (such as the socio-economic and territorial situation) and the tourism situation of the destination. A systemic picture aims to visualise causal connections between tourism exposure and territorial context. In other words, it shall

provide a picture to the question: in which ways and how does tourism affect your region/destination? By drawing these interlinkages, it becomes also clear where "information" will be needed in order to describe these causal loops: Territorial context indicators **(Sub-step 2.2)** and tourism indicators **(Sub-step 2.3)** are selected based on the systemic picture. The systemic picture and the indicator selection are validated in a systemic picture workshop **(sub- Step 2.4).** This Step needs preparation work by the facilitator and input from stakeholders at the systemic picture workshop. The number of workshop participants depends on the size of the destination but on average five to seven stakeholders should be invited. In order to capture the carrying capacity relevant aspects stakeholders from the municipality, the local DMO, the regional economic development agency, the environmental protection agency, and other tourism experts should be involved.

1.3.1   Sub-step 2.1: Development of a systemic picture

In the first Sub-step, the facilitator designs and creates a systemic picture of tourism impacts for the destination **(Sub-step 2.1).** This preliminary systemic picture reflects the situation in the particular destination based on information collected in Step 1 during the review of the policy documents, reports, and other sources (desk research), as well as the stakeholder-specific information retrieved from the conducted interviews. It captures the interlinkages between tourism and territorial context along the three dimensions of sustainability (economic, social, environmental), as well as the governance dimension.

Instructions

The systemic picture is first developed by the facilitator and then discussed and updated with the stakeholders in the workshop.

In order to capture the interlinkages, the following questions steer the draft:

- *What are the direct and indirect economic, social, environmental, and governmental effects of tourist presence and how do they occur?*
- *Has the tourism- and carrying capacity-relevant policy proposal any effects on residents in a region? On their living conditions? How and why?*
- *Does the policy proposal influence environmental conditions? Which ones? In which way?*
- *Does the policy proposal or its implementation effect the government or governance systems? Why? In which ways?*

An example of a systemic picture is provided below (see Figure 1.3).

A preliminary systemic picture developed by the facilitator on the basis of the material analysed in Step 1 should be used as a basis for discussion and further elaboration in the workshop. It can be prepared either on paper or in a digital version. Moreover, the final systemic picture developed in the workshop should be transformed into a digital version (such as in the figure above) and entered into the carrying capacity report.

Figure 1.3: Example of a systemic picture

External shocks (e.g. COVID-19, economic crisis, etc.)

Lack of leadership
Lack of coordination
Solidarity

Environment

Economy

Environment threats (-)
(e.g. traffic, pollution, etc.)

Creation of well-balanced and sufficient accommodation

Creation of job opportunities

Language Barrier (-)

Uniformization of street names

Destination

Potentially:
- Negative impact of "overtourism" in the long run
- More opportunities (shops, restaurants)

- Joint application for ECC 2025
- Will develop a unified destination (e.g. cross-border bike trails)
- Joint application for UNESCO World Heritage

Cross-border municipality to municipality coordination (+)
Cross-border bus lines

Language barrier
Historical background

Social

Governance

Multi-level governance
Policy factors

More well being (e.g. healthcare, transportation, trails, etc.) (+)

More balanced socioeconomic situation nowadays between Gorizia and Nova Gorica → change of relationsship (e.g. not so many young people speak Italian on the Slovenian side -->orientation more towards EU - English)

Source: Consortium 2020

1.3.2   Sub-step 2.2: Identification of context indicators

The causal links between tourism and the territorial context visualised in the preliminary systemic picture are translated into context indicators. A list of exemplary indicators retrieved from pre-existing methodologies (in annex (3.2) is used as a starting point since these indicators capture all relevant dimensions. Based on this list, a destination-specific indicator selection is suggested, which should be selected by the facilitator and the involved stakeholders based on the identified policy goals and needs. It is advisable to examine the availability of the needed data, including the source, the temporal and spatial scope and granularity at which the data would be available.

Instructions

Based on the systemic picture, a list of relevant context indicators that could capture tourism's impact on the socio-economic situation of the area should be compiled. Ideas on such indicators are briefly described in the annex (3.2). The facilitator should use the ideas provided in the annex as orientation and examine whether data for these and other relevant indicators is available as well as record where and at which level it is available. Indicators should be at least available for the last decade to allow a more profound analysis. If, during this research, interesting new indicators are found, they can be recorded as well.

The identified indicators and data sources should be recorded in the table below.

After the Step 2 workshop, the information provided should be complemented with additional findings from the workshop.

Table 1.2: Overview of availability of context indicators

Indicator name	Source (if needed also contact person)	Territorial unit	Years available	Comments

Source: Consortium, 2020.

1.3.3 Sub-step 2.3: Identification of tourism indicators and data

The causal links between tourism and the territorial context visualised in the preliminary systemic picture are translated into tourism indicators. A list of exemplary indicators retrieved from pre-existing methodologies (in annex 3.2) is used as a starting point since these indicators capture all relevant dimensions. Based on this list, a destination-specific indicator selection is suggested, which should be selected by the facilitator and the involved stakeholders based on the identified policy goals and needs. It is advisable to examine the availability of the needed data, including the source, the temporal and spatial scope and granularity at which the data would be available.

Instructions

Based on the systemic picture, please provide a list of relevant tourism indicators that could capture tourism impact on the socio-economic situation as well as measure carrying capacity. Ideas on such indicators are briefly described in the annex (3.3). The facilitator should use the ideas provided in the annex as orientation and examine whether data for these and other relevant indicators is available as well as record where and at which level it is available. Indicators should be at least available for the last decade to allow a more profound analysis. If, during this research, interesting new indicators are found, they can be recorded as well.

The identified indicators and data sources should be recorded in the table below.

After the Step 2 workshop, the information provided should be complemented with additional findings from the workshop

Table 1.3: Overview of availability of tourism indicators

Indicator name	Source (if needed also contact person)	Territorial unit	Years available	Comments

Source: Consortium, 2020.

1.3.4   Sub-step 2.4: Systemic Picture Workshop

The preliminary systemic picture and the indicator list are developed as a preparation for the systemic picture workshop. In this first workshop with destination stakeholders, the material produced so far is presented. Stakeholders are invited to revise and adapt the picture based on their own perspectives. This revision round is particularly important since the changes and adaptations in the systemic picture lead either to new and additional indicators or even to a complete removal of certain indicators. At the end of the workshop, stakeholders are asked to weigh each single indicator on a scale from one to five (1 = not important at all, …, 5 = extremely important) in order to identify the most important indicators within the group of involved stakeholders. A revision of the preliminary systemic picture and discussion of proposed indicators leads to the final systemic picture and a finalised indicator list for the destination.

Preparation

Instructions

The purpose of this workshop is to validate and update facilitator findings with regards to the systemic picture as well as indicators. The workshop would ideally be held with physical presence however if needed it can also be switched to a virtual environment. The facilitator would need to set-up a link to a videoconference tool (e.g. via MS Teams, Zoom, etc.) and include online tools like a virtual whiteboard or similar to allow for brainstorming sessions.

Early preparation. It is essential that workshops are planned well in advance. This includes composing a participant list, setting venue, date and time, inviting stakeholders as well as sending preparatory information and documents (relevant findings as well as agenda) in advance. Early preparation can ensure optimum participation.

Participants list. The workshop participants should include representatives of the following types of stakeholders:

- *Project stakeholders;*
- *Local and regional authorities;*
- *Tourism organisations and agencies;*
- *Representatives of statistical offices;*
- *Tourism experts from the scientific community;*
- *Further tourism actors, such as accommodation providers, tour operators, transportation authorities, depending on the specific problems in the destination.*

Cross-border perspective: In case of a cross-border destination, relevant stakeholders are particularly those who are concerned with cross-border tourism cooperation and cross-border regional development.

The number of participants depends on the size of the destination but there should be at least one representative of each stakeholder group being involved. It is of utmost importance that local and regional authorities are represented but overall a diverse representation of different stakeholder types should be pursued.

Planning: agenda and methods. *The workshop focuses on presenting and revising the systemic picture as well as indicators and data sources. A sample agenda is provided below. It should be used as an indication only and can be adjusted by the facilitator.*

Table 1.4: Sample agenda for Step 2 workshop

09:15	*Welcoming round*
09:30	*Introduction to the topic and preliminary results*
10:30	*Coffee break*
10:45	*Part 1: Discussion of destination's needs as well as policy and strategic orientation*
12:00	*Lunch break*
13:00	*Part 2: Systemic picture revisited*
14:45	*Coffee break*
15:00	*Part 3: Identification and verification of indicators and data sources*
16:30	*Conclusions, summary of findings and next steps*
16:45	*End of the workshop*

Source: Consortium, 2020.

