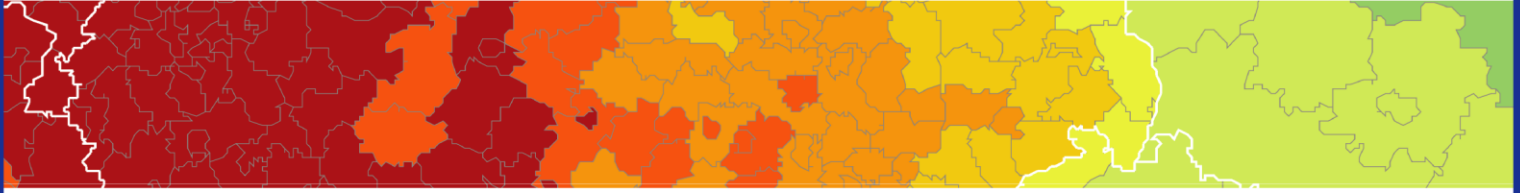


Inspire policy making by territorial evidence



Carrying capacity methodology for tourism

Targeted Analysis

Inception Report

Inception Report

This targeted analysis activity is conducted within the framework of the ESPON 2020 Cooperation Programme, partly financed by the European Regional Development Fund.

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Inception Report

Carrying capacity methodology for tourism

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The final version of the report will be published as soon as approved.

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Abbreviations

ARIMA	AutoRegressive Integrated Moving Average
CC	Carrying Capacity
CP	Cooperation Programme
EGTC	European Grouping of Territorial Cooperation
ETIS	European Tourism Indicator System
FVG	Friuli Venezia Giulia
GDP	Gross Domestic Product
GDS	Green Destinations Standard
GSST	Green Scheme of Slovenian Tourism
GSTC	Global Sustainable Tourism Council
LAC	Limits of Acceptable Change
SDG	Sustainable Development Goals
SGDM	St. Gallen Model for Destination Management
SO	Specific Objective
SVF	Strategic Visitor Flows
UGC	User-Generated Content

1 Background and structure of the report

1.1 Background of the report

Throughout the European Union, Tourism is a major economic factor 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 GDP on the Union 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 dimension. Where 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 where these critical thresholds are and thus how many tourists a region (or 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 circumstances.

The project at hand will develop a unified approach capable of being applied to any type of destination. This of course means that it is necessary to strike a delicate balance between comprehensiveness e.g. by providing extensive methodological guidance in order to enable destinations to apply it and flexibility in order to fit the approach to the specific needs of each destination. The project thus consists of three interlinked phases:

- development of a methodology to assess the carrying capacity of any destination, including guidance material for the subsequent case studies
- applying the methodology in the course of four case studies in three Slovenian destinations and one Slovenia-Italy cross-border destination
- revising and improving the methodology based on the feedback gathered in the case studies

The final products will be a comprehensive handbook leading through the methodological steps to assess the carrying capacity of any destination, supporting visualisation tools as well as territorial evidence on the impact of tourism in the case study regions along with recommendations on managing tourism flows to ensure sustainable development of the region.

1.2 Structure of the report

The document at hand represents the inception report to the ESPON carrying capacity methodology for tourism (short: ESPON Tourism) targeted analysis. It provides an overview of the work done so far, the conceptual framework of the project, information on the stakeholders objectives and needs, the steps taken in the development of the methodology and a first outline of the application approach to the case studies.

Section 2 presents the review of existing methodologies for measuring carrying capacity including an assessment of their respective strengths and weaknesses. Furthermore the relevant elements of these existing methodologies that can provide input to the methodological framework of the project at hand are identified. Subsequently the methodological approach is outlined indicating the relevant steps to be undertaken in the case studies.

Section 3 provides information on the political objectives and policy needs of stakeholders to the extent possible. As numerous stakeholders were not available for interviews at this stage, the section mainly builds on the review of relevant policies in the case study areas as well as the respective countries and can be considered as a first outline that will be detailed at a later stage of the project.

Section 4 described the case study areas and their characteristics as a basis for identifying regional needs in the case studies. Subsequently, the necessary steps for tailoring the relevant indicators and general methodological approach to the respective case study areas are described.

2 Methodological framework of carrying capacity

The overall approach to identify existing methodologies for measuring carrying capacity in tourism draws on a thorough review of the existing literature on this topic along a common definition of carrying capacity, thereby highlighting the specific strengths and weaknesses of each method, as well as their potential degree of applicability to the four case study destinations. Based on this review, a new methodology for measuring carrying capacity in tourism is proposed, which (a) is specific enough to cater to the identified needs of the four case studies of this project (as the case studies in Slovenia correspond to the four distinct tourism macro region of the country) and (b) is adjustable enough to be applicable to similar tourist destinations beyond the case studies throughout European regions.

Definition of carrying capacity

Discussion on the growth limits and carrying capacity of tourism destinations is not new. 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 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).

Reality is that 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, carrying capacity can be understood as a tool for destinations to become more sustainable (Jurado, Damian and Fernández-Morales, 2013), and as such more competitive, as “competitiveness without sustainability is illusory” (Ritchie and Crouch, 2003: 9).

Existing methodologies

Nowadays, there is a lot of attention geared towards overtourism. Although this buzzword entered our vocabulary only in 2016 after Skift had trademarked the term, there is nothing novel about it. Its definition focuses on the negative impacts of tourism on a destination, more specifically, on the quality of life of its residents and the quality of experiences for its visitors (UNWTO, 2018), which is all under the domain of sustainable tourism, toying with the concept of carrying capacity. The boost in its popularity was triggered with the media articles on a dire situation in cities such as Barcelona, Venice, and Dubrovnik. As a result, many research initiatives have been introduced on how to protect a city destination from overtourism (e.g., Roland Berger, 2018; UNWTO, 2018, 2019). For instance, Roland Berger (2018) consultancy focused on comparing tourism density versus revenue per available room (RevPAR) of 52 European cities. Or

in other words, contrasting quantity and quality. In addition, they proposed seven measures for dealing with overtourism, both proactive (short term, mid term, long term) and reactive measures, depending on whether destinations are already experiencing the problem of overtourism or not. Proposed measures that are in line with the current discussion on carrying capacity are for instance: (1) distribution of guests across the city and seasons, (2) regulation of capacities, and (3) limitation of access (entry tickets, slot allocation, flexible pricing) (Roland Berger, 2018: 11).

On a related note, the World Tourism Organization (UNWTO) and their project collaborators the Centre of Expertise Leisure, Tourism & Hospitality (CELTH), Breda University of Applied Sciences, and the European Tourism Futures Institute (ETFI) of NHL Stenden University of Applied Sciences, proposed eleven strategies and 68 measures for understanding and measuring visitors' growth (UNWTO, 2018). Not all strategies and measures are targeting carrying capacity per se, yet are contributing to the wider goal of destinations to become more sustainable. It was also underlined that "there is no one-size-to-fit-all solution" (UNWTO, 2018: 7). In their subsequent 2019 report, they have shown how cities across the world are working with the proposed measures (UNWTO, 2019). Furthermore, Önder and Zekan (2019) have raised the question whether current tourism development is a double-edged sword for the European cities, as dimensions (social, environmental, and economic) of sustainable development are clearly not performing in the optimal way. McKinsey & Company and World Travel & Tourism Council (2017) have also delved into managing overcrowding at tourism destinations, noting that this is a journey which understands engagement of the various stakeholders. The following nine metrics were suggested for a diagnostic development: importance of tourism, arrivals growth, density of tourism, tourism intensity, negative TripAdvisor reviews, arrival seasonality, attraction concentration, air pollution, and historic site prevalence (McKinsey & Company and World Travel & Tourism Council, 2017: 21). Most of these metrics are in line with the discussion on carrying capacity. Thus, their proposed tactics for addressing overcrowding were, among others, smoothing visitors over time, spreading them across sites, and limiting access and activities; each tactic with a specific set of actions (McKinsey & Company and World Travel & Tourism Council, 2017: 41).

The impact and possible policy responses were also discussed in an elaborate study by Peeters et al. (2018), thus, further adding to the body of knowledge on overtourism. Indicators of overtourism and early warning tool were detailed in this study, underlying the fact that various types of destinations (i.e., not only cities) are impacted by overtourism. Keeping this in mind, the following indicators were labeled as significant: tourism density and intensity, growth of bed-nights (when combined with density), share of Airbnb accommodation, share of tourism contribution to GDP, air travel intensity, and closeness to airports, cruise ports and World Heritage sites (Peeters et al., 2018: 109). As a side note, one of 41 case studies analyzed in this report is Bled and these results will understandably be taken into account in the current project.

What is also evident is that there is no one superior methodology to measure the sustainability (i.e., carrying capacity) of tourist destinations. Arguably, the most known is the tool developed by the European Commission, the European Tourism Indicator System (ETIS) for monitoring and measuring sustainable tourism performance (European Union, 2016). In more detail, 43 core indicators were proposed across four sections: destination management, economic value, social and cultural impact, and lastly, environmental impact. Among others, the sub-sections that concern customer satisfaction, tourism flow (volume and value), and community/social impact criteria can direct towards a status quo regarding the carrying capacity of a destination. In addition, a list of supplementary indicators was also proposed in order to give destinations a chance to tailor the indicators towards a specific type of a destination (e.g., maritime and coastal tourism) (European Union, 2016). This in particular is of great importance for the projects such as the current one, when a variety of types of destinations (Bled, Brežice, Divača, Nova Gorica – Gorizia) are to be subjected to analysis. Slovenia (as a whole) was already selected as one of the case studies among the ETIS Destination Spotlights, whereas Pomurje, Bohinj, Idrija, Ljubljana, Ptuj, and Velenje were among the destinations participating in the first/second pilot testing phases (European Commission, n.d.).

Similarly, The Green Destinations Standard is a tool recognized by the Global Sustainable Tourism Council (GSTC) for assessing and improving the overall destination sustainability by looking into various themes (e.g., destination management, nature and scenery, environment and climate, social well-being, etc.). This tool alone covers 100 theme-related criteria (Green Destinations, 2017). Furthermore, the World Economic Forum (WEF)'s Travel & Tourism Competitive Index is used for measuring the tourism competitiveness of the countries, and as such, not necessarily of interest for the current project. However, two of its pillars, environmental sustainability and natural resources are measured by ten and five different variables, respectively (WEF, 2019). Some of these variables such as sustainability of travel and tourism industry development and total protected areas could be integrated into the discussion on carrying capacity.

