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## ***Carrying capacity at sensitive cultural heritage sites***

**European Expert Network on Culture and Audiovisual (EENCA)**



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## Summary

Recently, there has been a rapid tourism growth in various destinations across the EU Member States. However, with this dramatic growth there has also been challenges for sensitive cultural sites and the preservation of intangible cultural heritage. The most common challenge is overtourism which can lead to overcrowding, destruction of cultural heritage, environmental degradation, visitor and local resident's dissatisfaction. Overtourism is also closely linked to the concept of carrying capacity of a specific geographic area. This concept, in turn, finds its origins in studies on the preservation of natural habitats of wild animals. However, the findings of said studies are nonetheless applicable to cultural heritage and intangible cultural heritage sites nowadays. Carrying capacity concerns the maximum number of tourists which can be accommodated within a specific site and challenges related to this are often tackled through capacity planning. The planning of the carrying capacity of a geographic area includes considerations for the maximum amount of visitors that can make use of the site without impacting/jeopardizing the environment or causing dissatisfaction among local residents and other visitors.

The focus of carrying capacity studies has changed throughout the years. Initially, these took into consideration the environmental and infrastructural capacities of areas, while later on the social component was included. In the late 20<sup>th</sup> century new carrying capacity models focused more on the acceptable limits of changes caused by tourism in certain areas, as opposed to the maximum number of visitors. This led to a greater significance of participatory planning – planning in cooperation with local communities and other tourism development stakeholders. Recently, carrying capacity models have aligned with the sustainable tourism development discourse, which focuses on meeting the needs of the current generations without compromising those of future generations.

This report outlines different carrying capacity models used throughout the years within the pillars of sustainable development in tourism – the **economic, socio-cultural** and **environmental**. The various models vary from the environmental carrying capacity approach of the 1970s to the most recent model of managing overtourism in urban destinations.

These can further be divided in two main groups – **diagnostic models** and **implementation models**. The former relates to identifying the acceptable limits of usage of a specific tourism area (e.g. national park, cultural heritage site, etc.), while the latter is based on qualitative and quantitative indicators for planning and managing tourism.

The general overview of the concept of carrying capacity, different models and their development throughout time is followed by examples of cases of sensitive cultural heritage sites. The Historic Centre of Bruges (Belgium), which is a part of the UNESCO World Heritage Site, has become one of the most visited tourist destinations in Flanders and has been faced with growing number of tourists arriving in recent years. Consequently, all of the implications of overtourism have led to the necessity to adopt measures which mainly relate to the efficient management, regulation and limitation of supply or demand. The report discusses in detail the specific measures taken. Cinque Terre (Italy) is another cultural heritage site faced with overtourism issues due to its popularity amongst tourists.

Moreover, the report provides two examples of intangible cultural heritage cases. Intangible cultural heritage such as oral traditions, social practices, rituals, and many more are of great significance for preserving and maintaining cultural diversity in the face of globalization. In Belgium, shrimp fishing on a horseback is a form of traditional craftsmanship closely connected with nature. This craft is passed on within families from generation to generation and this is why there have been efforts to preserve these practices. In Finland, the Finnish Sámi Parliament adopted guidelines for Culturally Responsible Sámi Tourism. The reason behind this measure is that often tourism stakeholders with no connection to the Sámi community and culture utilise different elements from it.

In order for cultural heritage sites and intangible cultural heritage to be preserved, problems relating to carrying capacity have to be diagnosed. This can be done using objective quantitative data on acceptable carrying capacity limits and subjective qualitative data which is based on local and tourist perceptions or value judgements on such limits. In this report, we have identified that the optimal approach in diagnostics is to use both objective data and subjective perception and aligning these to the three pillars of sustainability: economic, social and environment. Within the economic pillar the two most important indicators to be included are growth indicators and seasonality indicators. The most relevant diagnostics within the social pillar include the concentration of demand and supply and the satisfaction of both local residents and tourists. Lastly, within the environmental pillar diagnostics should evaluate indicators such as the quality of the environment, air quality, waste management and transportation. Furthermore, in addition to the three pillars of sustainability, consideration should also be given to the political participatory pillar due to its increasing importance in recent overtourism and anti-tourism debates. Indicators to be analysed within this pillar include participation of the local population, political support for development and media perception.

The report is concluded by a recommendations and implementation chapter. While implementation actions would be different in accordance with the specific characteristics of each site, in this report implementation measures are summarised in several groups:

- Implementation measures **for improving awareness and communication** with different stakeholders;
- Implementation measures in the field of **efficient management**;
- Implementation measures related to **development of infrastructure**;
- Implementation of **regulation measures** related to conservation and protection;
- Implementation measures for **limitation of supply or demand**.

Within the first set of measures, potential actions include: raising awareness, promotion of lesser known sites, etc. Regarding efficient management, measures could include improving the quality of services, redistribution of visitor flows, entrance fees and/or additional charges, and so on. Implementation measures relating to development of infrastructure are highly important and would involve the improvement of waste management and destination transport accessibility, introduction of sustainable transportation infrastructure, etc. Regulation measures would focus on the active collaboration between sensitive cultural site management and policy makers. Lastly, for example, limitation of the number of organised tours at sensitive cultural sites could be implemented as a measure for the limitation of supply or demand.

# 1 Introduction

## 1.1 Background EENCA

The European Expert Network on Culture and Audiovisual (EENCA) was established in December 2015 by a consortium of Panteia and iMinds-SMIT (VUB) on behalf of DG EAC of the European Commission.