The workshop methods should be adjusted to the type and the number of participants.

In Part 1, the facilitator presents the conclusions from desk research and interviews conducted in Step 1 with regards to the destination's needs as well as the policy and strategic orientation. Participants discuss the findings in the plenum, based on which the results of Step 1 are updated. If there are multiple issues and sustainability pillars that need to be addressed separately, participants can be divided into thematic groups according to their expertise. Findings should be discussed in the plenum at the end of the exercise.

In Part 2, the facilitator presents the preliminary systemic picture and asks participants to either draw a new systemic picture or modify the preliminary picture proposed by the facilitator. This exercise should be conducted in a group to make the work on the systemic picture more manageable. Guiding questions used by the facilitator in Sub-step 2.1. can be used as teasers. However, enough time should be reserved for a plenum discussion where all participants discuss their work and agree on one systemic picture. The agreed systemic picture should be attached next to the preliminary systemic picture.

Cross-border perspective: All questions should be addressed from a cross-border perspective and a common systemic picture between stakeholders from both sides of the border should be ideally drawn. A reference to specific cross-border issues affecting the destination (language and administrative barriers, mobility, border, etc) should be made whenever possible. If the locations on both sides of the border are not understood uniformly as one destination by some stakeholders, two separate systemic pictures can be drawn for each destination, referring whenever possible to the perception of the cross-border character from each perspective. Subsequently, time should be reserved for a discussion and exchange with regards to both perspectives, to achieve an understanding of the two destinations from the cross-border perspective.

In Part 3, the facilitator presents the translation of the systemic picture into indicators and respective data sources. Given that at this point the facilitator should already have a good overview of available data, the purpose is to identify additional data which is known to workshop participants and which was not identified in Step 1. In this exercise it is particularly important that representatives of statistical offices are attending the workshop to advise on indicator and data availability.

Recording and processing the results

The proceedings and findings should be recorded according to the questions in the Step 2 Systemic Picture Workshop minutes in the annex.

The facilitator should attach the participants list, the agenda as well as the final systemic picture to the carrying capacity report.

The facilitator is requested to provide a short description of the final systemic picture and the process of developing it. This description should also include details on how the final differs from the preliminary systemic picture.

Cross-border perspective: In case of a cross-border destination with two systemic pictures, both systemic pictures should be attached as well.

Moreover, findings should complement and add to the respective Sub-steps under Step 1 performed by the facilitator by adding and finalizing the descriptions under Sub-steps 1.2 and 1.3. The final systemic picture should be attached under Sub-step 2.1, next to the preliminary systemic picture (please keep both, for comparison). Additional ideas on indicators and their sources should be verified by the facilitator after the workshop and the lists under Sub-steps 2.2 and 2.3 should be completed.

Result	1) Identification of causal loops and interlinkages between regional development aspects and the tourism situation in the destination (Systemic picture)
	2) Identification of relevant indicators
	3) Validation in a workshop with stakeholders

Estimated workload: 20 working-days

1.4 Step 3: Measurement of tourism flows

After the completion of Step 1 and 2, the measurement of tourism flows is based on the identified indicators and starts with data collection for the detailed destination analysis of tourism and territorial context. Step 3 is structured along three Sub-steps, data collection **(Sub-step 3.1),** the tourist flow estimation **(Sub-step 3.2)** and the tourist flow prediction **(Sub-step 3.3).** At the end of Step 3 the destination's tourism exposure is visualised and analysed.

1.4.1 Sub-step 3.1: Collecting data

Data sources and data should be provided by the destination. All indicators need to be described in detail, including indicator name, data source, territorial unit, years available, comments (including data license). For safeguarding a fluent and swift procedure, the data sources need to be indicated in as much detail as possible, ideally with a direct link to the data or with a contact person at the respective organization. After the collection process of data from statistical offices, social media and OpenStreetMap (OSM), the collected data will be fed into a common database.

Instructions for the statistical data collection

The statistical data collection is based on Table 1.2 and Table 1.3 (see Step 2) which include the identified context and tourism indicators. Data sources and data should be provided by the destination. The data for the identified indicators include statistical and big data (social media data, OpenStreetMap (OSM) data, etc.). Statistical data is in most cases open data and can be collected from central statistical offices or regional and local authorities. Not all types of big data are available for free. For example, social media data needs to be purchased for detailed analyses. The statistical data to be collected should be summarised in a table containing the following information:

- *Indicator name: names should be the same as used in the primary data source*
- *Data source: as detailed as possible, ideally with a direct link or contact person*
- *Territorial unit: depending on the definition of the destination and the surrounding destinations used for benchmarking purposes*
- *Years available: minimum time period should be at least ten years for visualizing time series graphs and accurate predictions*
- *Data license information*

Data for all identified indicators needs to be fed into a common database (see ESPON Carrying Capacity Dashboard Manual). It is recommended to use formats such as Excel (xlsx, xls), comma separated values (csv), or raw data formats (txt, dat). Time series data is needed to identify trends, patterns, and outliers. Spatial data is needed for GIS-based visualisations like maps for identifying tourist hotspots (for compatibility reasons the WGS84 ellipsoid is recommended as it is a globally applicable coordinate system and a de facto standard for international spatial data). Different types of big data need to be identified for the destination and allow for complementary analyses. The ESPON Carrying Capacity Dashboard offers OpenStreetMap data visualisations (see ESPON Carrying Capacity Dashboard Manual) as well as pre-defined social media data visualisations (see ESPON Carrying Capacity Dashboard Manual) and an individual upload function (see ESPON Carrying Capacity Dashboard Manual).

After having collected all statistical data the following table has to be compiled:

Table 6: Data collected for the destination

Indicator name	Source	Territorial unit	Time	Access to the data[1]	Data integrated in the ESPON Carrying Capacity Dashboard

Source: Consortium 2020

Instructions for the big data collection

- *Identification of suitable big data sources to complement the statistical indicators: the existing big data sources (web and social media platforms) need to be selected along three important criteria – relevance to the destinations and sufficient volume for data analysis and affordability (social media platform data to be used for a full fletched analysis is usually not available for free and needs to be purchased).*
- *Definition of the methodology for collecting relevant data from the identified sources and delineation of criteria e.g. when formulating a data request*
- *Initiation of the data collection process: this includes data cleaning and storage in suitable formats.*

Identification of suitable big data sources

Out of a larger number of social media platforms containing user-generated content (UGC) the following ones are most relevant to contribute to the identification of the primary points of interest (POIs): Instagram and TripAdvisor.

The list of POIs can be compiled by identifying every "activity" listed in the TripAdvisor pages for the destinations and their adjoining regions with at least two reviews. TripAdvisor naturally matches the selected POIs with varying numbers of reviews. As it is stated in their Terms of Service, the use of TripAdvisor data for all external purposes including also academic purposes is prohibited.

Instagram is used very commonly for sharing visual impressions from locations that people visit and thus provides additional insights into how visits to POIs are communicated. However, the frequency of reviews on TripAdvisor is much lower compared to Instagram posts. Full datasets of posts on Instagram containing specific geolocations and/or hashtags can be acquired using third party services.

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[1] Access to the data is only given if the data is open access data.

As a consequence, the focus is on online data collected from Instagram. But both platforms help to identify tourist relevant hotspots and a combination of data from both can lead to a final list of POIs at the destination.

Other platforms like Facebook only allow access to publicly posted content which is too restrictive for the given purpose. Twitter shows very low data volume and relevance for content mentioning POIs and region-specific terms. Foursquare (https://foursquare.com/) exhibited very few reviews (called "tips") for many POIs.

Collecting relevant data from the identified sources

The final POI selection has to be based on (a) a comparative pre-analysis of the available different social media data for the destinations and (b) on the quantity of posts accessible on different social media platforms.

The data collection includes relevant data for the destinations as well as the surrounding region or POIs as the focus lies on collecting data from visitors to that particular tourism region (both domestic and international, for which the used language may be a basis for differentiation). However, English seems to be the most commonly used language also for people who are not native speakers, e.g. reusing popular hashtags associated with the destination.

Three criteria are used to collect data from Instagram: destination hashtags, POI hashtags, and POI geolocation. Instagram posts are often geo-tagged with a location. Hashtags are used frequently to further indicate the place and purpose of the posting. The focus is on posts which are tagged with the POIs previously identified for the destination, either through geolocation or hashtags.