Another interesting approach that should not be omitted in the discussion on visitor flows as it impacts the destination's carrying capacity is the St. Gallen Model for Destination Management (SGDM), which revolves around strategic visitor flows (SVF) and consists of six distinct steps (University of St. Gallen, 2017). Furthermore, an overview of the carrying capacity studies can be found for instance, in a research by González-Guerrero, Robles, Pérez, Ibarra, and Martínez (2016). The evaluation of the various visitor management models (e.g., Limits of Acceptable Change (LAC), Visitor Impact Management, Visitor Experience and Resource Protection, Visitor Activity Management Planning, Recreation Opportunity Spectrum, and Tourism Optimization Management Model as proposed by Eagles, McCool and Haynes (2002) is also provided in the same study by González-Guerrero et al. (2016).

As is evident, research on indicators that can be used for measuring sustainability of tourist destinations is abundant; one example of such a comprehensive overview can be found in the

study by Önder, Wöber and Zekan (2017). In more detail, potential objectives and indicators for destinations and their policymakers are provided in Table 1 of the aforementioned study. All objectives and indicators are classified as economic, social, and/or environmental. The proposed objectives are in range from maximizing competitiveness and growth to maximizing satisfaction of visitors and residents with tourism. For instance, a destination's objective may be to minimize congestion and intrusion, which can be measured by the tourism density rate and percentage of same day visitors to total number of visitors to the city, both of which are perfect examples of the indicators that assess carrying capacity from the environmental pillar. This type of measures is certainly of interest to destinations like Bled that welcome many same day visitors/excursionists. On the other hand, if destinations are aiming at maximizing growth, this is a pure economic perspective, which can be measured by bednights, arrivals, tourism revenues, and value added (changes of values or market shares). Thus, this table is based on the authors' elaborate review of the literature and as such, will be used as the basis for the development of the methodology and modified to fit the needs of the individual territories in Slovenia. Jurado et al. (2012) took a similar approach concerning the carrying capacity assessment in a coastal area: from 175 indicators, they streamlined to 24 (nine physical, nine socioeconomic, six social).

One further possibility to assess carrying capacity from an environmental pillar point of view is measuring the CO₂ emissions of tourists, in particular when traveling to and from a destination (European Union, 2016; UNWTO, 2014). Overly high CO₂ emissions are one of the major detrimental effects of uncontrolled mass tourism (Önder et al., 2017) and therefore a crucial sign of destinations being close to breaching their environmental carrying capacity. For 62 major European city destinations, with the "Travel distance and CO₂ estimation" on TourMIS, there already exists a ready-to-use possibility to assess the travel-related CO₂ emissions of European city tourism by source market, travel distance, and transportation mode (Gunter and Wöber, 2019), thereby considerably extending the existing literature on the topic (see e.g., Gössling et al., 2015).

For the envisaged four case studies, this methodology can be easily adapted. While tourist flow data are not available from TourMIS at this granular level (small municipalities and single attractions), different big data measures suggested to measure tourist flows can be consulted not only at the annual but also at higher frequencies. Since the four case studies differ in terms of their characteristics and the type of tourists visiting by belonging to the four different tourism macro regions of Slovenia (Nova Gorica: city tourism in a cross-border environment; Bled: Alpine landscape and a lot of excursionists; Brezice: thermal springs and predominantly spa tourism; Divaca: Karst and sun and beach tourism), different results are expected for their individual environmental carrying capacity levels and therefore also different policy measures will need to be recommended (e.g., how the carbon footprint of visitors could be minimized in the case of Divaca). However, the "beauty" of the proposed methodology is that it is universally applicable.

Going beyond CO₂ emissions, one should look into measures such as density and seasonality into more detail, which arguably, pose a problem for all four case studies. These indicators would

certainly need to be integrated in the final model on assessing carrying capacity. For instance, Önder et al. (2017) applied data envelopment analysis on a set of indicators that incorporate all dimensions of sustainability on a sample of 27 European cities with a purpose of inspecting their sustainability efforts. Although such analytical approach cannot be undertaken in the current project due to a small sample size (four case studies), alternative benchmarking approaches can be taken into account that could group same type of destinations into clusters (e.g., Bled benchmarked against its competitors; same for the other case study localities).

Thus, taking above into account, it can be concluded that there is no one solution that fits all destinations and that different sustainability initiatives should be considered. The current report has attempted to provide a glimpse into such initiatives, while highlighting the link between carrying capacity, visitor flows, proposed overtourism solutions, and various visitor management models. The most prominent approaches along with their specific strengths, weaknesses, potential degree of applicability to the four case study destinations, and finally, a list of suggested indicators for measuring tourism's carrying capacity (encompassing all three dimensions of sustainability) can be found in annex A.1.

While it is acknowledged that interviews with representatives of the stakeholders of the four case studies are indispensable in development of the carrying capacity methodology, the analysis of some of the stakeholders' needs and policy objectives for this inception report could only be performed in terms of a desktop review of the existing national and regional tourism development strategies due to time constraints (see chapter 3).

2.1 Outline of our methodological framework

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 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 phenomenon (flows and concentration) and all these multiple aspects. This causal loops 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. As has been described in literature the way to establish this link is by intertwining context related territorial information (as expressed by indicators) with tourist related information thus creating ratios. Our approach will pick up on this and try to establish a set of territorial specific indicators, which will be tailored to the circumstances of each of the destinations/regions and cross them with tourist related indicators expressing both stocks and flows of tourists and their concentration in the territory of the destination.
- There is no ultimate border line for defining carrying capacity along the different dimensions (social, economic and environmental), which means that there will be a difficulty in actually pointing out the critical threshold when carrying capacity is reached related to a

specific dimension. We have met this challenge in our methodological approach by allowing for different ways to assess normative borders for carrying capacities. This means that 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. We will meet this by avoiding an aggregation of the various dimensions and indicators capturing context and tourism impact on the one hand and by establishing the thresholds or corridors based on existing strategies and policy goals set, however in a broad consultation process with the stakeholders in the regions/destinations.

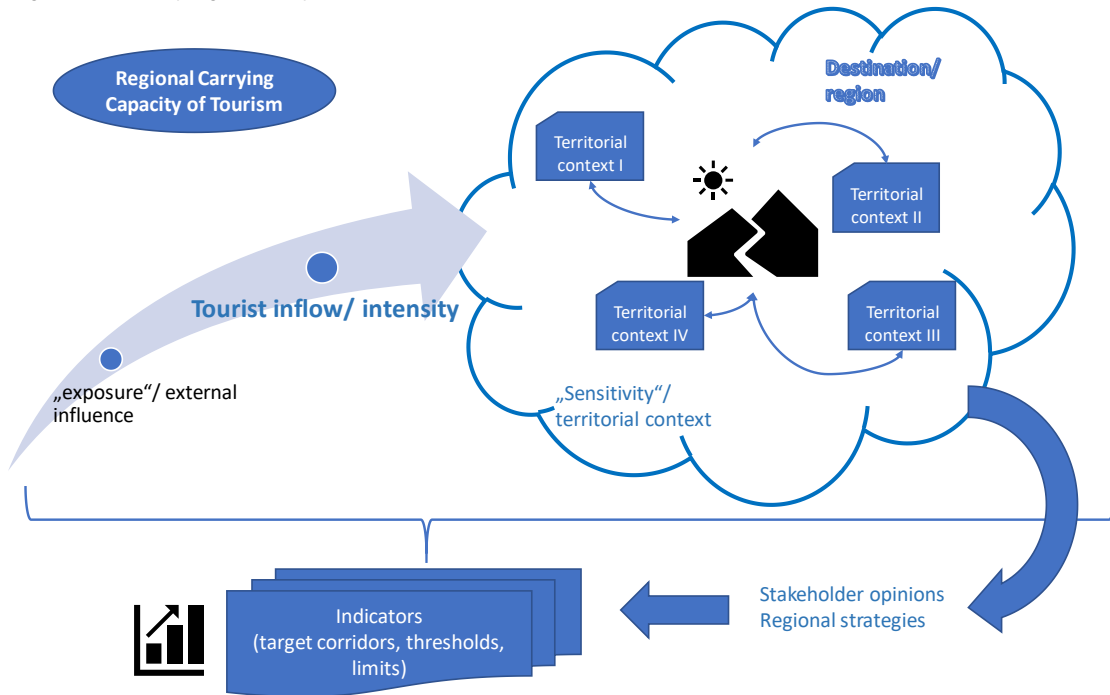
- There is no unified way to take territorial specifics of tourist destinations into account when assessing their carrying capacity. This means that carrying capacity will be different in different regional/territorial circumstances, so no one-size-fits-all approach for assessing carrying capacity of tourist destinations will be feasible. 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. Our suggestion will therefore be that the method developed is setting the 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 a suggested thesaurus of touristic and context indicators.