With a view to improving cultural and audiovisual policy development in Europe, the main objectives of EENCA are:

- To *contribute* to the continuous development of cultural and audiovisual policies by providing high-quality analysis and advice to the European Commission, and enhancing the in-depth understanding of the European Commission's services to culture and the threats and opportunities faced by the cultural, creative and audiovisual sectors.
- To *promote* decision-making informed by solid, evidence-based and data-driven research, being of a descriptive, analytical, evaluative, and prescriptive nature regarding relevant topics in the field of culture and the audiovisual sector; and being of a comparative nature, including expertise covering different sectors, policy areas, and territories.

For these purposes a multi-disciplinary network of leading European experts on culture and of the audiovisual industry was set-up. The Core Expert Team exists of 14 high-level experts who were carefully selected to cover a wide thematic, sectoral and geographical range. The Core Expert Team is complemented by a solid team of 16 associated experts and forms part of a comprehensive international network.

EENCA will engage in the analysis of the cultural and creative and audiovisual sectors' and policies. The main guiding questions are: what has happened, what is happening, and what will happen at local, national and European level, why is it happening, and how can we improve cultural and audiovisual policy development in Europe?

## 1.2 Request for services

If not appropriately managed, visitor numbers can pose a risk to cultural heritage sites, the local communities, and the surrounding environment. During the European Year of Cultural Heritage, a lack of a pan-European overview on the existing knowledge base regarding overtourism was identified. Therefore, the European Commission has commissioned research on carrying capacity at sensitive sites.

The research includes a comprehensive mapping and literature review of carrying capacity at sensitive sites and is reflecting existing findings on intangible cultural heritage associated with them.

The study was conducted within the framework of the deliberations and recommendations of the Sustainable Cultural Tourism OMC Group.

## 2 Carrying capacity models: An overview

In recent years, dramatic tourism growth has created new challenges for numerous tourism destinations, including sensitive cultural sites and intangible cultural heritage. Overtourism may cause overcrowding, environmental degradation, destruction of cultural heritage, visitor dissatisfaction and the dissatisfaction of local residents (Becker, 2017; Butler, 1996; Carrell, 2017; Coldwell, 2017; H., 2017; K.S., 2017; McKinsey&Company & WTTC, 2017; Simpson, 2017; UNWTO, 2017; Weber et al., 2017). Such negative impacts of tourism have given rise to an array of new terms, such as 'overtourism' (excess of tourists) and anti-tourism (organised opposition to tourism). However, these seemingly new challenges and terms sometimes obscure the fact that the acceptable tourism limits or carrying capacities of tourism have been under discussion for more than 50 years (Dredge, 2017).

Early research tackling the carrying capacity challenge revolved around planning. Capacity planning is a widely used technique that mainly deals with the spatial (and temporal) concentration of tourism. This is the main challenge that many sensitive culture sites experience nowadays. Those sites simply have high concentration of tourists in a limited geographic area (example of Cinque Terre in Italy). So "carrying capacity" is actually advising on the maximum number of tourists that can be accommodated within a specified geographic area (O'Reilly, 1986, p. 254). The planning of carrying capacity thus refers to the maximum number of people that can use the space without impacting the environment or causing dissatisfaction among local residents or other visitors beyond the acceptable limits (Mihalič & Kaspar, 1996). For example, in the case of Cinque Terre, local authorities decided to define the upper carrying capacity limit in terms of number of tourists that destination can host. Yet, with the development of carrying capacity literature, some important perspectives developed. The first relates to understanding the carrying capacity limits from the perspective of the local population, where maximum capacity is delimited by the number of tourists acceptable to the local population. Another perspective views carrying capacity from the visitors' viewpoint, as overcrowding can negatively impact tourists' satisfaction. So in the case of cultural heritage and intangible cultural heritage sites, this would mean that carrying capacity limits are reached when the perception of local population and tourists are negative or dissatisfying.

The concept of carrying capacity was initially formulated in studies on the preservation of the natural habitats of wild animals. The findings from those studies can easily be replicated in cultural heritage and intangible heritage sites. In the 1960s, carrying capacity was perceived as the maximum number of animals of a certain species in a given natural habitat (Manning, Lime, Hof, & Freimund, 1995). The need to develop a methodology for carrying capacity in tourism initially occurred in American national parks where rising visitor numbers started to affect the environment. Similarly, studies on carrying capacities on cultural heritage and intangible heritage sites were discussed when cases of Bridges Historic Centre, Cinque Terre, Venice Historic Centre indicated that number of tourists started to affect the cultural heritage and local population.

The first studies on carrying capacity in tourism focused on determining environmental and infrastructural capacities with regard to their usage (number of visitors). They underscored the physical component of the carrying capacity of a certain area which

involved the assessment of impacts on nature and/or assessment of the carrying capacity with regard to the existing infrastructure (Butler, 1996). They were based on calculations determining the upper limit of usage, i.e. the maximum number of visitors. Subsequent studies on the topic used dynamic and spatial modelling, simulations, and scenarios for different scopes of tourism usage of a certain area. Those approaches of defining or calculating the maximum number of visitors were also recently applied in certain cultural heritage sites. For instance, Historic Centre of Dubrovnik, due to the high pressure of visitors, set up the upper limit of maximum 4,000 visitors per day.