After having completed (a) and (b) the facilitator can purchase Instagram data for the needed period of time and locations. For the collection of data from the destination hashtags, the service Picodash (https://www.picodash.com/) can, for example, be used. It provides a certain number of posts (depending on the destination) per hashtag with a very complete metadata extraction. The generic destination hashtags are chosen for this step to allow for a more comprehensive picture of the UGC on Instagram since tourism-specific hashtags are likely to be used only by destination management and marketing organizations (DMOs). In more detail, for the destination, a specific number of hashtags needs to be created by the facilitator. The hashtags should look like this: #destination1, #destination2, …. #destinationN. If there are different names for the destination, then this needs to be included.

The metadata that can be obtained for each post are as follows:

media_id,short_url,date,date(GMT),caption,comments_count,likes_count,image_url,video_url, carousel_media,location_id,location_name,location_url,lat,lng,user_id,username,full_name,profile _pic_url,profile_url

In addition, a complementary collection using the tool 4K Stogram[2], which requires just a single one-time license fee for unlimited data downloading can be included. It captures both the photo/video posted as well as the accompanying text of the posting. However, it does not have any additional metadata like Picodash.

Data cleaning

For data cleaning, two aspects need to be considered.

Firstly, it should be attempted to include language detection of the text of the posting because the textual analysis pipelines (for association with terms, or detection of keywords) can only support certain languages (e.g., lexica used for lexicon-based approaches might contain just a handful of languages). Tagging each post with the language allows to separate the dataset more easily to language-specific subsets for different (language specific) analysis tasks.

Secondly, the Picodash posts should be tagged with the POIs they were taken at. The data contains the location_id and location_name of a post when the user geotagged it. However, where this is missing it may be necessary to use provided longitude/latitude information to associate a post with a POI or use text or hashtags in the post as an indicator of the related POI.

A first indicator that can be extracted from the data collection is the frequency of postings from a POI/region (see ESPON Carrying Capacity Dashboard Manual). [Note: The frequency of postings from POIs in destinations compared to the regions' own identified "hotspots" (or OpenStreetMap based POI hotspots) demonstrated a clear correlation: the "hotspots" were the POIs with the most posts according to geolocation and/or hashtag indicated that frequency itself can be a suitable indicator for the comparative volume of visitors to the regions' POIs.]

Textual analysis

Since the collected data contains textual information, text mining approaches can be considered valid in the analysis. The data needs to be fed into the ESPON Carrying Capacity Dashboard as the dashboard offers an additional function for further big data upload (a) from different social media platforms and (b) for other destinations. This function includes three steps:

(1) Data upload (see ESPON Carrying Capacity Dashboard Manual)

(2) Calculate overall sentiment/basic emotion values (see ESPON Carrying Capacity Dashboard Manual)

(3) Visualisations:
    Overall sentiment (see ESPON Carrying Capacity Dashboard Manual)

Then, for the textual elements, a generic sentiment analysis (positive/negative polarity) and a more detailed analysis determining the presence of basic emotions (as anger, fear, disgust, joy, anticipation, trust, surprise, and sadness) can be applied. This can produce aggregated scores

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[2] https://www.4kdownload.com/products/product-stogram

(along a specified scale such as -1....+1) for both sentiment (generic) and the eight basic emotions.

1.4.2   Sub-step 3.2: Tourist flow estimation

The tourist flow estimation **(Sub-step 3.2)** allows to understand the tourism situation of the destination. The visualisation of this data helps to set the grounds for an accurate prediction of the destination's tourist flows and to determine its development over time. For example, the tourism indicator "arrivals" visualises development of arrivals over a ten years period.

Figure 1.4: Example of a tourist flow visualisation based on arrivals (2008-2019)
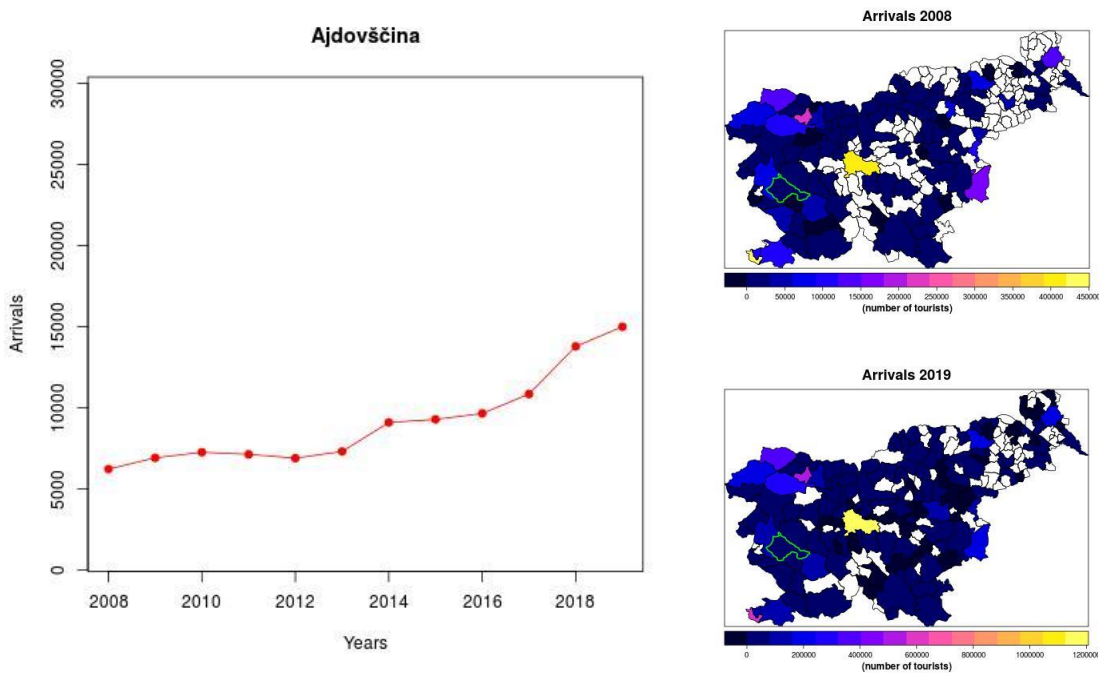
Source: Consortium, 2020.

The tourist flow estimation step helps to determine the destination's tourist flows over time and can be depicted with statistical data (see Figure 1.4) and big data (see Figure 1.5). With regards to big data, the number of Instagram posts in combination with the POIs can be used as proxies for the indicator visitors and visitors at attraction.

Figure 1.5: Example for tourist flow estimation based on Instagram data (right) and hotspot estimation based on OSM based POIs (left)
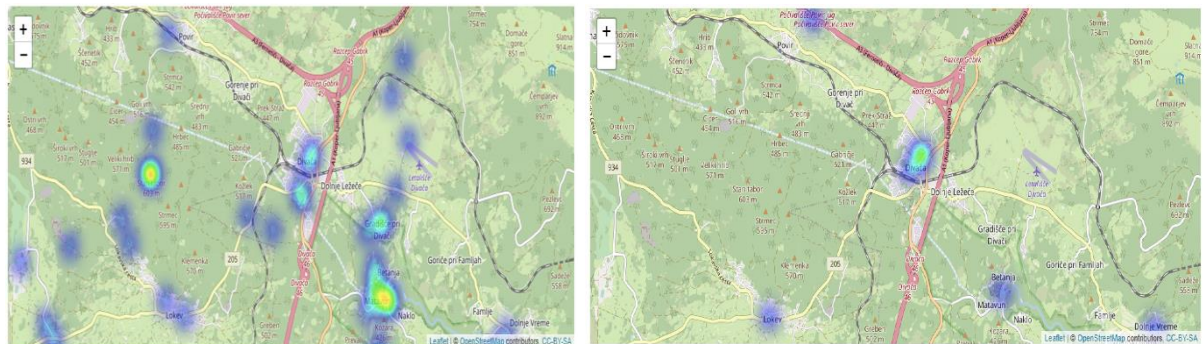
Source: Consortium 2020

The impact on certain destination characteristics depends on the quantity of tourists and the destination's characteristics; for example, heat maps derived from these data sources can be used for estimating tourist flow-related information (see Figure 1.5 – right side) and tourist hotspots (see Figure 1.5 – left side).