This means that when capturing carrying capacities for tourism we are facing a multidimensional problem which depicts an external influence on a territory:

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

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

Figure 2.1: Carrying capacity assessment



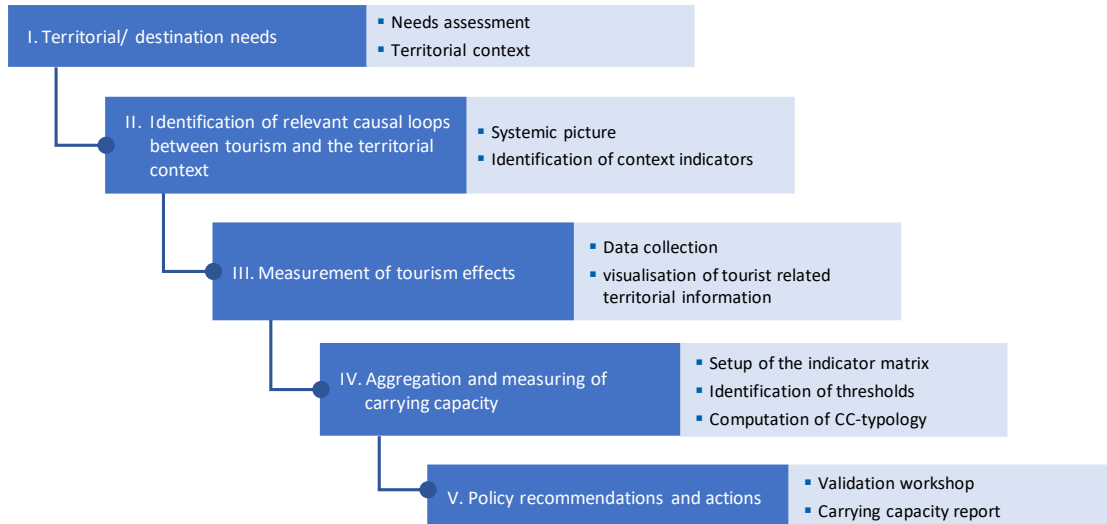
Source: Consortium

The actual method to be developed in detail and applied within the case study regions is a step-by-step approach which encompasses the collection of needs and specifics of the destination. The crucial element for reflecting the regional/destination specific conditions will be to establish a systemic picture of all potential causal connections between the exposure (i.e. tourism) and the territorial system with its existing character and traits (territorial context). Indicators capable of depicting these causal connections as well as corresponding data will be identified in the next step. What will be needed in order to bring in the normative component and finalise the necessary comparison against which carrying capacity will be measured, the definition and integration of target corridors (optima), thresholds and limits through revealed preferences of stakeholders in the region and strategies for tourism development and regional development will be assessed. The final step is then to compare these limitations and the actual forecasted tourist development and establish a deviation/classification of the status of the carrying capacity along the different single dimensions (indicators) and thus establish a development path for the single destination.

These development paths and corridors of regional development for the respective dimensions will be translated into policy recommendations and verified in a concluding workshop.

The following figure provides an overview of the step-by-step method developed and applied in the single case study regions:

Figure 2.2: 5 steps to assess the carrying capacity of a destination



Source: ÖIR

STEP 1

Step 1 aims at identifying the status quo of the destination with regard to territorial and policy needs. The purpose is to develop an overview of the situation in the area (including first context indicators) as well as collecting information about the policy direction pursued by the stakeholders. This should further inform the approach e.g. for focusing the assessment on a specific pillar of sustainability with help of specific indicators. This step requires both desk research and analysis of respective strategies as well as interviews or consultations with stakeholders. The desk research offers an unbiased overview of the needs and challenges of the area as well as a first overview of the policy approach. It also aims to provide a picture of the presence and development of tourist numbers.

Direct dialogue with stakeholders enables to gain a deeper insight into the political and territorial context of the case study area. The general themes of consultations are:

- Who is responsible for tourism at the destination? How is the tourism strategy governed?
- What are the needs and challenges with regard to tourism and three pillars of sustainability?
- What are the policy objectives and priorities with regards to tourism and three pillars of sustainability?

Result

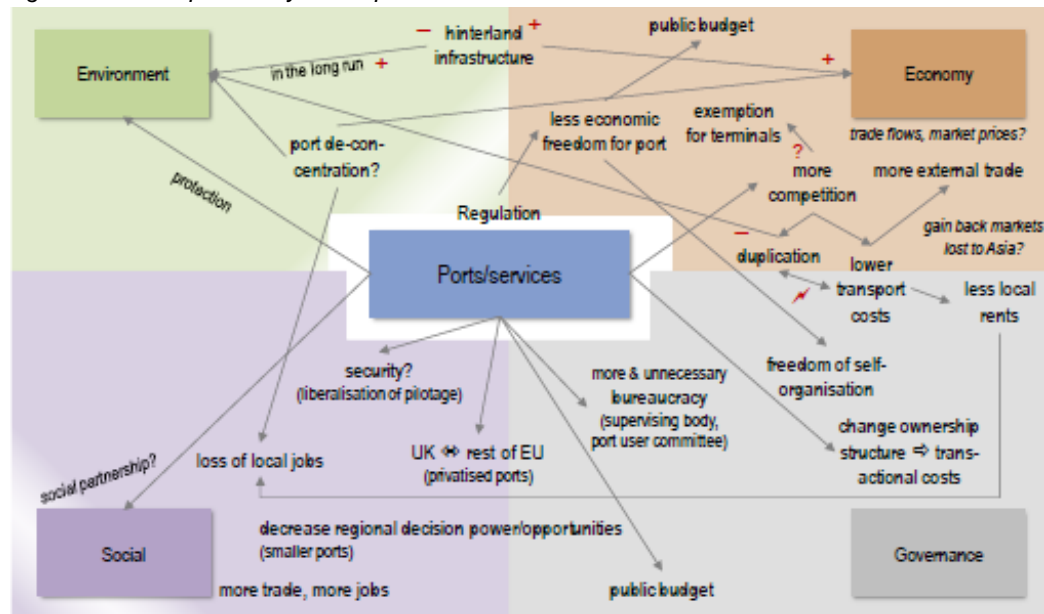
- A Detailed information on the destinations needs in relation to tourism management
- Background information on perceived and intended destination development

STEP 2

Step 2 builds on the information collected in Step 1 and takes a step further in the direction of understanding the interdependencies between the territorial context and the development of tourism in the area. Based on the information about needs and challenges as well as collected data about presence and development of tourist numbers, a systemic picture is drawn in order

to visualise the causal loops between the area's territorial context, including needs challenges and policy objectives, as well as tourist presence and development. An example of a systemic picture from a different topic is provided in the figure below.

Figure 2.3: Example of a systemic picture.



Source: ÖIR, 2014, CoR-Workshop.

Drawing a systemic picture allows capturing different, more and less subtle, interdependencies taking place in the area, rather than reducing them to other more general phenomena. Having a more complete overview of the causal relations within the territory, its characteristics, as well as external factors that act on them facilitates a more appropriate tailoring of the methodology via the selection of indicators.

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

- What are the direct and indirect economic, social, environmental and governmental effects and how do they occur?
- Has the policy proposal effects on the people 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?

Result

- Systemic picture of tourism related effects in the destination
- Identification of relevant indicators

STEP 3

Based on steps 1-3 the measurement of carrying capacity will be designed. For each indicator, corresponding data sources available based on desk research, information from stakeholders and have to be identified. In case data is not available, either second best indicators or approximations have to be made. The set of collected and estimated data will allow for different types of interactive visualisation of tourist flows which will then in turn help to identify the related hotspots. The following three steps illustrate the respective data processing steps:

- (1) *Tourist flow estimation and carrying capacity related information:* “Tourist flow and carrying capacity related information” will help to set the grounds for an accurate prediction of the study regions’ overnights/arrivals. Different data sources will be combined and tested against past overnights/arrivals. This helps to 1) reveal the most relevant tourist related data sources, and to 2) determine their relationship with observed overnights/arrivals (e.g. linear/non-linear relationships, autocorrelation, lags). As the impact on certain destination characteristics depends on the quantity of tourists and the study regions’ characteristics, the colourfulness of the case study regions will guarantee for a widespread inclusion of tourist related information. The data grid (see annex A.3) lists data that could be used for estimating tourist flow related information (not exhaustive).¹

Stakeholder questions addressed: Which case study characteristics are related with tourist flows and how to grasp them?

Deliverable: e.g. maps visualizing the transport infrastructure, accommodation facilities, or restaurant densities in combination with tourist hot spots.

- (2) *Tourist flow prediction:* The main aim of the “Tourist flow prediction” task is to predict future overnights/arrivals.
 - (a) First, a model will be trained and optimized on past arrivals/overnights. Different forecasting methods will be investigated (e.g. regression, exponential smoothing, seasonal decomposition, autoregressive integrated moving average – ARIMA) to predict past overnights/arrivals based on indicators representing past information and being used in the model as independent factors. Different forecasting parameters will reveal insight into the development of tourist flows over time (e.g. the overall trend, seasonal components, the amplitude of overnights/arrivals at comparable points of time, constantly recurring patterns like weekends, the influence of shocks like holidays) and will be used in a model to predict future tourist overnights/arrivals. Statistical indicators

¹ “As a data source, FLOWS utilises information obtained from the automatic traffic counters available in a form of regularly updated data, which at the same time mean that **access to historical data is guaranteed**. What is more, the future upgrade will also include other sources of data, such as anonymised mobile phone activities, accesses to Wi-Fi and user-generated content from social media. The application will in addition be supported by an appropriate visualisation toolkit clearly showing areas where excessive traffic loads and seasonal variations occur.” (<https://tourism4-0.org/strategic-thinking/flows/>; accessed 28 October 2019)

(e.g. CI, MAPE, MAD, R^2) will give insight into the prediction power of overnights/arrivals based on the available data sources and will help to select the model with the highest prediction accuracy of overnights/arrivals. The project team foresees different ways of estimating tourist flows and will decide for the most appropriate according to the available data.

Stakeholder questions addressed: How did tourist overnights/arrivals develop over time? What are the high seasons? Which low seasons became more attractive over time and should maybe be supported to attract more tourists or shift tourists from overcrowded seasons?

Deliverables: e.g. time series charts of overnights/arrivals together with their amplitude.

(b) Second, depending on the insights of the first prediction accuracy step in based on past data (a), future developments of overnights/arrivals will be presented. They will include additional data that reveals insight into the future behaviour of tourists to fine-tune future predictions based on pure time series components. On a greater time interval, e.g. autoregressive lags of Google trend data (Onder & Gunter, 2015) and click stream data from local websites offering tourist information (Senecal, Kalczyński & Nantal, 2005; Shao & Gretzel, 2010) can be used to finetune forecasts of forthcoming tourist flows as visitors tend to search for destination related terms before going there as well as destination websites are visited more often before going on holiday in a certain region as a planning step. On a shorter time interval, weather forecast predictions helpful especially for outdoor and beach activities, forthcoming holidays and annual events will enrich the prediction accuracy.

Stakeholder questions addressed: How will the tourism figures look like in the future? What is the estimated number of arrivals for a sunny vs. rainy day in July, to handle weekend day tourists in an appropriate way? How will certain events change my overnight/arrival figures?

Deliverables: e.g. time series charts with tourist overnights/arrivals forecasts.