Studies on natural environments also advised that the acceptable number of visitors also depends on perceptions of overcrowding. As a result, the methodology for understanding the carrying capacity of tourism destinations solely on the basis of the physical component was soon considered insufficient. Therefore, subsequent studies were founded on, or included, the social component (Shelby & Heberlein, 1987). When studying populated areas, the attitude of local communities towards excessive visitor numbers and negative impacts of tourism development on their lives also had to be considered (Bezzola, 1975). This led to the agreement that upper or maximum limit of visitation is not just a number, but also has to include and understand the perception of the local population and their attitude towards tourism, meaning that we have overtourism when locals have enough of tourism. For instance, local residents in Venice Historical Center (cultural heritage site) have protested multiple times against further tourism development. In this case we have an example of anti-tourism not just overtourism, meaning that local population is actively protesting against tourism and has political support for those protests.

By including the social component in the consideration of carrying capacity, the determination of the maximum upper limits of usage of an area becomes a value judgement (McCool & Lime, 2001). It depends on the subjective perceptions of visitors and other stakeholders.

In the 1980s and 1990s, new carrying capacity models came to the fore. They focused on the acceptable limits of changes caused by tourism in a certain area, rather than on upper limits to visitor numbers. Those models can be divided into those that focus on objective diagnostics using hard data, and those that focus on subjective perceptions about tourism development in a selected area (McCool & Lime, 2001; Shelby & Heberlein, 1984). In this respect, greater importance is given to participatory planning, in cooperation with local communities and other tourism development stakeholders.

In recent decades, carrying capacity models and the search for acceptable limits have aligned with sustainable tourism development discourse. Sustainable tourism promotes the creation of environmentally conscious and sustainable models of tourism development. The goal of such efforts is to meet the needs of current generations without compromising those of future generations (WCED, 1987, p. 43). In tourism this is related to the following three key pillars: environmental; socio-cultural; and economic (Edgell Sr, 2016).

Sustainable tourism encourages the development of new and complex carrying capacity models. These models are comprehensive and include various components such as: physical, which can be environmental (nature or cultural heritage site) or infrastructural (infrastructure that can support tourism development); social, from the perspective of tourists and locals; political; participatory; cultural (preservation of intangible cultural heritage), etc. Due to the importance of sustainable tourism in the newest models and

its emerging features in earlier models, this overview of carrying capacity models rests on the conceptual framework of the pillars of sustainable tourism development.

## 2.1 Overview of tourism carrying capacity models

Carrying capacity literature tackles the different aspects of carrying capacity limits in the specific geographic area or critical points. Those different aspects involve:

- *tourist or visitor perception*, which deals with final users' perception the certain geographical area or critical point. This is a subjective perception that includes the feeling of too many people present in a certain space or a feeling of discomfort due to overcrowding.
- *perspective of the local population*, which deals with local perceptions about the tourism development and its impact on their quality of life;
- *political aspect*, which deals with political support for tourism growth and development;
- *culture and heritage aspect*, which explores the impact of tourism development on culture and heritage sites and intangible cultural heritage;
- *participatory aspect*, which deals with the inclusion of local communities, the public and/or other interested stakeholders in tourism development process;
- *economic aspects*, which provides an economic perspective on tourism development, mainly focused on growth and its acceptable limits;
- *infrastructural aspects*, which is connected to issues of infrastructural support and development that can facilitate growth in a certain area;
- *natural aspects*, which discusses the issues of environmental protection and the carrying capacity limits of the natural environment.

In order to understand those aspects better, we have structured and summarised them using the sustainable development framework in table 1. It is apparent that there is a large body of literature dealing with the socio-cultural pillar of development. This body of knowledge developed subsequent to the first studies on carrying capacity limits which dealt with environmental issues and the economic aspects of growth.

**Table 1:** Carrying capacity components within pillars of sustainable development in tourism

Economic pillar	Socio-cultural pillar	Environmental pillar
Economic component related to tourism growth	Local population's perception Tourists' perception Political support Participatory development Culture and heritage protection	Infrastructure development Natural environment protection

In order to provide a detailed overview of the carrying capacity literature development we have prepared Table 2, that contains: name of the model, time of creation and authors of the model, unit of analysis, type of model and aspects/components are included in the model. Those models are not specifically developed for cultural heritage sites and intangible cultural heritage. Yet some of them, specifically models that have been developed in recent years, provided findings that can easily be applied to cultural heritage sites and intangible cultural heritage, since they are dealing with the same challenges as for instance natural sensitive sites.

**Table 2: Overview of carrying capacity models**

YEAR	NAME OF MODEL/APPROACH	AUTHORS	UNIT OF ANALYSIS	CARRYING CAPACITY COMPONENTS WITHIN PILLARS OF SUSTAINABLE DEVELOPMENT								
				SOCIO-CULTURAL PILLAR					ENVIRONMENTAL PILLAR		ECONOMIC PILLAR	
				Tourists	Inhabitants	Participatory component	Political component	Culture and heritage	Infrastructure	Natural environment		
<b>Around 1970</b>	Environmental carrying capacity	Various	National parks, natural areas, archipelagos, projects								<b>x</b>	
<b>1975</b>	Concept of tourism capacity planning	Bezzola	Mountain destinations, Switzerland	<b>x</b>	<b>x</b>	<b>X</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>
<b>1979</b>	ROS (Recreation Opportunity Spectrum)	US Forest Service	National parks, recreational areas	<b>x</b>					<b>x</b>	<b>x</b>		
<b>1984</b>	LAC (Limits of Acceptable Change)	US Forest Service	Wild nature, national parks, subsequent other use	<b>x</b>	<b>x</b>	<b>X</b>			<b>x</b>	<b>x</b>		
<b>1984</b>	Social carrying capacity	Shelby and Heberlein	Primarily national parks, later other destinations included	<b>x</b>		<b>X</b>						
<b>1985</b>	VAMP (Visitor Activity Management Process)	Parks Canada	National parks	<b>x</b>					<b>x</b>	<b>x</b>		