For the tourist flow analysis as visualised in Figure 1.4 and Figure 1.5, data needs to be selected in a systemic way. It should be clear for each destination which indicator is available for which time period (space-time components). It is highly recommended to use formats such as Excel (xlsx, xls), comma separated values (csv) or R file formats (Rdata, rds). Time series graphs like Figure 1.4 allow to detect trends, seasonal patterns, outliers, and missing values. Spatial data allows GIS-based visualisations: for example, maps where tourism hotspots can be easily identified (Figure 1.5). Different types of big data (e.g. Instagram, TripAdvisor, etc.) allow additional analyses, which help to understand tourism behaviour and/or help to compensate for missing statistical data. However, not all types of big data are available for free (see Sub-step 3.1).

Instructions

The tourist flow estimation must be based on a variety of available indicators in the database:

- *Based on statistical data the following tourism performance indicators should be selected: arrivals, arrivals change, overnights, overnights change, length of stay, seasonality, tourism intensity, and tourism density.*
- *Based on big data: Tourism related OSM POIs and Instagram data (or any other social media data if uploaded individually) are available for identifying hotspots.*

The indicators based on statistical data can be depicted for the available time series. The ESPON Carrying Capacity Dashboard allows to produce and download as many visualisations as needed. Different types of visualisations are available:

- *Time series graphs (choose "Time-Series-Quartile Benchmark" see ESPON Carrying Capacity Dashboard Manual) – see Figure 1.4*
- *Maps (GIS-based visualisations) (choose "Spatial Benchmark" see ESPON Carrying Capacity Dashboard Manual) – see Figure 1.4*

For measuring the impact on certain destination characteristics heatmaps can be produced in the ESPON Carrying Capacity Dashboard. Heatmaps based on different types of data are available, i.e. OSM based POIs and Instagram data.

Maps (GIS-based visualisations) (choose "Touristic OSM POI Hotspots", "Instagram Post Hotspots" see ESPON Carrying Capacity Dashboard Manual) – see Figure 1.5

Cross-border perspective: For cross-border destinations tourist flows need to be directly compared for both sides of the border. The respective visualisations can be presented side by side.

Result	Territorial visualisations of tourist flows based on statistical and/or big data

1.4.3   Sub-step 3.3: Tourist flow prediction

After visualizing tourist flows in Sub-step 3.2, the next **Sub-step 3.3** is dedicated to predicting tourist flows into the future. Based on the structure of the included variables, appropriate forecasting models need to be employed. For most of these, more advanced statistical software such as R will be needed since these models are typically not available or feasible to produce in Excel.

Instructions

The tourist flow prediction has to be calculated in the ESPON Carrying Capacity Dashboard for the same statistical indicators used for estimating tourist flows (see ESPON Carrying Capacity Dashboard Manual). The prediction as a standard setting is a three years forecasting.

Out-of-sample forecasts in the ESPON Carrying Capacity Dashboard are automatically produced using the "forecast" package for R. In more detail, point and interval forecasts are calculated for a forecast horizon of three years ahead and visualised with their 80% and 95% confidence intervals. The forecast model class employed by the "forecast" package, namely the Error Trend Seasonal (ETS) forecast model class, is a general framework comprising typical exponential smoothing models. The optimal model out of this class is selected automatically by minimizing an information criterion.

The interpretation follows the trend depicted in the prediction visualisation. The three dots in the centre (blue) and the confidence interval areas (grey and light-grey) are calculated based on historical data of each indicator available in the ESPON Carrying Capacity Dashboard.

- *Forecast graphs (choose "Prediction (3-years)" see ESPON Carrying Capacity Dashboard Manual) – see Figure 1.6*

Figure 1.6: Example for a tourism forecast visualisation based on arrivals
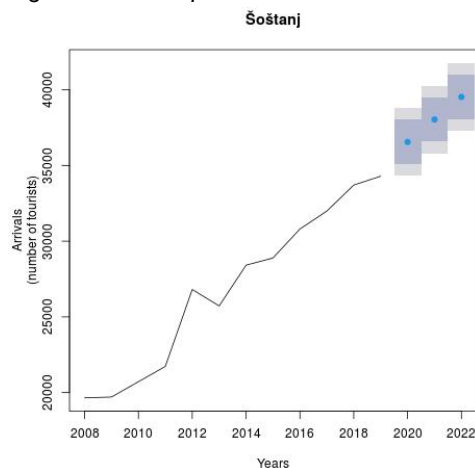
Source: Consortium 2020

Result	Time series charts together with their amplitude and forecasts

Estimated workload: 30 working-days

1.5 Step 4: Combining tourism effects and territorial context

Step 4 provides an overview of the tourism impact based on combining tourism effects and the territorial context. The combination of the two types of indicators will help to grasp the touristic impact on various regional contexts, such as the environment (e.g., waste), local residents (e.g., income or employment), or the local government (e.g., tax income).

The key element of this Step is a combination of indicator pairs **(Sub-step 4.1)** which depict both territorial and tourism contexts of the destination. The selection of indicator pairs is based on the identified needs in Steps 1 and 2. The facilitator suggests indicator pairs for those needs where data is available in the database. In a first step, indicator pairs will be selected and visualised in the ESPON Carrying Capacity Dashboard. This first round of visualisations helps to identify the most relevant carrying capacity related indicator pairs which will then be benchmarked according to quartiles and neighbouring territories to obtain a better understanding of the impact **(Sub-step 4.2).** The ESPON Carrying Capacity Dashboard allows for various types of pairwise indicator comparisons and it is recommended to the facilitator as well as the destination stakeholders to thoughtfully experiment with multiple meaningful combinations to see how tourism performance and territorial context indicators behave over time and to understand their interdependencies.

1.5.1 Sub-step 4.1: Combining tourism performance and territorial context indicators into tourism impact

The two aspects – tourism performance (1) and territorial context (2) – are regarded as two related dimensions to the concept of carrying capacity.

 (1) Tourism is captured by tourism performance indicators (e.g., overnights, arrivals, length of stay) to measure the touristic exposure of a certain geographical region. It is captured by statistical data. Big data (is used as a complementary source for depicting tourism performance in the respective destinations.

 (2) Territorial context is captured by territorial context indicators that are relevant to the destination, as identified in Step 2. Territorial context consists of three different dimensions: the economic situation, the environmental situation, and the social attractiveness situation. The economic and environmental situation are represented by statistical data. The social/attractiveness situation is represented by big data, e.g. sentiment indicators.

Figure 1.7 illustrates which types of data are used for depicting and analysing tourism performance and territorial context indicators.

The number of indicators to be used will depend on the selected indicators for the destination in Step 2 as well as on data availability. In the next step, facilitators have to combine the available tourism performance and territorial context indicators using statistical data.

*Figure 1.7: Combinations of data types for tourism and territorial context indicators.*
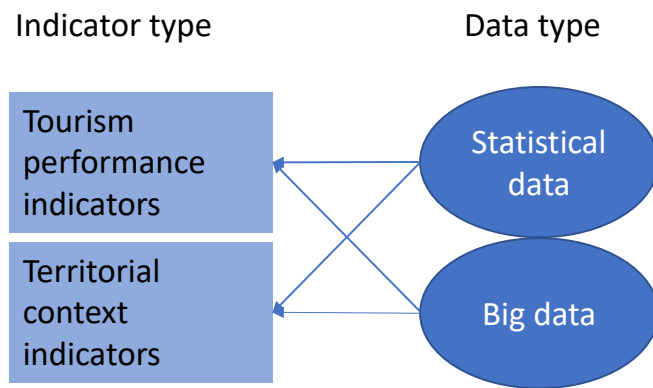
Source: Consortium, 2020.

Instructions for combining pairs of indicators

The combination of the tourism performance and territorial context indicators provides an overview of the tourism performance vis-à-vis territorial context relationship (i.e., "Tourism Exposure" combined with "Territorial Sensitivity" leads to territorial impact). Hence, it results in an exposure-impact typology regarding carrying capacity for different pairs of indicators.

The selection of relevant indicators is developed according to defined policy objectives and needs, based on the work conducted in Steps 1 and 2. This includes the stakeholders' greatest concerns when it comes to carrying capacity problems as derived from desk research, interviews and workshops. The identified needs have to be translated into indicator pairs in order to be able to depict tourism impact. If this is done the facilitator can visualise specific graphs for each need which will help stakeholders to identify challenges and opportunities.