(3) *Tourist flow impact:* The “Tourist flow impact” task bridges the gap between raw tourist overnights/arrivals and their positive/negative impacts. First, relationships with alternative data sources that help to understand its impact on various different stakeholders, as e.g. the environment (e.g. air quality, water consumption, CO₂ emissions), local residents (e.g. overnights/arrivals per capita, density), or the local government (e.g. tax income). Second, not only the stakeholders on sight are addressed, but also the impact on the perception of the region from the tourists’ perspective plays a crucial role as they will also have an effect on the future tourist flows. Overcrowding of certain regions might decrease positive feelings on sight and vice versa. A substream within the broader field of opinion mining (for an overview see Pang & Lee, 2008; Liu, 2012), called sentiment analysis, allows one to operationalize the feelings of people expressed in emotive written text or statements. As positive and negative posts represent the authors feelings, user-generated content (UGC) from the study regions will be investigated using text mining methods like verbal emotion

recognition. Sentiment analysis based on Instagram posts reveals insight into the perception of the region from the tourists perspective (Ranaweera & Rajapakse, 2016). Similar attempts are based on online reviews (González-Rodríguez, Martínez-Torres, & Troal, 2016) of hotels, restaurants or attractions (e.g. Tripadvisor, Airbnb). Topic-based sentiment analysis even allows to measure feelings towards concrete characteristics like the management of attractions on-site (Ren & Hong, 2017). In addition to the holistic separation between positive and negative feelings, basic emotions like joy, fear, surprise, anger, joy, or sadness, as listed in the wheel of emotions (Ekman, 1992a, 1992b) will be investigated to trace feelings influenced by various temporal characteristics, as e.g. the number of tourists and subsequent perceptions of the region due to overcrowding, or the effect of positive headlines (e.g. cultural events) and negative headlines (e.g. terrorist attacks) in the news about a certain region. But also, the impact of tourist flows on stakeholders like the local government can be monitored, e.g. economic data like tourist taxes could be used to measure part of the monetary impact on the case study regions.

Stakeholder questions addressed: Which study destination characteristics (e.g. air quality, traffic figures, restaurant evaluations) are influenced by tourist flows? For which items is an impact not visible at the moment? How to identify crucial changes in time by constantly monitoring relationships between tourist flows and carrying capacity related information? Deliverable: e.g. sentiment map for the case study regions based on social media data (restaurant reviews, blog entries or posts on tourist attractions, etc.).

Result

- Full set of destination data
- Territorial visualisations

STEP 4

Step 4 will actually recompose the systemic links as established in Step 2 via a systemic picture of tourism as external influential factor and the territorial context via computation of the components. In step 3 these components have been established in the form of indicators:

- Indicators depicting the tourism components (intensity, flows, concentration) and their future prospects
- Indicators depicting the territorial context specific to the destination in question and affected by the tourism sector

These two aspects will be regarded as two dimensions to the concept of carrying capacity and will now be computed by a simple combination of the values of both along an assessment table, which orders the values in quintiles to arrive at an assessment grid, which provides the performance vis-à-vis the carrying capacity for this very indicator combination (i.e. exposure – sensitivity product = impact).

Table 2.1: Indicator Matrix (example)

	Indicator	Units	1 st Quin- tile ¹	2 nd Quin- tile	3 rd Quin- tile	4 th Quin- tile	5 th Quin- tile ²
Popula- tion/tour- ism inten- sity (x-axis)	Population growth	%					
	Tourism intensity	% of population					
	Tourist concentration						
	Tourist flows						
Destination	bed nights	absolute value and % change					
	arrivals	absolute value and % change					
	average length of stay	absolute					
Economy	tourism revenues	Euro					
	share of tourism contribu- tion to GDP	Euro and %					
	occupancy rate	%					
	number of bed spaces avail- able in commercial accom- modation establishments	absolute and % change					
	share of Airbnb bed spaces	%					
	distribution of bed spaces						
Environ- ment	distribution of demand (seasonality)	Difference in high and low season (ratio)					
	tourism density	e.g. number of tourists/square km					
	tourism intensity	number of visitors/ residents					
	percentage of same day visi- tors to total number of visi- tors	%					
	CO ₂ emissions (during trav- eling to/from and at the des- tination)	T					
	waste production per tourist night compared to general population waste production per person	Kg					
	waste production per tourist night compared to general population waste production per person	Liter					
	water consumption per tourist night compared to general population water consumption per resident night	kWh					
	energy consumption per tourist night compared to general population energy consumption per resident night	km					
	closeness to airports, cruise ports and World Heritage Sites						
Social/ Attractive- ness	negative TripAdvisor re- views	good – medium – bad					
	overall satisfaction of visi- tors and residents with tourism	Likert scale – mean values					

Dimension (y-axis)

Source: Consortium | ¹ lower boundary, ² upper boundary

An indicator matrix as exemplified above will be compiled based on defined goals in existing local/regional strategies (document analysis and interviews) as well as the destination-based stakeholders' perception and expertise (interviews and consultation). This includes the selection of relevant indicators (y-axis) as well as the definition of the destination's relative risk of experiencing an overcrowding problem. The local knowledge of every single stakeholder is important in order to balance the importance of tourism to the local economy, society and environment.

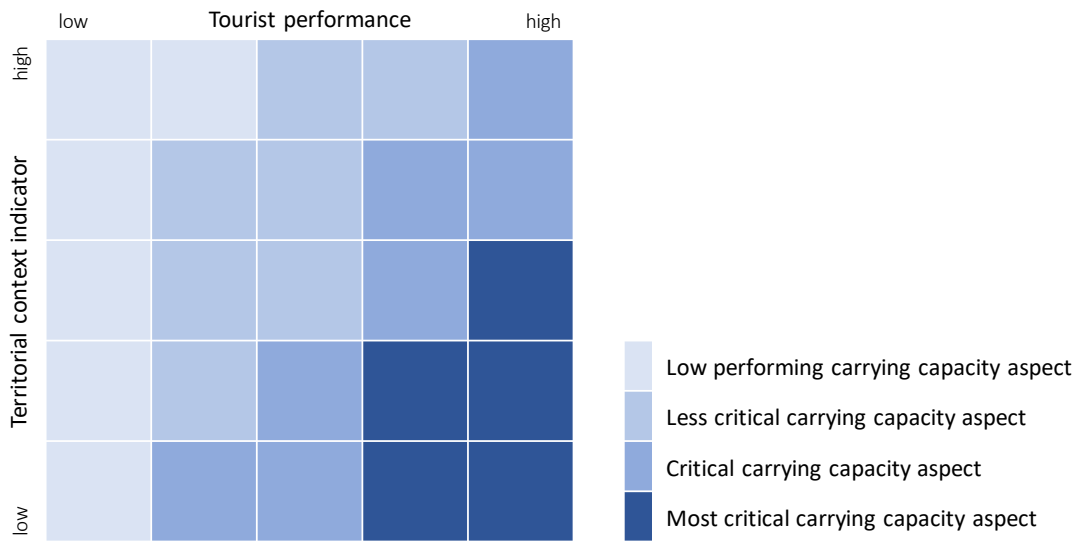
The purpose of the matrix is to relate tourism intensity to selected indicators (social, environmental, economic). The threshold can for example be scaled on the basis of quintiles (from the highest risk = upper boundary to the lowest risk = lower boundary) which indicate a destination's relative risk of reaching certain socioeconomic and ecological limits.

This will be done by aggregating the two dimensions to composite exposure, sensitivity indices. For easy processing, a five-part scale based on the quintiles of indicator performance will be used. As pointed out above the scales will be adopted to the character of the indicators and the ranges of indicator values for establishing the quintiles will be gathered from the revealed preference/information of stakeholders in the region. This means that Figure 2.4 below just shows one possible example of value combinations and normative orientation of the indicator. The indicators may have different normative directions (e.g. unemployment decrease to be regarded as positive, while income decrease to be regarded as negative with respect to carrying capacity effect). Moreover the quintiles may also represent the relative distance from a performance corridor (e.g. biodiversity may be seen as an optimisation realm and therefore the carrying capacity effect of tourism may only be to keep a minimum distance from this optimal corridor of the indicator performance). This means that for each of the indicators chosen such an evaluation of normative direction and character of the denominator will have to be conducted. This is the reason, why we will not suggest any aggregation over the different indicator performances – due to the weak comparability and commensurability² character of the single carrying capacity performances.

This results in impact performance with regard to carrying capacity for each of the indicator combinations and aspects of carrying capacity. This leads to a typology that combines tourist performance and territorial context into four classes which is presented in Figure 2.4

² Strong commensurability, according to which there exists a common measure of the different consequences of an action, based on a cardinal scale of measurement.
Weak commensurability, according to which there exists a common measure based on an ordinal scale of measurement.
Strong comparability, according to which there exists a single comparative term by which all different consequences can be ranked.
Weak comparability, according to which values are irreducibly plural and cannot be uniquely ordered along a single scale.
see Martinez-Alier, J., G. Munda and J. O'Neill (1997), 'Incommensurability of Values in Ecological Economics', in M. O'Connor and C. Spash (eds), *Valuation and the Environment – Theory, Method and Practice*, Cheltenham, UK and Lyme, USA: Edward Elgar.

Figure 2.4: Carrying Capacity typology



These results per indicator highlighting domains of critical importance will then be fed into the policy recommendation process by building the basis for the validation of the stakeholders and thus formulating policy path ways for tourist and regional development actions.

Result

- Completed and validated indicator matrix
- Identification of critical domains of tourism pressure
- Identification of geographic hot-spots

STEP 5

Step 5 moves from the measurement of the indicators as well as the carrying capacity to concrete outputs for stakeholders, including clearly formulated policy recommendations. Based on the undertaken steps, a report will be drafted.

The report’s structure will be developed with consideration of its target audience and will focus on capturing the most relevant information for stakeholders. It will provide easy-to-understand overview of the steps and the results, visualisations of the results as well as specific policy recommendations. In order to ensure accessibility and usability to stakeholders, and yet maintain transparency, it will provide all technical descriptions, such as methodological steps and methods, analyses, and data overview in annex A.3.