<b>1990</b>	VIM (Visitor Impact Management)	US national park service (Graefe et al., 1990)	National parks at specific locations	x						x	x	
<b>1993</b>	VERP (Visitor Experience Resource Protection)	US national park service	National parks	x	x	x				x	x	
<b>1997</b>	TOMM	Manidit Roberts Consultants	Islands, rural destinations	x	x	x	x			x	x	x
<b>1997</b>	Carrying capacity as a tool of the ICAM system	PAP/RAC., Regional Activity Centre Split	Coastal tourism destinations		x	x	x	x		x	x	x
<b>2002</b>	Carrying capacity of European destinations	Environmental Planning Laboratory of the University of the Aegean, Greece	Coastal areas, islands, protected areas, rural areas, mountain resorts, historical settlements and towns		x	x	x			x	x	x
<b>2002</b>	PAVIM	Farrell, T. A., & Marion, J. L.	Protected areas	x	x					x	x	x
<b>2004</b>	Dynamic model of tourism	Patterson, T., Gulden, T., Cousins, K., & Kraev, E.	Islands		x						x	x
<b>2013</b>	Multiple tourism carrying capacity	Salerno, F., Viviano, G., Manfredi, E. C., Caroli, P., Thakuri, S., & Tartari, G.	Protected natural areas	x						x	x	

<b>2012</b>	DPSIR model of carrying capacity	Castellani, V., & Sala, S. (2012)	Tourism destinations							x	x	
<b>2017</b>	Carrying capacity based on demand attributes	Wang, E., Wang, Y., & Yu, Y.	National parks	x							x	x
<b>2017</b>	Carrying capacity of theme parks	Zhang, Y., Li, X., Su, Q., & Hu, X.	Theme park	x	x					x	x	x
<b>2017</b>	Managing tourism destinations under pressure	Weber, F., Stettler, J., Priskin, J., Rosenberg-Taufer, B., Ponnareddy, S., Fux, S., . . . Barth, M.	Tourism destinations	x	x					x	x	x
<b>2017</b>	Managing overcrowding in tourism destinations	MCKinsey&Company, & WTTC	Tourism destinations	x	x			x		x	x	x
<b>2018, 2019</b>	Managing overtourism in urban destinations	UNWTO, CELTH, NHTV Breda University of Applied Sciences, NHL Stenden University of Applied Sciences	Urban tourism destinations	x	x	x	x	x		x		x

As shown in table 2, not many models are directly tackling cultural heritage and intangible heritage sites, yet as stated above knowledge generated from the existing body of knowledge can be applied on cultural heritage and intangible heritage sites. Based on the above typology of the different components discussed in carrying capacity literature, models can be divided into two groups:

- **Diagnostic models** – these models are used to identify the acceptable limits of usage of a specific tourism area: national park, destination, cultural heritage site or specific cultural/sport event. They are based on objective measures using the quantitative indicators. All of the diagnostic models include carrying capacity components from the environmental pillar of sustainable development and in some of them economic or socio-cultural components were added. Overall, those models are diagnostic in nature and do not provide implementation guidelines, they focus on defining maximal carrying capacity limits per day or m2: examples of Dubrovnik in Croatia or Cinque Terre in Italy.
- **Implementation models** – these models include diagnostic models based on qualitative and also quantitative indicators for planning and managing tourism/recreational/cultural/natural areas. Beside diagnostics those models include implementation activities that can help to overcome carrying capacity challenges. For instance, in the case of Bruges, Belgium local authorities implemented management activities such as higher taxation of Airbnb offer or monitoring of tourism guides offer. This is an example of implementation approach, when beside diagnostics local/regional/national authorities are implementing certain measures to manage carrying capacity challenges.

The first **carrying capacity diagnostic models** started to emerge in the 1970s as **environmental carrying capacity models** (Butler, 1996). They studied the impact of excessive tourism/recreational use on the natural environment and looked at destinations with sensitive natural habitats, such as natural parks (ibid.), river ecosystems (Lee & Chang, 2014) or cave ecosystems (Lobo, 2015). Earlier studies also applied the Environmental Impact Assessment (EIA) methodology in tourism (Duffield & Walker, 1984; Green, Hunter, & Moore, 1990; Rajotte, 1978) to estimate environmental carrying capacity.

In recent decades, we have observed the development of approaches to assessing the ecological footprint of tourism, particularly the carbon footprint. In addition to the environmental component, these approaches take into account the infrastructural component because they tend to explore the impacts of tourism from the perspective of international tourism flows (Gössling, Hansson, Hörstmeier, & Saggel, 2002) or the impact of investments in tourism infrastructure (Cadarso, Gómez, López, & Tobarra, 2016). The ecological footprint of tourism has been studied in diverse destinations, such as archipelagos (Gössling et al., 2002), national parks (Chen, Chen, Chang, & Hsieh, 2014) and also city destinations (Lin, Li, Li, & Xu, 2018). The assessment of the ecological footprint in tourism destinations sometimes rests on the theories of destination life cycle (Cadarso et al., 2016; Castellani & Sala, 2012b). Those models could also be applied in the case of cultural heritage and intangible cultural heritage sites yet they have limited practical values since the focus on environmental carrying capacity.

Conceptual frameworks for destination life cycles have also been applied in studies that used economic models (Lozano, Gomez, & Rey-Maqueira, 2008). Economic models are based on economic theories, such as the chaos theory (S. Cole, 2009) or the economic growth theory (Cerina, 2007; López Bonilla & López Bonilla, 2008; Marsiglio, 2017). These models usually take economic and environmental components into account. One

of the studies (S. Cole, 2009) even incorporated the tourists and infrastructure components.