Figure 1.8: A theoretical concept of tourism impact
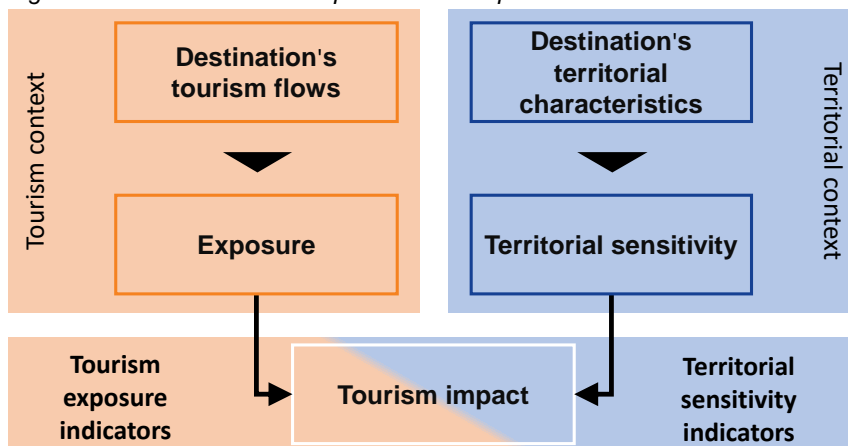
Source: Consortium, 2020.

The methodology is based on a theoretical concept of tourism impact which is illustrated in Figure 1.8. This concept is needed to interpret the results of the needs specific indicator pairs. The concept defines tourism impact as a cause-effect reaction of tourism exposure on the one hand and territorial sensitivity on the other hand. Tourism exposure is defined by tourist flows

and territorial sensitivity by the destination's territorial characteristics. In order to measure tourism impact both types of indicators (tourism exposure indicators and territorial sensitivity indicators) need to be displayed against each other.

The respective combinations are displayed in the visualisations against each other on the x-axis and y-axis of the graphs:

(1) The tourism exposure axis (x-axis) contains tourism performance indicators which denote the tourism exposure of the destination measured with indicators like arrivals, overnights, length of stay, seasonality, etc.

(2) The territorial sensitivity axis (y-axis) contains territorial context indicators which denote the territorial sensitivity of the destination measured with indicators like ageing, employment, income, bedspace, etc.

Figure 1.9 provides an example for such a combination and shows an increasing trend of overnights (tourism performance indicator) as well as bedspace (territorial context indicator) over time (*see ESPON Carrying Capacity Dashboard Manual*). A positive relationship between the two is necessary. Otherwise, the destination will sooner or later reach its carrying capacity limits as it cannot offer a place to sleep for tourists spending their night in the destination in the long run (e.g., if the line would be developing horizontal from left to right but not vertically increasing).

Figure 1.9: Example for a visualisation of tourist flow impact (Overnights/Bedspace)
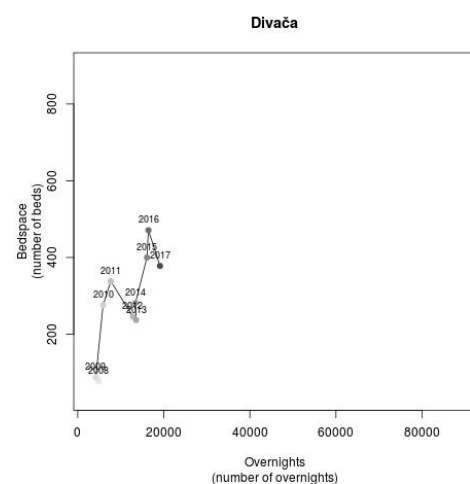
Source: Consortium 2020

| Result | Tourism impact visualisations based on pairing tourism performance and territorial context indicators |

1.5.2 Sub-step 4.2: Interpreting tourism impact with benchmarking

Tourism impact measured on the basis of pairwise comparisons of tourism performance and territorial context indicators helps to identify the destination's carrying capacity. However, there are issues to be considered:

- Carrying capacity itself is an "optimization problem" – assuming that there is a "border situation" of the territorial context, where one additional unit of input (in our case tourism intensity) will result in a crossing of the capacity threshold.
- At the same time, there is no strict threshold which may be established, but territorially specific situations or target corridors defining the carrying capacity.
- Still one crucial element of determining the carrying capacity of a tourist destination will be the comparative element positioning the performance of a single destination vis-à-vis the threshold/borderline of carrying capacity.

In economic theory such an "optimization" problem is described by the Production Possibility Frontier (see Figure 1.10) combining within a given technical standard of production two (or more) production factors (e.g., capital and labour). The aim of every economically efficiently acting enterprise is to reach a combination of factors that produces an output as close as possible to the production possibility frontier, which symbolises the combinations with maximum output at any given input combination.

Transferred to the context of carrying capacity, this means that the translation of the carrying capacity concept in **Sub-step 4.2** shall allow for

(1) an assessment of the carrying capacity for each pair of tourism performance (in the sense of exposure) and territorial context (in the sense of sensitivity), and

(2) a positioning of each destination within or without this carrying capacity "borderline". As no fixed border can be established, the comparative element is needed and comparisons with "like" objects (i.e. all destinations located within the broader surrounding of the destination under focus) will be determined.

Figure 1.10: Production possibility frontier
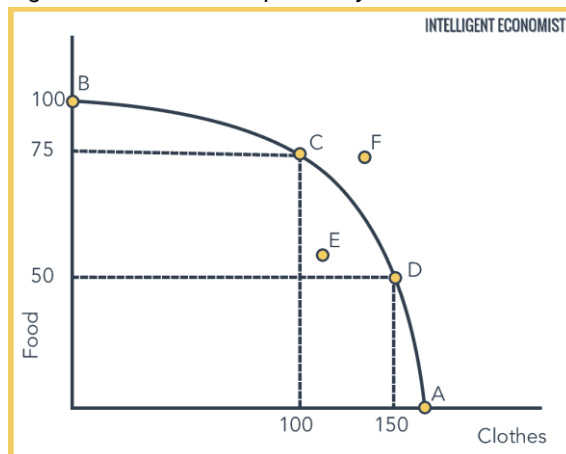
Source: Intelligent Economist, 2019[3].

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[3] https://www.intelligenteconomist.com/production-possibilities-frontier/

Ultimately, the method is able to differentiate better the similarity of the destinations which will be the foundation of the comparisons and thus the establishment of the carrying capacity frontier. For the purpose of the methodology, the carrying capacity will be established by a comparison with the broader surrounding of destinations, but this destination sample may be narrowed down when discussing single destination results in Step 5 of the methodology.

Visualisations like Figure 1.9 provide an overview of the relationship between the development of the territorial context and tourism performance. It is important to note that, while interpreting the resulting impact, an objective evaluation of "good" or "bad" is not possible. For example, increasing tourism intensity might be bad for an already overcrowded destination, but good for an economically weak destination with more or less no tourists. The actual evaluation of what is to be understood as "good" or "bad" depends on destination specific policy goals and strategic objectives of the destinations. Thus, results derived from such comparisons are case specific for each individual destination and must be further addressed in Step 5, where these outcomes are interpreted jointly with stakeholders, against the findings from Step 1 and 2. Nevertheless, the ESPON Carrying Capacity Dashboard allows to provide a context to the performance of the indicators which is a part of **Sub-step 4.2.**

Instructions

*The ESPON Carrying Capacity Dashboard offers different types of visualisation for benchmarking:*
  (a) "Quartile-Matrix-Benchmark" – see Figure 1.11 (see ESPON Carrying Capacity Dashboard Manual)
  (b) "Density-Matrix-Benchmark" – see Figure 1.12 (see ESPON Carrying Capacity Dashboard Manual)

These two visualisation options offered in the ESPON Carrying Capacity Dashboard solve the carrying capacity issue in different ways:
  (a) The first one allows stakeholders to evaluate their destination's development in comparison with the quartile thresholds of all other destinations in the broader surrounding (e.g., LAU or any other local administrative unit can be selected depending on the data specifications in the ESPON Carrying Capacity Dashboard) contained in the database over time. Quartile thresholds are calculated by ranking all destinations in the database, splitting all of them into four equal parts, and determining the cut-off values at the 25%, 50%, and 75% percentiles.
  Figure 1.11 presents an example for such a visualisation. It reveals a positive trend of the destination over time when it comes to the relationship between overnights and bedspace. In addition, the stakeholders have the possibility to evaluate their destination's development compared with other destinations contained in the database. The destination moves towards a higher number of overnights and bedspace – a higher rank – compared with the typical trend of all other destinations in the database. Between 2010 and 2015 it passed the 50% quartile threshold describing a shift from the bottom 50% to the top 50% indicating a faster development compared with the destinations' average.