Another element of step 5 will be a joint workshop where the results of the applied methodology will be presented, discussed and validated. The workshop will serve several purposes: to ensure that stakeholders understand the methodology and the steps undertaken as well as to commonly discuss the derived policy recommendations and ensure their relevance and validity. At the same time, stakeholders will have the possibility to exchange with experts on further ways of applying the policy recommendations as well as managing their destinations. The joint workshop will contribute to stakeholders’ ownership of the results of the case studies. A detailed agenda for the workshops will be provided in further phases of the project.

The draft report will be circulated as a preparation of the workshop. The report will be finalized based on the process and outcomes of the validation workshop. It will be disseminated as a stand-alone document not only to involved stakeholders but also to other similar destinations that could benefit from the results and potentially be interested in applying the methodology to obtain a tailor-made analysis.

Result

- Validated results on carrying capacity measurement
- Policy recommendations

3 Stakeholders objectives and policy needs

3.1 Introduction

In line with the main objective of this project on *Carrying capacity methodology for tourism* to support stakeholders in taking up territorial evidence in their sustainable tourism development policy and management, the project relevant stakeholders have been identified (according to the relevance for the topic and selected case studies) and interviewed; or their strategic documents have been analysed. This inquiry which provides an overview of stakeholder objectives and needs helps to inform and direct the development of the project and its outcomes. The findings of these consultations are reflected in the following sub-sections.

Table 3.1: Considered stakeholders for identifying stakeholders needs

Stakeholder	Document/issue addressed
European Commission (EU)	European Commission: Research for TRAN Committee – European tourism: recent developments and future challenges.
Government Office for Development and European Cohesion Policy (GODCP)	Strategija razvoja Slovenije 2030. (Development strategy of Slovenia)
Ministry for Economic Development and Technology (MEDT)	Strategija trajnostne rasti slovenskega turizma 2017-2021. (Strategy of sustainable growth of Slovenian tourism) Interview Mihalič T, correspondent Martinčič R (MEDT) (Nov. 2019)
Ministry of Environment and Spatial Planning (MES)	Predlog predpisa: Stanovanjski zakon. (Accommodation law: in preparation) Prenova Strategije prostorskega razvoja Slovenije. Interview Kuščer K, correspondents Miklavčič T (MES) (Nov. 2019) and Červ A (MES) (Nov. 2019)
Slovenian Tourist Board (STB) – Tourist macro regions	The new organization model (the Macro destinations model) of Slovenian tourism
Slovenian Tourist Board (STB) – Green Scheme of Slovenian Tourism (GSST)	Green Scheme of Slovenian Tourism. Interview Mihalič T, correspondent Apih J (GoodPlace, director) (Nov. 2019)
Slovenian research agency (ARRS, Agencija za raziskovalno dejavnost Republike Slovenije)	Smernice za management turističnih destinacij na podlagi modelov nosilnih zmogljivosti in turističnih tokov. (Guidelines for tourism destination management based on carrying capacity and tourist flows) Interview Kuščer K, correspondent Knežević Cvelbar L (expert and leader of the study, SEBLU) (Nov. 2019)
Association of Municipalities and Towns of Slovenia (SOS, Skupnost Občin Slovenije)	Association of Municipalities and Towns of Slovenia and ESPON project. Interview Mihalič T, correspondent Kek S (Secretariat AMTS) (Nov. 2019)
Association of Cities of the Republic of Croatia	Vlada Republike Hrvatske (2013) Strategija razvoja turizma Republike Hrvatske do 2020. godine. Institut za turizam (2016) Akcijski plan razvoja zelenog turizma. Email correspondence with Mr. Marko Ercegovic
Informest	Email correspondence with Mr. Ivan Curzolo
PromoTurismoFVG	– Documento di pianificazione regionale. Il piano strategico 2018/2023 – Nota di Aggiornamento al Documento di Economia e Finanza Regionale – Friuli Venezia Giulia. Piano marketing 2014-2018 E-mail correspondence with Giorgia Ceschin (PromoTurismoFVG)

Source: consortium.

3.2 European Commission: Research for TRAN Committee – European tourism: recent developments and future challenges

This study for European Committee for Transport and Tourism (Weston et al., 2019) provides an overview of the current state of affairs in European tourism, considering the latest developments, identifying future challenges and emerging opportunities. It draws a number of conclusions and makes recommendations at an EU policy level that will support the sustainable development of the sector. It is relevant for this project for the following reasons. First, the study is a result of joint efforts of tourism consultants and survey correspondents from three different European states, including Slovenia. Second, the study lists GSST (Green Scheme of Slovenian Tourism) as a best practice for other European destinations/regions/countries. Third, the study addresses the sustainability and responsibility (including overtourism and climate change) of EU tourism.

This study should benefit this project on *Carrying capacity methodology for tourism* to emphasize importance and relevance and access to GSST and access to Convention, both relevant for sustainability and responsibility of Slovene tourism and its policy development at all levels.

3.3 Government Office for Development and European Cohesion Policy: Development Strategy 2030

In December 2017, the Government of Slovenia adopted the Slovenian Development Strategy 2030. Its central goal (Vision 2050) is titled The Quality of Life for All. With the five strategic orientations and twelve interlinked development goals, it sets a foundation for the future development of Slovenia and sets guidelines for all policies in Slovenia. By including SDGs and the 2030 Agenda adopted by the United Nations, Slovenia recognizes the importance of a sustainable, inclusive, and more conscious future where society as a whole can flourish.

The Slovenian Development Strategy has been criticized by the non-government initiative Plan B for Slovenia (a network of non-government organizations), claiming that the document despite that it recognizes the need to change the existing economic models, it over-stresses the need for constant economic growth and neglects the goal of social balance, society of prosperity and environmental sustainability. The civil initiative has been organised to urge the Government of the Republic of Slovenia to recognize climate change as a national crisis and to address it as a matter of priority (Civilna iniciativa, 2019).

3.4 Ministry for development and technology: Strategy for Sustainable Growth of Slovenian Tourism 2017-2021

The main Slovenian strategic tourism document is the Strategy for Sustainable Growth of Slovenian Tourism (MGRTRS, 2017). Key targets are: to increase international tourism receipts, visits and average length of stay, to increase accommodation and employment capacities employees. Strategy then builds on the three-pillar sustainability concept with main focus on economic sustainability. Slovenian tourism is less competitive, compared to the other countries in the region and for this reason, the focus is on tourism size and competitiveness, as well as on supporting developmental elements such as infrastructure, accommodation and attraction quality development. The simulation model about the size assumes that carrying capacity limits are not yet reached, at the national, yearly level. More appropriate diagnosis about Slovenian tourism would be undertourism in general. The possible overtourism days in some destinations are addressed through sustainability indicator schemes that exist in the framework of green tourism policy.

According to the governmental correspondent in this interview, the ESPON project should be based on GSST (Green Destinations, 2019) and progress it in terms of management tools and approaches for sustainable management of destinations. Further, the project should build on findings from ARRS (2019) study, which has been financed by national (governmental) Research Agency and suggested by the Ministry, responsible for tourism. It is important to progress the overtourism and capacity planning debate by a tool for understanding/using management reactions towards unsustainable situations.

3.5 Ministry of Environment and Spatial Planning: Housing law: Airbnb regulation proposal

As tourism carrying capacities are strongly influenced by tourism accommodation policies, relevant policy issues in place are presented here. Newly proposed Housing Law, currently in the public debate (MOP, 2019a). A revision of the Spatial development strategy of Slovenia is in preparation, which is concerned about landscaping regulations (MOP, 2019b).

AirBnb needs stronger regulation, since there are currently estimated 31,000 AirBnB beds, in addition to 46,000 hotel beds in Slovenia. There is a need to include non-tourist destinations in tourist flows and redirect tourist flows from concentrated destinations and/or attractions. In order to manage tourism flows, in time comprehensive model of environmental indicators is needed.

In the draft of the new Housing Law (SZ-2) (MOP, 2019a), short-term leasing is regulated in the same way as in the existing law – as the use of a dwelling for another purpose, for which no change of purpose is required, but it is necessary to obtain 100% consent of the condominium owners, if the apartment is rented in a multi-apartment building. However, a more detailed regulation of this activity is planned in the Hospitality Act (ZGos), on the basis of which, in

cooperation with the Ministry of Economic Development and Technology (MGRT), which prepares this law, it is expected to reduce the necessary approvals, provided that the regulation is appropriately adapted for multifamily buildings (max. time of sublet, max. no. of beds, consent of the municipality, etc.) and control over implementation (responsibility of inspection bodies).

3.6 Slovenian Tourist Board: The new organization model (the Macro destinations model) of Slovenian tourism

The Macro destinations model (and product portfolio strategy) is one of the six policies of the Strategy for Sustainable Growth of Slovenian Tourism (MGRTRS, 2017), aimed at establishing the new marketing, management and tourism development system of Slovenian tourism. The basis of the model is formulation of 4 macro destinations and defining the key partners at destinations level.

Within the four macro destinations (Alpine Slovenia, Mediterranean & Karst Slovenia, Thermal Pannonian Slovenia, and Ljubljana & Central Slovenia), 35 leading destinations acquired the status of “Leading destinations”, representing 97.9% of overnight stays in Slovenia. The status grants the destinations access to special funds from the Ministry of the Economic Development and Technology for product development and digitalization (4.5 million € in 2018-2019, and another 5 million € in 2020-2021) and 1.2 million € from Slovenian Tourist Board (in 2020).

3.7 Slovenian Tourist Board: Green Scheme of Slovenian Tourism (GSST)

The GSST is the strategic instrument for more sustainable tourism development for destinations, protected areas, travel agencies and accommodation (STB, 2019; Weston et al., 2019). The GSST is based on international sustainability criteria (GDS and ETIS). To obtain the Slovenia Green Destination label (bronze/silver/gold), the destinations must meet the Green Destinations Standard criteria (GDS), while providers first obtain/present one of internationally recognized labels that are also verified by Slovenia Green (for example Travellife). The four Slovenian destinations, involved in our ESPON project (Bled, Brežice, Divača, Nova Gorica), are already a member of GSST.