The last group of diagnostic environmental pressure models consists of sustainable diagnostic models. They comprise complex carrying capacity models that assess the carrying capacity of an area based on various components and a quantitative methodology (Zhang et al., 2017). Some even develop simulations or methodologies for testing different scenarios according to the level of tourism pressure on the environment (Patterson et al., 2004). This group of models would be applicable for sensitive cultural heritage and intangible cultural heritage sites, since it is approaching carrying capacity challenge more holistically and include quantification of all sustainability pillars.

The group of **implementation models consists of models focusing on the social component of carrying capacity, early planning models and advanced planning models**. Early planning models include the concept of tourism capacity planning and the following models: recreation opportunity spectrum (ROS), limits of acceptable change (LAC), visitor activity management planning (VAMP), visitor impact management (VIM), visitor experience and resource protection (VERP), tourism optimization management model (TOMM) and protected areas visitor impact management (PAVIM). Advanced planning models are more recent and they strongly focus on implementation guidelines, discussing not only diagnostic but also critical limits of development.

Implementation models prominently included the social component of carrying capacity. The first attempts to include the social component took place in the 1960s (Butler, 1996). The most famous concept of **social carrying capacity** was developed by Shelby and Heberlein (1984) in the 1980s for natural areas intended for recreational usage. The authors underlined the importance of expectations and experiences of tourists towards overcrowding, as these elements must be considered in effective tourism planning and in order to determine the carrying capacity of an area. In this respect, Shelby and Heberlein developed a model with a **descriptive** and **evaluative** dimension (Shelby & Heberlein, 1987). The first dimension is connected to objective parameters about the impacts of area usage that can be manipulated with planned decisions. The second dimension is based on visitors' subjective assessment of, e.g. the frequency of encountering other visitors. For the model to work, consensus needs to be established about the usage of an area and consensual drafting of parameters among the envisaged stakeholders (Watson, 1988). Findings from those approaches are important for cultural heritage and intangible cultural heritage sites since subjective evaluation of visitors is highly relevant aspect of carrying capacity challenges in those sites.

The expansion of the principles of sustainable tourism development and emphasis on tourism planning shifted the focus of the social carrying capacity methodology from natural areas to other tourism destinations (De Ruyck, Soares, & McLachlan, 1997; Mokry, 2013). This also raised awareness of the social component of carrying capacity, which started to consider the experience of local communities with the effects of tourism (Saveriades, 2000). Social carrying capacity models usually consider the social (and subsequently physical) component, as well as the participatory component. More recent social carrying capacity studies conducted in European city destinations, such as Barcelona, take into account the political component as well as culture and heritage (Alvarez-Sousa, 2018). This approach is holistic and absolutely appropriate for cultural heritage and intangible cultural heritage sites such are Historic City centres in Dubrovnik, Bruges or Cinque Terra.

The multiple tourism carrying capacity model (Salerno et al., 2013) is also considered as a social carrying capacity model because its most visible elements are visitor experiences and the physical component. The multiple tourism carrying capacity (ibid.) model has a strong participatory component and is meant to be applied to protected natural areas. Its complexity, sensible connection between diagnostic and implementation dimension and respect for the sustainable tourism framework make it a good example of an advanced planning model appropriate for sensitive natural area. Subjective criteria regarding the visitors' experience and the changing limits of carrying capacity relative to the consensus between tourism development stakeholders contributed to the development of **early planning models**. Early planning models emerged as approaches to managing natural areas in American and Canadian national parks. They were developed in the form of planning tools and as such they shifted the perception of static limits of capacity to the systematisation of processes in order to achieve the necessary conditions for the development of an area (Stankey et al., 1985). Later they were adapted and applied to other natural areas and areas for recreational usage around the world. Early planning models are: recreation opportunity spectrum (ROS), limits of acceptable change (LAC), visitor activity management planning (VAMP), visitor impact management (VIM), visitor experience and resource protection (VERP), tourism optimization management model (TOMM) and protected areas visitor impact management (PAVIM).

These approaches were developed in order to identify opportunities for the development of recreational and tourism areas and to assess the relationship between human usage and impacts on a certain area. In addition, they enabled the systematisation of steps in determining the acceptable conditions for the selection of adequate managerial strategies (Farrell & Marion, 2002). Though slightly different from one another, early planning models all discuss the limits of carrying capacity, adequate and desired visitor usage and identification of physical impacts resulting from recreational usage. All of them involve the physical and social component of carrying capacity. Quantitative and qualitative indicators support planning for desired conditions and goals (quality standards). The process of achieving results is monitored and assessed (Hof & Lime, 1997). Even though those models are holistic, they have a strong focus on physical or environmental carrying capacity limits and therefore have limited applicability for cultural heritage and intangible cultural heritage sites.

The ROS approach is used to determine the range of development of recreational options in an area while taking into account the environmental and social carrying capacity. The LAC model also uses the class methodology from the ROS model. However, LAC is different in terms of the conceptualisation of participatory processes involving the public and relevant stakeholders in formulating the desired standards (Clark & Stankey, 1979).

The LAC model usually consists of nine (not necessarily consecutive) steps:

- (1) identify issues and concerns,
- (2) develop and describe opportunity classes,
- (3) select indicators for resource and social conditions,
- (4) inventory existing resource and social conditions,
- (5) develop standards required for each opportunity class,
- (6) identify alternative opportunity classes,
- (7) identify management actions for each alternative,
- (8) evaluate alternatives and select preferred alternative, and
- (9) implement actions and monitor conditions (Stankey et al., 1985). LAC later developed in to the VERP model (Manning et al., 1995).