Figure 1.11: Example for a quartile-benchmarking visualisation (Overnights/Bedspace)
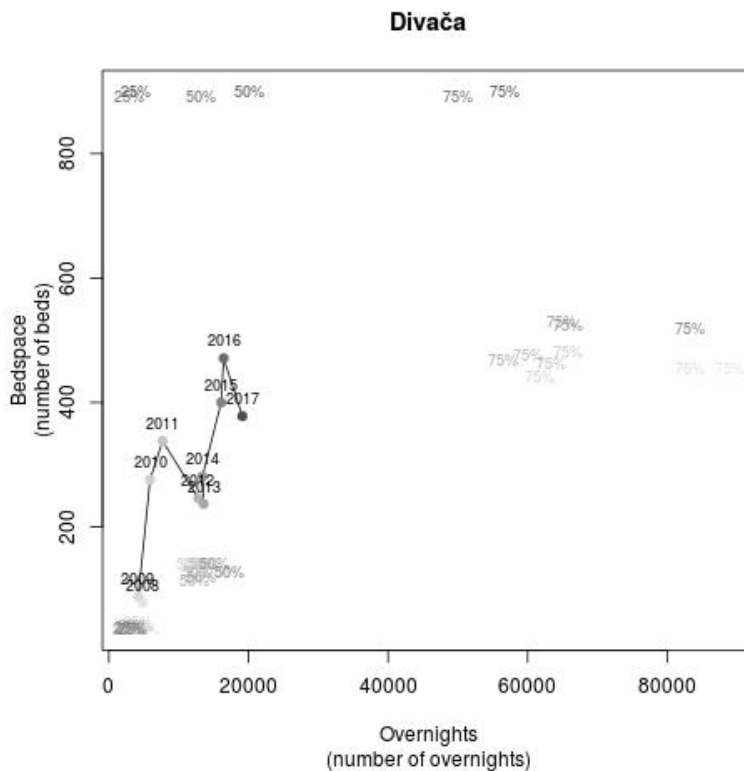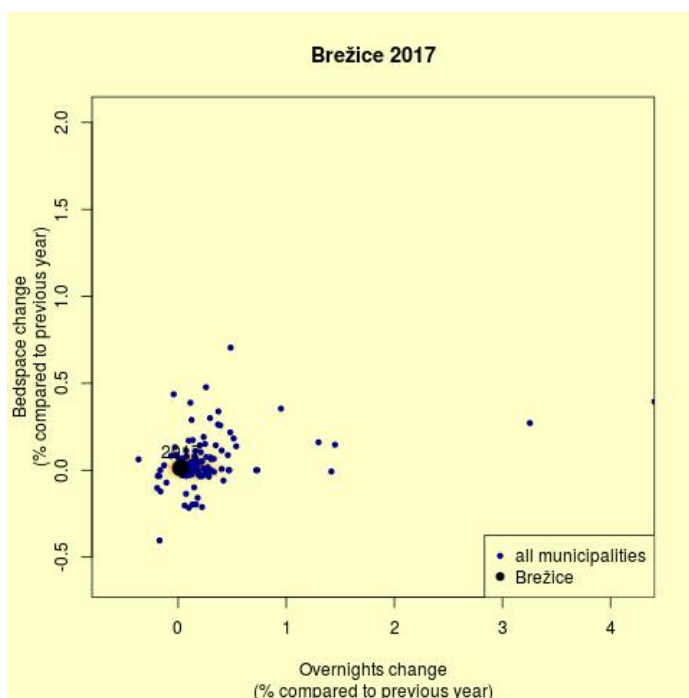

Source: Consortium 2020

(b) *The second type of visualisation allows stakeholders to evaluate their destination in comparison with all other destinations in the broader surrounding (e.g., LAU or any other local administrative unit can be selected depending on the data specification in the ESPON Carrying Capacity Dashboard) for a specific year and to have a look at this over several years. The plot shows the density of all other LAU regions' observations and highlights the destination under study. The user is able to browse through the years to observe the development of the specific destination.*

Figure 1.12 presents a visualisation for a destination in the year 2012. There was an increase in overnights. However, the bedspace showed a decreasing trend. This indicates potential problems in the long run as there will be carrying capacity problems as the number of overnights will sooner or later exceed the bedspace. Whilst clicking through the different years, each destination can inspect such trends over all available time points contained in the dataset.

Figure 1.12: Example for a benchmarking density plot visualisation (Overnights change/Bedspace change)

Source: Consortium 2020

Result	Tourism impact visualisations with benchmarking helping to identify carrying capacity challenges

Estimated workload: 30 working-days

1.6 Step 5: Identification of carrying capacity and formulation of policy recommendations

Step 5 focuses on interpreting the results from the application of the methodology in a particular destination and formulating concrete statements for stakeholders. This includes conclusions about the carrying capacity in the destination and clearly formulated policy recommendations. There are three Sub-steps foreseen: **Sub-step 5.1** is the organisation of the carrying capacity workshop, **Sub-step 5.2** formulation of conclusions and policy recommendations, and **Sub-step 5.3** is the finalisation of the carrying capacity report.

1.6.1 Sub-step 5.1: Carrying Capacity Workshop

The crucial element of Step 5 is a joint validation workshop where the results of the applied methodology are presented, discussed, and validated. The workshop serves several purposes: it ensures that stakeholders understand the methodology and its results, and it offers a platform to commonly discuss the findings and finalize the understanding of the carrying capacity in the destination. Therefore, the purpose of the workshop is to introduce the methodology to the

destination's stakeholders, to discuss the destination specific results, and to reflect on the outcome of the systemic picture developed in Sub-step 2.1. At the same time, stakeholders will have the possibility to exchange with facilitators on further ways of applying the results as well as managing their destinations. The joint workshop will contribute to stakeholders' ownership of the results of the methodology application.

Instructions

The purpose of this workshop is to validate and update facilitator findings with regards to the systemic picture as well as indicators. The workshop would ideally be held with physical presence however if needed it can also be switched to a virtual environment. The facilitator would need to set-up a link to a videoconference tool (e.g. via MS Teams, Zoom, etc.) and include online tools like a virtual whiteboard or similar in order to allow for brainstorming sessions. In the course of this workshop results from the application of the methodology will be presented and discussed with destination stakeholders. The outcome is a detailed interpretation of these findings in terms of the destination's carrying capacity.

Organisation of the workshop. *As a first step, facilitators should prepare a participant list, set venue, date and time, invite stakeholders as well as send preparatory information and documents (relevant findings as well as an agenda) in advance. Early preparation can ensure optimum participation.*

Participants list. *The workshop participants should include representatives who have enough expertise and knowledge for interpreting the results as well as for whom the information on carrying capacity is relevant. Thus, the following types of stakeholders should participate:*

- *Project stakeholders,*
- *Local and regional authorities,*
- *Tourism organisations and agencies, and*
- *Tourism experts from the scientific community.*

An optimum number of participants is around 15 where the highest share of stakeholder type should be local and regional authorities, although a diverse representation of different stakeholder types should be pursued.

Planning: Preparation of material. *The facilitator needs to process and prepare a substantial amount of information based on previous steps. All visualisations produced in Step 2, 3 and 4 should be presented at the workshop. While Step 3 will in most destinations look similar since the tourism flow estimation and prediction will most likely be based on the core tourism indicators (i.e. arrivals, overnights and length of stay), Steps 4 is tailored to the destination specific needs and visualisations will present indicator pair comparisons tailored to the needs identified in Steps 1 and 2. The facilitator should compile a set of slides including all relevant visualisations. Visualisations should function as a teaser for discussing the carrying capacity challenges.*

Cross border aspects: Step 3 visualisations should be presented for both sides of the border if the destination is not defined as a unified cross-border destination.

Agenda and methods. The workshop should focus on presenting data and results in form of visualisations as well as ensuring that discussions will focus on interpretations of these findings. This will allow for specifying the carrying capacity challenges for the destination, the situation in the destination, the nature of the issues present in the destination, data availability and results from previous steps. For this reason, it is necessary that the facilitator who is conducting the workshop has a clear understanding of the data and results available after Step 4 as well as the kinds of statements that can be made about carrying capacity. The discussion with the stakeholders should target at identifying the most challenging carrying capacity aspects and stakeholders should be encouraged to link the carrying capacity challenges to the destination's policies and strategies.

A sample agenda is provided below. It should be used as an indication only and can be adjusted by the facilitator.