According to the GSST operator Jana Apih from Goodplace (correspondent), our ESPON project can further assist the GSST by testing the sustainability indicators (Green Destination, 2019) and expanding the approach through the management tool to manage unsustainable situations, such as visitor flows. At the same time, GSST can assist the project by the existing green scheme in terms of process (based on ETIS), qualitative indicators (based on GDS) and satisfaction surveys (based on ETIS). The GBS has a functional electronic tool (platform) that assist the destinations to collect the relevant data on a platform. (For indicator list see the internet document, Green Destination, 2019).

3.8 Slovenian research agency (ARRS): Guidelines for management of tourist destinations based on models of carrying capacity and tourism flows

Central research project endorsed by Research Agency of the Republic of Slovenia (ARRS) introduces the guidelines for management of tourist destinations based on models of carrying capacity and tourism flows (ARRS, 2019). Carrying capacity literature review connects to well to overtourism and the breach of carrying capacity and overtourism can be identified through the Traffic Lights Indicator System, which identifies the problematic areas (for indicator list (in Slovene) see the corresponding webpage (ARRS, 2019)). This diagnostic tool identifies growth rates and seasonality, decision makers can orient themselves and consequently improve their sustainability. Increased visitation creates numerous negative socio-cultural influences. That is why local population and media coverage need to be put forward to improve political and population support, since locals are heavily influenced by tourism transport. The political dimension was included through the Ministry of Economic Development and Technology. Political support was given as an estimate by tourist boards.

The project (ARRS, 2019) includes big data in measuring tourist flows. Mobile phones data provide a useful resource for determining affected areas. New technologies, such as gathering data from tourism portals is suggested. Such data gathering and analysis can be applied to the management of any European tourist destination. In addition to big data quantitative indicators, qualitative research should also take place.

Proposed is the inclusion of Traffic Lights Indicator System (ARRS, 2019) in the GSST. The indicators were suggested based on carrying capacity, and the solutions need to be adapted to the specifics of each destination, which could be the added value of this ESPON project.

There are a few challenges for the future that should be addressed, such as environmental indicators not being measured in most destinations. Transit nature of Slovenian tourism contributes to the problem. Transport should be measured daily – options need to be discussed. It is also quite hard to measure increase of waste due to tourist traffic. There is a need for measuring how active residents are in participating in tourism development and positive/negative opinion of media regarding tourism. Residents' satisfaction with tourism development measurement requires common methodology across destinations and representative samples. For measuring visitor satisfaction, the questionnaires are usually obsolete and active monitoring is missing, so there is still room for improvement.

3.9 Association of Municipalities and Towns of Slovenia: stakeholder needs

The Association expects the ESPON project will benefit tourism related needs of local municipalities in respect to sustainable tourism development and data (indicators and management tools). It is expected, project will help to design a tool for international communication and dissemination of sustainable destination best practices (special target are international networks that municipalities belong to, such as NALAS (Network of Associations and of Local Authorities of SE Europe), CEMR (Council of European Municipalities and Regions). Improvements for municipalities tourism related operations in regard to in time digital data are expected. The stakeholder also suggested the project should support and help to upgrade the GSST by managerial tools how react to unsustainable situations, that should ideally be presented at the easy reachable platform (interview with Saša Kek, November 2019).

3.10 Croatia

Given that the Association of Cities of the Republic of Croatia is one of the partners in the stakeholder consortium, it is important to look into the tourism development strategies on Croatian national level. Already in 2013, a comprehensive document titled “Tourism Development Strategy of the Republic of Croatia until 2020” was introduced in order to increase the country’s competitive standing on a global tourism stage within the upcoming seven years. More specifically, a very ambitious goal of achieving a rank in the top 20 tourist destinations in the world in terms of competitiveness was then put forward (Vlada Republike Hrvatske, 2013). When looking towards 2020 from the perspective of 2013, ten key directions for Croatian tourism development were identified: partnership, deregulation, “green”, beyond the sun and sea, the entire national territory, authenticity and creativity, hotel industry as the initiator of investments, innovative market image (i.e., rebranding of the country), Croatian products for Croatian tourism, and the culture of quality (Vlada Republike Hrvatske, 2013). Based on these development directions, a 2020 vision was formulated:

In 2020 Croatia is a globally recognized tourist destination, competitive and attractive for investments. It creates jobs and manages the development on its entire territory in a sustainable manner, nurtures the culture of quality, and offers its guests hospitality, security, and the authentic offer and experiences throughout the year (Vlada Republike Hrvatske, 2013).

If narrowing down the focus and looking into the aforementioned “green” direction in specific, another document was developed in a collaboration of the Institute for Tourism and the Ministry of Tourism of the Republic of Croatia: “The Action Plan for Development of Green Tourism”. In order to make these actionable, 9 programmes and 33 measures were proposed. Notably, the concept of carrying capacity was integrated throughout this action plan (Institut za turizam, 2016).

Based on the above, it can be argued that there is a direct link between the current project on carrying capacity methodology in tourism, visions for Croatian tourism, and two of the aforementioned directions in particular: “green” and the entire national territory. The “green” approach signalizes the importance of sustainable development, whereas the latter approach suggests the need for spreading tourism across the whole country (in contrast to the current major imbalances between the coastal and continental parts which point towards the probability of exceeding the carrying capacity in certain parts of the country). Whilst this brief overview summarizes the country’s objectives for tourism development which are indeed tilted towards sustainability, interviews are yet to be conducted with the Croatian stakeholders in order to identify their specific needs regarding the measurement of carrying capacity. Thus, this is exactly where the current project comes in.

3.11 Italy, FVG Region

The FVG Region within the Italian state enjoys a special status that derives from historical paths in which many cultures have followed one another on its territory. Together with these two Countries of notable tourism development, the FVG has realized many common and cross-border projects. The tourism policies of the FVG region have had considerable development over the last few decades.

Autonomous Region of Friuli Venezia Giulia: Tourism Plan, 2014-2018

The 2014-2018 Tourism Plan of the Autonomous Region of Friuli Venezia Giulia, approved by the Regional Council on May 30, 2014, is the strategic planning document for the entire territory and for the overall tourism sector of the Region, in a system logic that allows to combine tourism, history, culture, food, transport, crafts and industry. The objective of the Plan is to make Friuli Venezia Giulia a Slow tourist destination capable of offering thematic tourism with high added value. The important goal the Plan aims at is to transform the territory into an integrated tourism system. The tourist model to be achieved is based on three key concepts: competitiveness, attractiveness and sustainability.

Autonomous Region of Friuli Venezia Giulia: Strategic Plan, 2018-2023

The Strategic Plan, 2018-2023 approved by the local Government on February 8, 2018, includes at point 7 the directives regarding Tourism and Culture which blend together in a common strategy: rediscover the roots and strengthen the identity through the enhancement of cultural heritage and traditions regional. The Region contributes to stimulate the promotion of the territory and its multiple riches through projects shared between reality neighbouring (Veneto, Austria, Slovenia and Croatia) or similar, linked by a central annual themes. Investments will be supported for the recovery, preservation and enhancement of the assets of the archaeological heritage. To favour the influx of visitors, the focus is on the quality offer in which the traditional cities of sea and mountains are joined by the cities of art. FVG aims to be a 360-degree tourist service destination, open to reception 365 days a year.

4 Approach to the case studies

The four selected case studies are destinations where the newly developed tourism carrying capacity methodology will be applied and tested for its applicability and further transferability. The set of cases includes different destinations which represent types of destinations typical for other European regions, i.e. a city tourism destination with a specific cross-border environment (Nova Gorica), a spa tourism destination with thermal springs (Brežice), an Alpine destination (Bled), and a destination with a Karst landscape in the hinterland (Divača). The core of the destinations is administratively associated to municipalities (local level) however the tourist flows need to be measured at the regional level. A first round of interviews with destination relevant survey correspondents has been conducted, in order to get a glimpse into destination needs. The list of stakeholders involved in this survey is provided in Table 4.1. The methodological interview grid is presented in the annex A.2, the full interview transcript is available on the internet (Mihalič et al., 2019).

Table 4.1: Identifying stakeholders needs – destinations

Stakeholder	Document/project interviews
Destination Bled	Strategija trajnostnega razvoja blejskega turizma 2018-2025. Interview Novak M, correspondent Purkart R (Nov. 2019)
Destination Divača	Analiza strateških turističnih tokov na destinaciji Kras z vključenim razvojnim in trženjskim načrtom za destinacijo Kras. Interview Novak M, correspondents Ščuka S, Franetič B, Hreščak Z (Nov. 2019)
Destination Brežice	Strategija turizma občine Brežice 2017-2021. Interview Novak M, correspondent Vreščak N (Nov. 2019)

Source: Mihalič et al., 2019.

4.1 Case study 01: Bled

Bled is one of the three Slovenian destinations with over 1 million overnight stays (with Ljubljana being the only one with 2 million), with 95.6% of foreign overnights and 2.31 average stay. The number of overnight stays more than doubled from 2008 to 2018. Next to the capital it is considered to be the strongest brand in Slovenian tourism. It holds the gold Slovenia Green label, indicating the destination's compliance with requirements defined by the Green Scheme of Slovenian Tourism (GSST). It is located on the outskirts of the only national park in Slovenia (the Triglav National Park).

Bled prepared a new tourism strategy in 2018 (TB, 2018), in which it did not adequately cover the challenges of fast growth and increasing pressure on natural (predominantly the pressure on the Bled lake basin and the quality of the lake water) and social-cultural environment (the inhabitants are moving out from the centre, putting their houses and flats for apartments, increasingly for short term rentals).

In 2018, Bled acquired the long awaiting north bypass road, which halved the traffic pressure in the direction of the Bled Castle and Pokljuka Plateau, but the all-inclusive solution for the vigorous traffic problem will come only with the north bypass (now all the traffic to neighbouring

lake destination of Bohinj passes the centre of Bled and goes along the Bled lake) – planned for the beginning of 2020-s it is to be postponed for 10 years. Bled has together with other Alpine destinations of the Julian Alps and the Triglav National Park (Gorje, Bohinj, Kranjska Gora, the Soča Valley – Kobarid, Tolmin and Bovec, Radovljica, Jesenice and Žirovnica) been working closely for the last four years within the MAB UNESCO Biosphere area of Julian Alps. The destinations are developing joint tourism products (such as recently opened Juliana Trail – encircling the Triglav National park, to ease the pressure on the mount Triglav itself; joint ski pass, cycling trails, etc.) and strongly build on the local identity and natural & cultural heritage conservation, aiming to target environmentally sensitive and affluent travellers, who bring more added value and spend longer in the whole area. The partners have been recently preparing a development plan with the aim for tourism in the area to become short-term the first industry without single use plastic (and single use articles), and long-term transformation into circular economy. Bled already has many best cases in this respect (zero waste municipality, zero waste festivals, zero waste hotel).