The VIM model resembles LAC in that it can be applied in various environments. However, it is intended for the managerial functions of specific locations and does not focus on regional aspects. VIM is based on the professional assessment of desired standards without the involvement of the public or interested stakeholders (Kuss et al., 1990). The VAMP model focuses on managing daily activities of visitors. It was developed primarily for Canadian national parks (Graham et al., 1988). The TOMM model resembles LAC and VIM. It was developed for Fraser Island, Australia (Manidis, 1997; *TOMM Tourism optimisation management model. Annual Report, 2000*), and later applied to other destinations around the globe (Arnberger et al., 2013; Matt et al., 2015).

The last group of implementation models is called **advanced planning models**. They generally emerged after 2000 when sustainable tourism was already an important concept in scientific research and technical application. They were designed for tourism destinations rather than recreational areas and can be applied to various types of destinations because they typically involve various components and diverse stakeholders (participatory component). Those models are absolutely applicable for cultural heritage and intangible cultural heritage sites.

Carrying capacity in advanced planning models is integrated in a wider conceptualisation of sustainable development in tourism (Coccosis, Mexa, & Collovini, 2002), specific management systems, such as **integrated coastal area management (ICAM)** (PAP/RAC, 1997), or measures for destinations coping with overcrowding, overtourism and anti-tourism (McKinsey&Company & WTTC 2017, Weber et al, 2017, UNWTO et al., 2018 in 2019). All of the above approaches are successful in merging the diagnostic definition of upper limits with dynamic and occasionally participatory planning processes in destinations.

The early model that falls into the group of advanced planning models is that of carrying capacity as a tool of the ICAM system that was developed for coastal destinations in the Mediterranean (PAP/RAC, 1997). It resembles many early planning models because it envisages a participatory decision about up to two development opportunities that condition the definition of carrying capacity. However, it differs from other early planning models in terms of the number of components it considers and the fact that it takes into account the experience of local communities instead of tourists in the social component. It typically attaches great value to the natural, cultural and historical heritage of a destination.

One of the key sustainable models in Europe is the sustainable carrying capacity model of EEA countries. It was devised as part of an international study in the Environmental Planning Laboratory of the University of the Aegean, Greece. It was published in the report *Defining, Measuring and Evaluating Carrying Capacity in European Tourism Destinations* (Coccosis et al., 2002). The methodology followed Shelby and Heberlein's model (1987) and includes (1) an overview of the situation in a destination, i.e. physical, ecological, social, political and economic aspects, and identification of issues and tourism impacts; (2) an assessment of a destination's carrying capacity along with the definition of goals and acceptable (and measurable) impacts connected to planning and managing the destination. The model (Coccosis et al., 2002) sets a conceptual framework for the identification of the key limiting factors for tourism development in various types of destinations (coastal areas, islands, protected areas, rural areas, mountain resorts, historic settlements). Groups of indicators in this model are devised

according to the following carrying capacity components: physical-ecological, socio-demographic and political-economic.

In recent years, we have witnessed the emergence of models, tools and recommendations for tackling overcrowding, overtourism and anti-tourism protests in tourism destinations. Among them are approaches to managing tourism destinations under pressure (Weber et al., 2017), managing overcrowding in tourism destinations (MCKinsey&Company & WTTC, 2017) and the newest approach to understanding and managing overcrowding in urban destinations (UNWTO et al., 2018, 2019). Those models are conceptualising the cutting edge knowledge in the area of carrying capacity and are definitely applicable on cultural heritage and intangible cultural heritage sites.

The first approach (Weber et al., 2017) is based on a comparative study of eleven diverse destinations from around the world. It was published in the report called *Tourism destinations under pressure: Challenges and innovative solutions*. The results of the study show that challenges arise once a destination's carrying capacity is exceeded. The authors outline the principles of successful destination management that focus on the identification of the drivers of tourism growth, factors influencing carrying capacity of a destination, challenges, and solutions. Vienna (one of the cultural capitals in Europe) was one of the cases elaborated within this study finding that city experience challenges of overcrowding in some of the major attractions (including cultural heritage sites) during the high season and peak times.

The second approach (McKinsey&Company & WTTC, 2017) is described in the report *Coping with success: Managing overcrowding in tourism destinations*. It provides a set of tactics for managing and planning overcrowded tourism destinations, a diagnostic tool for overcrowding in city destinations and an overview of good practices. The report defines **overcrowding** as a complex phenomenon that causes alienation of local residents, degradation of the tourist experience, overloaded infrastructure, damage to nature and threats to culture and heritage. The tool details a methodology for assessing overcrowding on the basis of a five-point scale and comparative values of indicators.

McKinsey's indicators (MCKinsey&Company & WTTC, 2017) are divided into the following groups:

- overall context (indicators: tourism share of GDP and employment, growth in tourist arrivals)
- alienated local residents (indicators: number of visitors per square kilometre, number of visitors per local resident)
- degraded tourist experience (indicator: share of "poor" or "terrible" reviews among top attractions on TripAdvisor)
- damage to nature (indicator: annual mean PM10 particulate concentration)
- threats to culture and heritage (share of top 20 TripAdvisor attractions that are historic sites)
- over-loaded infrastructure (indicators: difference between incoming flight seats between high and low months, share of reviews limited to top 5 attractions on TripAdvisor).

The approach and indicators proposed by MCKinsey&Company & WTTC (2017) are suitable for measuring carrying capacity in cultural heritage and intangible cultural heritage sites.