Table 1.5: Sample agenda for Step 2 workshop

Time	Activity
09:15	Welcoming round
09:30	Introduction to the purpose of the workshop, presentation of the methodology and overview of results
10:30	Overview of the systemic picture as prepared (possibility of updating the picture)
	Explanation of the selection of indicators as aligned with the destination specific needs
	Overview of indicator combinations: how to interpret carrying capacity (CC) for the specific indicator combination and justifications
11:00	Coffee break
11:30	Discussion about the implications of results: the aim is to identify rooms of manoeuvre in the light of the findings of CC
	Update of existing tourism strategies (based on CC)
	Forum 1: Setting the frame (poster session/mind mapping): identification of sensitive points in existing tourism strategies – i.e. those areas where CC/allows for development/change and where systemic change is possible
12:30	Coffee break
13:00	**Forum 2:** Discussion of potential actions per destination
	Poster session – brainstorming: posters for short-, medium-, and long-term action addressing concrete questions like "what?", or "by whom?"
14:00	Interpretation of CC issues in the destination and a list of concrete actions per destination that lead to addressing these issues
14:30	End of the workshop

Source: Consortium, 2020.

The workshop agenda and the methods should be adjusted to the type and the number of participants.

The facilitator introduces the purpose of the workshop, ensuring that participants are aware that at the end of the workshop the most important carrying capacity challenges should be identified. The facilitator should explain in an easy and understandable manner the carrying capacity methodology and the structure of the workshop in order to facilitate understanding of results as well as Steps foreseen.

Before launching work, the facilitator should specifically introduce the methodology and assumptions which have led to the selection of indicators and the pairwise comparisons. This

includes justifying the combinations of indicators with reference to the systemic picture. It is important to ensure that participants understand and are capable of interpreting the visualisations, given that they are the basis of their further work.

Forum 1: Setting the frame (poster session/mindmapping)

Stakeholders are invited to identify sensitive points in existing tourism strategies. A moderated discussion along the identified needs helps to identify already existing activities and blind spots where the existing strategies would need to be extended.

Forum 2: Discussion of potential actions per destination

What specific actions do destinations need to undertake, based on the findings in Forum 1? Please differentiate if possible, between short-, medium- and long-term actions as well as indicate how precisely they should be implemented and by whom.

The purpose of the workshop is to introduce the methodology to the destination's stakeholders and to discuss the destination specific results. At the same time, stakeholders will have the possibility to exchange with facilitators on further ways of applying the results as well as managing their destinations.

Recording and processing the results

The proceedings and findings should be recorded according to the questions Step 5 Outcomes of the Carrying Capacity Workshop minutes in the annex.

The facilitator should attach the participants list and the agenda.

Particular attention should be paid to capturing and describing conclusions, policy recommendations and communicating any relevant information for formulating or refining such recommendations.

1.6.2 Sub-step 5.2: Formulation of conclusion and policy recommendations

Based on the previous Steps, desk research, interviews, data analysis as well as the workshop in Step 5.1, please formulate (add or elaborate to the ones resulting from the workshop) the most important conclusions as well as policy recommendations for the destinations. For each conclusion and policy recommendation, a justification referring to findings from different methods applied should be provided.

Instructions

Findings of the workshop should serve the facilitator to capture tailor-made and specific recommendations for the destination with regards to destination management in the view of the carrying capacity as well as relevant issues in the destination. These recommendations should have either crystalized or could be directly deduced from workshop discussions and interpretations.

Conclusions and policy recommendations should focus on supporting destination management with regards to the carrying capacity of the destination, differentiating between different issues, aspects of carrying capacity and or pillars of sustainability.

Conclusions can refer to any issues the facilitator and workshop participants identify with regards to measuring carrying capacity and carrying capacity issues in the destination itself. Policy recommendations should be specific recommendations on how to deal with carrying capacity challenges identified in the destination.

1.6.3 Sub-step 5.3: Finalisation of the carrying capacity report

In the last Step, the carrying capacity report should be finalised.

Instructions

The carrying capacity report should be developed as a stand-alone document following the recording of findings from each Sub-step. The structure of the report should follow the structure of the methodology handbook.

Result	Validated results on carrying capacity measurement Policy recommendations

Estimated workload: 20 working-days

2 Facilitator feedback on the methodology for measuring carrying capacity

After finalizing the application of the methodology, please record the facilitator impressions with regards to appropriateness, applicability as well as suggest modifications. The feedback may concern any aspect of the methodology such as general approach, assumptions, single Steps, methods or data sources.

3 Annex

3.1 Step 1: Interview guideline

Name of the stakeholder:

Institution/organisation:

(1) How would you define your destination?

(2) How would you assess the overall tourism development in your destination? Please describe it in a more detailed way.

(3) What is your approach of sustainable tourism and how do you apply it in your destination, if at all?

(4) Provide a short general description of the destination along the following criteria:

Problem/Background [Carrying capacity dimension]	Identify the most urgent challenge/problem in your destination. If there is not any challenge yet, please anticipate into the future.		
Impacts [sustainability]	Environmental (pollution, infrastructure, congestion, damage, overcrowding, etc.)	Economic (inflation, economic dependence on tourism, infrastructure costs, accessibility, land use conflicts etc.)	Social (destination image, degradation of infrastructure, marginalization of residents, hostility, loss of cultural identity, etc.)
Sustainable development in the region [Concrete Activities – broader than tourism]	Environmental	Economic	Social
Solution	How do you wish to solve the problem? How did you solve the problem? Give a short description of the implemented instrument.		
Stakeholders and Aims [Destination level]	Who are the main stakeholders?	Provide some stakeholder specifications and try to specify their stake.	What are their aims and targets?
Initiation [Destination level]	If applicable: Who initiated the sustainable tourism strategy and why? Are there any other sustainability strategies and is the sustainable tourism strategy harmonized with these (e.g. LEADER local economic strategies, etc.)?		
Organization of the stakeholder network [Destination management related]	How is the network organized? Describe the power distribution among the stakeholders.		
Role of the regional environment [Regional development dimension]	Who are the main stakeholders?	Provide some stakeholder specifications and try to specify their stake in tourism and sustainability	What are their aims and targets?
Cross-border cooperation	What is the approach to a cross-border cooperation, what are its aims and targets?	What are the concrete measures implemented and what actors are involved into cross-border cooperation?	How do you assess the intensity of a cross border cooperation and do you wish it would be stronger? If so, how can it happen?

(5) Identify the most important obstacles preventing a smooth transition towards sustainable tourism.

3.2 Context indicator ideas

The question about which data can be processed highly depends on the willingness of the respective institutions on sight to cooperate with the project partners (classified as "upon availability" in column three), as well as their price (classified as "free" vs. "commercial" in column three). In the optimal case they are available on a daily basis for several years (if not static, e.g. actual infrastructure related data). A minimum of 10 years should allow for the inclusion of yearly variations. Longer time periods increase the accuracy of e.g. prediction models. Primary data, secondary commercial data, and free secondary data will be used to develop a common model framework tackling carrying capacity.

- Primary and secondary commercial data will be used to present tailor-made results addressing specifically the stakeholders' requests on sight. They are solely collected/bought to deliver destination-relevant information for the destinations being part of the project.
- Primary data: Decisions on which data will be collected on sight will be made at a later stage as soon as the "indicator matrix" is completed and the necessary items are identified.
- Secondary commercial data: The project budget reserved for data acquisition will be allocated to the different sources upon their usability for the tasks at hand. Decisions will be made after testing the usefulness of the identified data sources of the "indicator matrix" on comparable samples.
- Free secondary data sources: In general, the focus lies on open data sources as well as data sources that can be delivered by public institutions for free, as this guarantees for the widest possible application of the developed approach.