There is a need at Bled for a structured process, in which Bled would define the carrying capacity in some of the hotspots within the destination, and further, to define what activities the destinations would like to pursue in certain locations, in order to preserve nature, biodiversity and livability at Bled.

4.2 Case study 02: Divača

Divača is a small municipality in classical Karst region of Slovenia, with 4,000 inhabitants and only 26,000 overnight stays (of which 90% are made by foreign visitors), 60 tourist beds and with a UNESCO site Škocjan caves (200,000 visits annually, which is only a fifth of the visit of the Postojna cave).

The Divača municipality holds the bronze Slovenia Green label, indicating the destination's compliance with requirements defined by the Green Scheme of Slovenian Tourism (GSST). The destination is underdeveloped in terms of tourism infrastructure and tourism supply, and still struggles with basic public infrastructure. They strive for visitors who would stay longer in the destination, but do not dispose of adequate offer and infrastructure. The destination does not have its own tourism organisation (only a developmental agency) and is currently in the process of preparing a joint strategy and organisation with three neighbouring Karst destinations (JZKK, 2018).

The Park Škocjan Caves are a show case of careful and strategic management of the cave (and the whole protected area of the regional park), which remains a more boutique cave in comparison to the Postojna cave. In 2019 they put a system in place, which limits the number of people visiting the cave at one time (from 300 to 130) and enables visitors to make an on-line reservation of the time slot (until 2019 there were only two entrances a day, with two to three hours waiting time in high season, as of autumn 2019 visit will be every half an hour).

They also expanded the parking lots (in the vicinity, with shuttles). The park management is aware of the shortcomings of the destination's lack of tourism offer, and is financially stimulating new ideas in the area.

According to the head of development at Divača Municipality Zdenka Hreščak (correspondent) the need of the destination is infrastructure and not over-tourism indicators models. She sees the destinations still as hugely underdeveloped, not only tourist-wise, but in general. Also according to director of Park Škocjan Caves Stojan Ščuka (correspondent) they do not have challenges in caring capacities for the cave, but to develop the destination and have a stronger impact on directing the flows of visitors (Mihalič, Kuščer, Novak, 2019).

4.3 Case study 03: Brežice

Brežice is a classical thermal destination, located in the eastern part of Slovenia (the macro destination Thermal Pannonian Slovenia). It has showed a steady, but very slow increase of overnight stays (10% increase from 2008 to 680,000 in 2018). The destination has one strong tourist supplier (Terme Čatež, a big day aqua fun provider and thermal wellness and health resort) and from 2010 another spa, but more boutique thermal supplier Terme Paradiso (which accounts for some 20,000 overnight stays).

The Brežice municipality holds the silver Slovenia Green label, indicating the destination's compliance with requirements defined by the Green Scheme of Slovenian Tourism (GSST). The municipality has an Entrepreneurship, Tourism and the Youth Organisation, but in the area of tourism works more actively through a wider regional destination of Posavje. The region is considered still underdeveloped tourist wise (in terms of supply and demand). The main focus of activities in the field of sustainability is to build on the local identity and develop experiences that would promote spreading the tourism flows across the region, outside the thermal centres (OB, 2017).

The challenge of the destination is not so much in the area of caring capacity, but more on developing competitive tourist products that would be incentives for the visitors at spa centres to explore the region. They also seem to lack concrete sustainability projects, with value for the visitor (Mihalič, Kuščer, Novak, 2019).

4.4 Case study 04: Nova Gorica – Gorizia

The common trans-border Metropolitan zone covers 73,750 inhabitants in a 365 km² area including three municipalities Comune di Gorizia (I), Mestna občina Nova Gorica (Slo) and Občina Šempeter-Vrtojba (Slo) (CoR 2019).

The intensification of the cooperation between the cities in various aspects of development and tourism is still ongoing. The background behind the cross-border character of the area dates back to the end of Second World War, when Gorizia became a part of Italy, whereas Posočje

region and Vipava valley lost its urban center. The idea of developing Nova Gorica (the “new” Gorica city) started to come to life in 1947, with ambitious building plans. With opening up the borders and loss of a big proportion of the old industrial and logistic systems Nova Gorica, together with Šempeter and the Italian Gorizia the cities needed to find a path to shape its new identities. The challenges in the gambling industry forced Nova Gorica (and also its main tourist provider HIT Nova Gorica) to start developing leisure tourism, next to casinos.

As a result of the divide and resulting political history, Nova Gorica and Gorizia, have to overcome significant cross-border obstacles. Destination’s main challenges, next to overcoming cross-border obstacles, lie in developing competitive tourism product that stretch beyond the city, into its green surroundings, and together with neighbouring destinations in Vipava Valley, Brda and Gorizia (there is cultural cooperation taking place, but not in tourism promotion – the destinations of Gorizia and Nova Gorica do not work as one or towards one destination). According to the Green Coordinator and Director of Tourist Association of Nova Gorica Dejana Baša the destination does not have challenges in exceeding caring capacities – not even in one of the most frequented hill over the City Sabotin (some 70,000 visitors annually). The decrease in casinos’ visits in the city decreased the daily visitors to the city from some 2,000-3,000 to 1,000-2,000. The needs of the destination is to be more competitive in managing the flows within Vipava Valley and also cross-border.

The establishment of the EGTC

The three municipalities established an EGTC (European Grouping of Territorial Cooperation) in 2011 in order “to overcome difficulties in developing and managing territorial cooperation activities under different national legislation and procedures” (CoR 2019). The EGTC is active in shaping a shared strategy of urban development, representing the needs of the three communities, and active in operating across the entire cross-border area. Pilot Project 1: The “Isonzo – Soča” aiming at developing an integrated cross-border network of cycling and walking which is linked to the specific objective (SO 3.1) “Conserving, protecting, restoring, and developing natural and cultural heritage” of the cooperation programme (CP) Italy-Slovenia. This cross-border urban park aims at improving attractiveness for tourists and visitors and at the same time improving sustainable mobility for both visitors and residents. Another important implementation project is the “EGTC GO Cross-border Public Urban Mobility Plan” aiming at removing obstacles for developing an integrated urban transport network.

Pilot Project 2: Establishment of a network of cross-border health services

The project intends to contribute to the specific objective 4.1 of the Cross-border Cooperation Programme, which aims to strengthen the capacity for institutional cooperation through the mobilization of public authorities and the main operators of the area so that joint solutions to common needs are planned.

Specifically, in fact, the proposal promotes the strengthening of the offer and the improvement of the quality of a series of social and health services for the population residing in the area of the EGTC GO and in the cross-border areas of competence of the public bodies involved.

Pilot Project 3: Gorizia – Nova Gorica – Šempeter-Vrtojba railway junction (not yet financed, see Gorizia 2019a)

The goal of the project idea is to revitalize the “GORIZIA RAILWAY NODE – NOVA GORICA – ŠEMPETER-VRTOJBA to foster sustainable transport systems in the field of freight transport in a coherent and coordinated context for the purpose of economic stimulation of the area and for the railway structures of the Sdag-Vrtojba train station.

Intensification of other kinds of cross-border initiatives

In recent years there have been an increasing number of other cross-border initiatives and projects, also with regards to culture, such as Alpe Adria Puppet Festival 2019. The two cities also aim to both become “Cultural City of Europe 2025” which will hopefully contribute to creating a capacity for attractiveness from a tourism point of view that can increase GDP in Gorizia, Nova Gorica, Friuli Venezia Giulia and Slovenia. This less formal type of cross-border cooperation manifests an intensification in cooperation with regards to management of tourism.

4.5 Tailoring of the methodology to the case studies

The needs analysis of the stakeholders of the project at hand outlines the first focus points and consideration to take into account in the case studies. It will guide the drafting of the case study handbook, ensuring that all such needs are addressed properly. The handbook is prepared prior to the launch of the case studies and will at a later stage be used as a basis to develop the general methodological guidance document as an output of the project. An outline of the foreseen handbook structure is presented in Figure 4.1.

Figure 4.1: Methodology handbook for measuring carrying capacity

<p>Methodology handbook for measuring carrying capacity in tourist destinations</p> <ol style="list-style-type: none">1. Purpose of measuring carrying capacity2. Characteristics of carrying capacity relevant aspects3. Methodology step-by-step<ol style="list-style-type: none">a. Destination needsb. Causal loops between tourism and territorial contextc. Measurement of tourism effectsd. Aggregation and measuring of carrying capacitye. Policy recommendations4. Process documentation5. Feedback to the methodological development6. Annexes <p>List of indicators and data sources</p>
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Source: Consortium

While section 1 consists of a general introduction and outline for information purposes, section 2 will outline the potential relevant aspects gathered through the project stakeholders as a first

focus point for each individual case study. Subsequently these focus points will be detailed by destination stakeholders.

The core part of the handbook consists of describing the methodology and the specific actions to address the destinations needs in section 3. In order to safeguard a tailor-made adaptation the nominated stakeholders in the four destinations (selected key-stakeholders) are first consulted in order to identify a customized list of stakeholders representing different organizations in the destination (organizations being involved in tourism, being affected by tourism, etc.) which will result in a case study specific stakeholder map. For that purpose a specific questionnaire has been developed (draft see annex A.2 to streamline -stakeholder interviews covering 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. The case study team will rely on a mix of methods including desk research (secondary data provided in reports and policy documents) and field research for collecting primary data in the course of interviews, informed meetings and telephone consultations depending on the availability of the set of stakeholders.

Building on the knowledge gathered from the interviewees and their tourism expertise, the case study teams will create the systemic picture of tourism impacts tailored to each destination. The relevant impact factors can be identified as a basis for defining the relevant indicators. The task is done independently by the case study team, however will be verified by the regional stakeholders in combination with the defined indicators.