The newest guidelines to prevent overtourism in urban destinations were also proposed by the UN World Tourism Organization (2018, 2019) and its partners: CELTH, NHTV Breda University of Applied Sciences and NHL Stenden University of Applied Sciences. In the form of two reports entitled *Overtourism?: Understanding and Managing Urban Tourism Growth beyond Perceptions*. Both reports define overtourism as a new term for existing concepts in managing overcrowding and carrying capacity of destinations.

The first report (UNWTO et al., 2018) devises a conceptual framework for overtourism and suggests broad-based guidelines for tackling challenges and grasping tourism growth opportunities in urban destinations. The guidelines take the form of 11 strategies and 68 measures. The strategies revolve around spatial and temporal dispersal of tourists, development of new paths/attractions, improvement of regulations, promotion of greater visitor segmentation, ensuring that local communities benefit from tourism, creation of experiences that bring together local residents and tourists, improving infrastructural capacities, involving local stakeholders and tourists in the implementation of measures, developing measures for monitoring and tackling challenges. Proposed measures are applicable for cultural heritage and intangible cultural heritage sites.

The second report 'Overtourism'? Understanding and Managing Urban Tourism Growth beyond Perceptions Volume 2: Case Studies, is a collection of 18 case studies examining strategies to tackle overtourism in 18 urban destinations around the globe (Amsterdam, Antwerp, Barcelona, Berlin, Besalú, Cambridge, Dubrovnik, Edinburgh, Gent, Hangzhou, London, Lucerne, Macao, New York, Lisbon, Seoul, Porto, Prague and Venice – some of those are destinations with important cultural heritage and intangible cultural heritage offer. The studies show that successful strategies have a strong link with the actual situation in the destination and that there are no uniform solutions for every destination. Challenges in destinations, such as spatial and temporal overcrowding, poor mobility, insufficient infrastructure and services, loss of the destination's authenticity and negative impact on everyday life, are all interconnected.

Even though carrying capacity literature developed from natural protected areas and evolved towards tourist destinations the latest literature is tackling cultural heritage sites and is discussing both overtourism and anti-tourism challenges that these sites are already or may experience in the future. Those studies are proposing both diagnostics and implementation measures that can be applied. Those are reflected in summarised in chapter 4 of this report.

## 3 Cases of sensitive cultural heritage sites

### 3.1 Cultural heritage sites

#### **Belgium - Bruges Historic Centre**

Bruges is the capital and largest city of West Flanders, a Flemish region of Belgium. The historic city centre of Bruges is a UNESCO World Heritage Site and is considered to be one of the best preserved medieval towns in Europe (Visit Bruges, 2018). The unique reputation of Bruges has turned the city into one of the most visited tourist destinations in Flanders (Visit Flanders, 2017). Bruges has been experiencing a record number of arrivals in the past 10 years. (Westtoer & Proximus as cited in Nijs, 2017).

In Bruges, most of the tourism activities take place in the confined Egg Market (Eiermarkt). The highest concentration of sites, attractions, accommodation and catering facilities is in an even smaller area, the so-called "Golden Triangle". Consequently, pressure is most visible in this area (Nijs, 2017). Due to the high concentration of visitors, overcrowding and mobility problems often arise. Cruise tourists and group tourists form the core of the problem. It has been pointed out that further increase in the number of arrivals may lead to conflict between residents and tourists (Nijs, 2017). The Port of Zeebrugge receives more than 150 cruise ships and 300,000 passengers annually. Besides cruise tourists, the port operates several ferry lines across the channel to England. As Zeebrugge is mainly a transit port, cruise tourists spend only a few hours in the city, resulting in no or minimal contribution to the local economy. The number of cruise tourists is expected to grow further in the near future (Port of Zeebrugge, 2017). One of the most significant economic implications is the rising value of real estate and the increasing costs of living (Nijs, 2017). It has been reported that the medieval cityscape is slowly changing and the high number of souvenir stores and chocolate and beer shops has led to annoyance amongst the residents (Papp, Postma & Koens, 2018).

The measures taken in relation to the historic centre of Bruges mainly relate to the efficient management, regulation and limitation of supply or demand. The first significant measures were taken in 1996. The so called "concentration model" was put in place in order to release pressure on the outskirts of the city by forcing all tourism related developments to take place within the "Golden Triangle" (Neuts & Nijkamps, 2012). A hotel stop was implemented in order to protect the liveability of the city and to ensure affordable homes for the locals (WES, 2012), and Airbnb owners are obliged to pay tax on their services, just like other official accommodation providers (Flanders Today, 2015). Only licensed tour guides can operate in the city. In order to attract the right target market, Bruges' marketing strategy focuses on specific segments such as high-end cultural tourists or families. Furthermore, certain events are strategically organised in the shoulder months (WES, 2012).

#### **Italy - Cinque Terre**

Cinque Terre, an 18-km stretch of rugged and rocky coastline, is famous for the five small picturesque villages that cling to the steep hillside overlooking the sea. The area was declared a UNESCO World Heritage Site in 1997, for its man-made landscape (Korey, 2017). Tourists are mainly attracted by the picturesque atmosphere of the villages, the extensive hiking trails that connect them, and the stunning landscape. Around 75% of overnight stays are made by international tourists (Ministero

dell'Ambiente, 2017). The nearby cruise ship port of La Spezia facilitates the increase of one-day visitors (Parco Nazionale delle Cinque Terre, 2014).