Table 3.1: Possible context indicators to be researched

Data	Data source	Availability
Overnights	Public authorities	Upon availability
Arrivals	Public authorities	Upon availability
Tourist tax income	Public authorities	Upon availability
Past and future weather records	Public/private authorities: e.g. National weather station – https://meteo.arso.gov.si/met/en/	Commercial (past time series)/free (weather forecasts)
Automatic highway traffic counters	Tourism 4.0	Upon availability
WIFI access	Tourism 4.0	Upon availability
Mobile data access	Tourism 4.0	Upon availability
Bus tickets sold	Public/private authorities	Upon availability
Railway tickets sold	Public/private authorities	Upon availability
Entry tickets sold (e.g. Skocjanske jame caves in Divača)	Public/private authorities	Upon availability
Google trends for case study destination related terms (terms to be selected in the course of the project)	https://trends.google.de/trends/?geo=EN	Free
Holidays (national holidays calendar, weekend for monitoring day tourists)	https://www.officeholidays.com/countries/slovenia/	Free

Data	Data source	Availability
Click stream data from local tourist websites or other attractions (Destination Management Organizations, tour operators, etc.)	Public/private authorities: Bled – Slovenia – https://www.bled.si/en/, Nova Gorica – Slovenia – http://www.vipavskadolina.si/de/splosno/nova-gorica, Gorizia – Italy – https://www.lifeinitaly.com/tourism/friuli/gorizia, Brežice – Slovenia –https://www.brezice.si/, Divača – Sloveni – https://www.divaca.si/	Upon availability
Instagram posts	https://www.instagram.com/	Commercial
Restaurant, accommodation and attraction reviews	Tripadvisor – https://www.tripadvisor.com/, Airbnb – https://www.airbnb.com/, Yelp – https://www.yelp.com/, Booking – https://www.booking.com/, further user-generated content (UGC) from social media platforms	Free
Air quality data	Public/private authorities: e.g. https://aqicn.org/, https://www.arso.gov.si/en/air/data/	Upon availability
Infrastructure data: restaurants, pubs, cafes…, hotel, models, and other places to stay the night…, supermarkets, bakeries…, tourist information, sights, museums, places of worship such as churches, mosques…, natural features, lakes, forests…, traffic related information, parking lots, petrol (gas) stations, roads, tracks, paths, railway, subways, light rail, trams, rivers, canals, streams…, building outlines, residential areas, industrial areas…	OpenStreetMap (OSM) https://www.openstreetmap.org/	Free
Price levels of ticket entries for different attractions on sight	Public/private authorities	Upon availability
Pimary data sources	Interviews, questionnaires, etc.	Commercial

Source: Consortium, 2020.

3.3 Tourism indicator ideas

Study	Strengths	Weaknesses	Potential degree of applicability	Suggested indicators[4]
Jurado et al. (2012)	Carrying capacity assessment : 24 indicators (9 physical, 9 socioeconomic, 6 social)	− Focus on the coastal area − Data availability/collection effort	Medium	1. bednights (absolute value and percentage change)
UNWTO (2014)	Density (explicitly labeled as carrying capacity in this report), CO_2 emissions, water consumption, solid waste generation, visitor load (number of tourists per day per 100 residents), resident satisfaction, congestion and intrusion, use of essential services	− Focus on cities − Data availability/collection effort	Medium	2. arrivals (absolute value and percentage change) 3. average length of stay 4. tourism revenues 5. share of tourism contribution to GDP
Gössling et al. (2015)	Travel distance and estimation of CO_2 emissions	Focus on countries, no focus on modal split, source-market weighting, number of destinations visited	Low	6. occupancy rate 7. number of bedspaces available in commercial accommodation establishments (absolute value and percentage change)
European Union (2016); European Commission (n.d.)	− 43 core indicators − Supplementary indicators for specific types of destinations − Slovenia as one of the case studies	Data availability/collection effort	High	
González-Guerrero, Robles, Pérez, Ibarra, and Martínez (2016)	− Overview of the carrying capacity studies − Evaluation of visitor management models	NA	Low	8. share of Airbnb bedspaces
Green Destinations (2017)	− 6 main themes − 100 criteria	Data availability/collection effort	Medium	9. distribution of bedspaces
McKinsey & Company and World Travel & Tourism Council (2017)	− 9 metrics for a diagnostic development − 5 tactics with specific sets of actions	Focus on cities	High	10. distribution of demand (seasonality)
Önder, Wöber and Zekan (2017)	An overview of potential objectives and indicators for destinations and their policymakers (classified as economic, social, and/or environmental)	Focus on cities	High	11. tourism density 12. tourism intensity 13. percentage of same day visitors to total number of visitors
University of St. Gallen (2017)	− 6 Steps for understanding visitor flows	NA	High	

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[4] Based on the literature review on carrying capacity of tourism destinations.

Study	Strengths	Weaknesses	Potential degree of applicability	Suggested indicators[4]
Lenzen et al. (2018)	– Bilateral embodied CO_2 emissions – Breakdown of the tourism carbon footprint into purchased commodities and emitting industries	– Focus on countries – Analytical complexity	Low	14. CO_2 emissions (during traveling to/from and at the destination) 15. waste production per tourist night compared to general population waste production per person (kg)
Peeters et al. (2018)	– 6 indicators of over-tourism – Applicable to various types of destinations – Bled as one of the case studies	NA	High	
Roland Berger (2018)	– Quality versus quantity – 4 proactive measures (short term, mid term, long term) – 3 reactive measures	Focus on cities	Medium	16. water consumption per tourist night compared to general population water consumption per resident night
UNWTO (2018, 2019)	– 11 strategies – 68 measures	– Focus on cities – Data availability/collection effort	Medium	
Gunter and Wöber (2019)	Travel distance, modal split, source-market weighting, number of destinations visited, and estimation of CO_2 emissions	Focus on cities	High	17. energy consumption per tourist night compared to general population energy consumption per resident night
Önder and Zekan (2019)	Recommendations	Focus on cities	Medium	
WEF (2019)	Variables from the pillars on environmental sustainability and natural resources	– Focus on countries – Data availability/collection effort	Medium	18. closeness to airports, cruise ports and World Heritage Sites 19. negative TripAdvisor reviews 20. overall satisfaction of visitors and residents with tourism

Source: Consortium, 2020.

3.4 Step 2: Systemic Picture Workshop minutes

For cross-border destinations, the below minutes should include reference to cross-border aspects, problems and issues whenever possible.

Table 3.2: Preliminary structure for Step 2 Workshop minutes

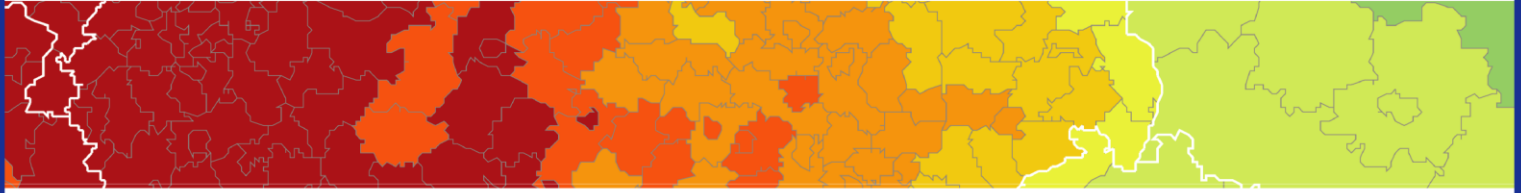| Step 2 workshop minutes |
|---|
| Place: Date: |
| Participants list (or reference to the table) |
| **Findings Part 1: Discussion of destination's needs as well as policy and strategic orientation** |
| How did the participants assess the facilitator assessment of destination's needs? How does the facilitator assessment need to be modified? What are the most highlighted issues by stakeholders: what has been particularly emphasised and what has been assessed as less important? What are the facilitator's further comments and impressions based on discussions? |
| If possible, please provide the same answers as above with differentiation of different aspects and sustainability pillars (particularly applicable if discussion was based on group work focusing on different aspects and sustainability pillar). |
| How did the participants assess facilitator assessment of destination's policy and strategic orientation? How does facilitator assessment need to be modified? What are the most highlighted issues by stakeholders: what has been particularly emphasised and what has been assessed as less important? What are the facilitator's further comments and impressions based on discussions? |
| If possible, please provide the same answers as above with differentiation of different aspects and sustainability pillars (particularly applicable if discussion was based on group work focusing on different aspects and sustainability pillar). |
| **Part 2: Systemic picture revisited** |
| What was particularly striking/interesting difference between the preliminary systemic picture and those prepared by participants? |
| What important points about the systemic picture did the group work and discussions centre around? |
| In case of cross-border destinations with differing perception of the destination (not as a cross-border one): how did the two pictures differ and what was the discussions and their conclusions about them from a cross-border perspective? |
| **Part 3: Identification and verification of indicators and data sources** |
| How did the participants assess the facilitator suggestion on indicators and data sources? |
| **Please add any additional comments/impressions from the workshop** |

Source: Consortium, 2020.

3.5 Step 5: Carrying Capacity Workshop minutes

Table 3.3: Preliminary structure for Step 5 Workshop minutes

Step 5 workshop minutes
Place: Date:
Participants list (or reference to the table)
Discussion of the destination-specific results
What feedback did participants give while revisiting the systemic picture?
What feedback did participants give the combination of indicators? Did they find these combinations and their justifications appropriate?
Forum 1: Setting the frame (poster session/mindmapping) What needs were identified in the destination?
Forum 2: Discussion of potential actions per destination: What actions were formulated for the respective needs?
Please add any additional comments/impressions from the workshop

Source: Consortium, 2020.