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 data collection exercise is aiming at **(a)** collecting and harmonising tailored statistical and structural data (including national and regional statistics, Green scheme data, ETIS data, etc.) and where not available back it up with big data and **(b)** collecting information about visitation and if applicable overcrowding. This includes both qualitative and quantitative data of different sources. The data collected is recorded in a data grid (see annex A.3), including additional information on estimated data and estimation methods as well as an indication of lacking data. The list has to be understood as a “wish list”. Some of the suggested data is not available for free and therefore only available if for example the lead stakeholder (Ministry of Economic Development and Technology in Slovenia) is providing access to data being used in the Tourism 4.0 project, i.e. automatic traffic counters at the highway, WIFI access, mobile data access). Territorial information gathered can furthermore be visualised as presented in section 2.

Identified indicators and corresponding data sources will be inserted in the indicator matrix and subsequently discussed with destination stakeholders as identified by the stakeholder mapping,

This will include the definition of optimums and thresholds, based on policy goals in the destination as well as stakeholder judgement. The consolidated indicator matrix filled with indicators, corresponding data on the status quo and identified thresholds, as validated by the stakeholders can be prepared by the case study team. The critical sectors threatened by tourism pressure thus can be identified and provide the basis for the final step,

The results of the measurement of carrying capacity and corresponding pressure levels will be reflected in the validation workshop. Workshop participants will include the relevant stakeholders of the destination, additionally external tourism experts can be contacted as well as they might aid in the interpretation of patterns and formulation of policy responses. Based on the feedback from the validation workshop, the case study team then can draft policy recommendations clearly outlining the addressee, the recommended actions and the timing (i.e. short, medium or long-term depending on the pressure levels). All results will be summarised in a concise case study report, including process documentation. The structure of this report will be provided as an element of the methodology handbook.

4.6 Participative character of the project and the methodology

Providing a methodology for carrying capacity and an application of this methodology in case studies which should result in specific policy recommendations requires involvement of relevant stakeholders. First of all, at the very outset of the project, the project team collects the general needs of relevant different types of stakeholders at different governance levels with regards to challenges in tourism, overall policy objectives. These should guide experts in development and refinement of the methodology for carrying capacity. A side-effect of this consultation will be awareness-raising of stakeholders about the ESPON project which shall hopefully raise their interest for the results.

Secondly, involvement of specific stakeholders relevant to the case study region is foreseen as a part of the methodology. In order to be transferable and yet capable of providing tailor-made recommendations, the methodological steps are general while instructions are given how they shall be adjusted to the case study regions. One element of this adjustment involves considering the policy objectives, needs and challenges in the region which, next to a desk research, can be effectively collected through consultations with relevant stakeholders. Furthermore, the involvement of stakeholders is necessary when draft results are available. The methodology foresees a joint validation workshop in order to discuss the steps and the results of the application of the methodology in case studies. This ensures that stakeholders understand the outcomes as well as have an opportunity to exchange with experts and develop a better understanding about how to use these results for policy-making. It also increases their ownership of the results.

All relevant outcomes of the project will be formulated in an accessible way in order to be able to disseminate them among various types of stakeholders after project's closure.

4.7 Policy recommendations

The project will take the opportunity to provide different types of recommendations with respect to measuring and maintaining carrying capacity and applying the developed methodology. General recommendations to the methodology should be differentiated from specific policy recommendations which will result from case studies.

The first type of policy recommendations will be generalized strategic policy guidelines for carrying capacity which will be derived from recommendations provided in each case studies. The starting point for these recommendations will be specific tailored recommendations for each case study region. Whenever possible, project team will generalize derived recommendations for different types of destinations characterized by specific challenges, needs and territorial characteristics, similar to case study destinations from which the recommendations originate. This will ensure that the output of the project is not only a transferable methodology but also specific recommendations that can inspire policy makers in similar destinations. In addition, recommendations will be differentiated and specifically formulated for stakeholders at EU, national and regional/local level.

Furthermore, the project will also culminate in general recommendations concerning the methodology, ways of improving the application of the developed methodology as well as collecting data and making sustainable use of the results. These recommendations will be directed at all kinds of actors including:

- Stakeholders: with regards to use of the methodology and collection of data and cooperation with statistical offices as well as making use of the results;
- Statistical offices: especially with regards to data collection and cooperation with stakeholders with regards to the data they need;
- Scientific community: concerning the need for further research with regards to facilitating the measurement of carrying capacity;
- European institutions: with regards to the ways of supporting destinations in capturing and managing carrying capacity.

The recommendations will be formulated in a clear and concise manner. Each target group will be able to easily identify which set of recommendations is relevant for them. The differences between the types and the topics of recommendations will be made evident and explicit in order to prevent confusion.

5 Workplan until delivery 2

Delivery 2 will include the following elements:

- The finalised overview of the stakeholders political objectives and policy needs
- The final results of reviewing existing methodologies
- The methodology for measuring carrying capacity as applied in the case studies
- Interim results of the case studies, including visualisations
- A first draft of guidelines and policy recommendations

Tasks	Dec.	Jan.	Feb.	March	Apr.	May	June
1 Identification and critical review of existing methodologies for measuring the carrying capacity of tourist destinations and models for management of visitors							
1.1 Identification of existing methodologies	[Blue bar from Dec to Jan] D1						
1.2 Coordination effort with stakeholders	[Blue bar from Dec to Jan]						
1.3 Critical review of existing methodologies	[Blue bar from Jan to Feb] D1						
2 Development of a methodology for measuring tourist capacity for each different type of stakeholder's territory							
2.1 Measuring sustainability in tourist destinations	[Blue bar from Dec to Feb]						
2.2 Development of the methodology	[Blue bar from Jan to March]						
2.3/ 2.4 Methodology Handbook	[Blue bar from Feb to April] D2						
6 Project management and management of deliveries							
6.1 Kick off Meeting	[Blue bar from Dec to Jan]						
3 Steering Group Meetings	[Red square SG1 in Jan]						
3 ESPON Outreach events	[Blue hourglass in March]						
6.2 Preparation and organisation of deliverables	[Blue bar from Dec to June] D1 D2						
6.3 Project controlling	[Blue bar from Dec to June]						
6.4 Project close-down	[Blue bar from Dec to June]						

 Deliveries to ESPON EGTC
  Internal delivery - contributions to ESPON EGTC Deliveries
  Steering group meetings
  ESPON Outreach event

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Annex

- A.1 List of suggested indicators for measuring tourism's carrying capacity
- A.2 Interview grid
- A.3 Data grid

A.1 List of suggested indicators for measuring tourism's carrying capacity

Study	Strengths	Weaknesses	Potential degree of applicability	Suggested indicators ³
Jurado et al. (2012)	Carrying capacity assessment : 24 indicators (9 physical, 9 socioeconomic, 6 social)	<ul style="list-style-type: none"> – 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	<ul style="list-style-type: none"> – Focus on cities – Data availability/collection effort 	Medium	2. arrivals (absolute value and percentage change)
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	3. average length of stay
European Union (2016); European Commission (n.d.)	<ul style="list-style-type: none"> – 43 core indicators – Supplementary indicators for specific types of destinations – Slovenia as one of the case studies 	Data availability/collection effort	High	4. tourism revenues
González-Guerrero, Robles, Pérez, Ibarra, and Martínez (2016)	<ul style="list-style-type: none"> – Overview of the carrying capacity studies – Evaluation of visitor management models 	NA	Low	5. share of tourism contribution to GDP
Green Destinations (2017)	<ul style="list-style-type: none"> – 6 main themes – 100 criteria 	Data availability/collection effort	Medium	6. occupancy rate
McKinsey & Company and World Travel & Tourism Council (2017)	<ul style="list-style-type: none"> – 9 metrics for a diagnostic development – 5 tactics with specific sets of actions 	Focus on cities	High	7. number of bedspaces available in commercial accommodation establishments (absolute value and percentage change)
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	8. share of Airbnb bedspaces
				9. distribution of bedspaces
				10. distribution of demand (seasonality)
				11. tourism density
				12. tourism intensity
				13. percentage of same day visitors to total number of visitors
				14. CO ₂ emissions (during traveling to/from and at the destination)

³ Based on the literature review on carrying capacity of tourism destinations.

Study	Strengths	Weaknesses	Potential degree of applicability	Suggested indicators³
University of St. Gallen (2017)	– 6 steps for understanding visitor flows	NA	High	15. waste production per tourist night compared to general population waste production per person (kg)
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	16. water consumption per tourist night compared to general population water consumption per resident night
Peeters et al. (2018)	– 6 indicators of overtourism – Applicable to various types of destinations – Bled as one of the case studies	NA	High	17. energy consumption per tourist night compared to general population energy consumption per resident night
Roland Berger (2018)	– Quality versus quantity – 4 proactive measures (short term, mid term, long term) – 3 reactive measures	Focus on cities	Medium	18. closeness to airports, cruise ports and World Heritage Sites
UNWTO (2018, 2019)	– 11 strategies – 68 measures	– Focus on cities – Data availability/collection effort	Medium	19. negative TripAdvisor reviews
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	20. overall satisfaction of visitors and residents with tourism
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	

A.2 Interview grid

- (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?

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

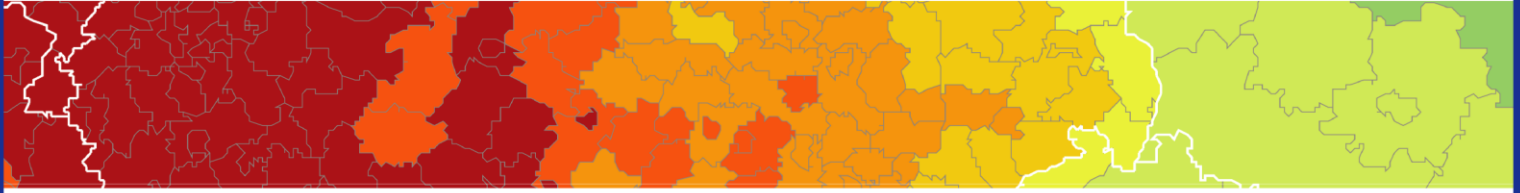
A.3 Data grid

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 case study 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.

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. Skočjanske 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
Primary data sources	Interviews, questionnaires, etc.	Commercial



ESPON 2020 – More information

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