Overtourism issues in Cinque Terre are more visible during the summer months, because of the increase in one-day trips from nearby coastal tourism destinations and the large numbers of cruise tourists (Cotroneo, 2017). All five villages are affected. Also, the narrow hiking paths between the rocks that connect the villages, are under heavy pressure (Faccini et al., 2015). The major issue in terms of overtourism is the pressure exerted by the overcrowding of visitors on a delicate and small portion of territory, also affected by geomorphological risk (due to its hillside waterfront position and multiple human interventions) (Calandri, 2016). Services for residents have been disappearing in favour of services for tourists (Parco Nazionale delle Cinque Terre, 2014). Over the years, the hiking paths have fallen into disrepair from erosion and overuse (Baker, 2018). Issues related to water supply during summer and waste disposal have been reported for some time (Bartolini, Peppalepore, Panerai, & Panico, 2004). Facilities and infrastructure are under pressure and the physical co-location of the villages does not leave scope for interventions aimed at increasing their carrying capacity (Calandri, 2016; Coggio, 2018). This has led to a widespread concern among locals and authorities about how to cope with overcrowding tourism and a rapid degradation of the landscape and living conditions (Mose, 2016).

The measures taken in relation to conservation of Cinque Terre as a sensitive cultural heritage site mainly relate to the improvement of awareness and communication, and efficient management and development of infrastructure. For decades, the concerns about the impacts of (over)tourism have been on the agenda of the local authorities, and their actions have always been sustainability-oriented, with appreciable results in terms of environmental conservation (Bartolini et al., 2004). Nevertheless, those good practices and intentions, which are still shaping the management plan of the national park area (Parco Nazionale delle Cinque Terre, 2016) clash with the relentless increase of visitors that undermine the effectiveness of the adopted policies. For this reason, in recent years the focus has shifted to how to decrease, if possible, the number of visitors, with the intention of applying a cap of 1.5 million visitors per year (compared to the current 2.5 million). The idea has been termed "unfeasible" and "just a provocation" by the President of the National Park (Korey, 2017), saying that instead, a more intelligent management of tourism is needed. For example, local authorities installed "counting systems", which enables the determination of the number of people on specific routes in real time. A mobile application (app) was developed, which tourists can download to see the number of people on the routes in real time, see when a path is overcrowded, and decide if they want to join (Baker, 2018). The aim is to increase awareness of overcrowding, but so far there is no evidence for their effectiveness in better managing the tourism flows.

### 3.2 Intangible cultural heritage

Cultural heritage does not end at monuments and collections of objects, but also includes traditions or living expressions inherited from our ancestors and passed on to our descendants, such as **oral traditions, performing arts, social practices, rituals, festive events, knowledge and practices concerning nature and the universe** or the **knowledge and skills to produce traditional crafts**.

While fragile, intangible cultural heritage is an important factor in maintaining cultural diversity in the face of growing globalisation. An understanding of the intangible cultural

heritage of different communities helps with intercultural dialogue, and encourages mutual respect for other ways of life.

The importance of intangible cultural heritage is not the cultural manifestation itself but rather the wealth of knowledge and skills that is transmitted from one generation to the next. The social and economic value of this transmission is relevant for minority groups and for mainstream social groups within a State, and it is as important for developing States as for developed States.

Intangible cultural heritage is:

- **Traditional, contemporary, and living at the same time:** intangible cultural heritage does not only represent inherited traditions from the past but also contemporary rural and urban practices in which diverse cultural groups participate;
- **Inclusive:** we may share expressions of intangible cultural heritage that are similar to those practiced by others. Regardless of geographical origin or process of adaptation and evolution, they all form part of the intangible cultural heritage. They have been passed from one generation to another, have evolved in response to their environments and contribute to our sense of identity and continuity, providing a link from the past, through the present, and into the future. Intangible cultural heritage does not intersect with issues of whether certain practices are specific to a culture. It contributes to social cohesion, encouraging a sense of identity and responsibility which helps individuals to feel part of one or several communities and to feel part of society at large;
- **Representative:** intangible cultural heritage is not merely valued as a cultural good, on a comparative basis, for its exclusivity or its exceptional value. It thrives within communities and depends on those whose knowledge of traditions, skills and customs are passed on to the rest of the community, from generation to generation, or to other communities;
- **Community-based:** intangible cultural heritage can only be heritage when it is recognized as such by the communities, groups or individuals that create, maintain and transmit it – without their recognition, nobody else can decide for them that a given expression or practice is their heritage.

The Intangible Cultural Heritage means “the practices, representations, expressions, knowledge, skills – as well as the associated instruments, objects, artefacts and cultural spaces – that communities, groups and, in some cases, individuals, recognize as part of their cultural heritage. This intangible cultural heritage, transmitted from generation to generation, is constantly recreated by communities and groups in response to their environment, their interaction with nature and their history, and provides them with a sense of identity and continuity, thus promoting respect for cultural diversity and human creativity”. (Article 2, 2003 Convention for the Safeguarding of the Intangible Cultural Heritage).

Several challenges exist regarding intangible cultural heritage:

- There is a lack of understanding as to what intangible cultural heritage is and how it differs from tangible heritage;
- There is a lack of funding to support the safeguarding of intangible cultural heritage;
- There is a lack of concrete policy to address the issue of intangible cultural heritage.

Industrialisation, urban development, the expansion of mass tourism and the standardisation of lifestyles in towns and villages and of the various forms of knowledge and skills all constitute a context which places intangible cultural heritage in a vulnerable position. Intangible cultural heritage is a “living heritage”, the idea of which is not to preserve rigidly entrenched age-old practices, but rather to enable them to develop and evolve, and to encourage practices that are embedded in contemporary society and interact with other cultures.

The following case studies provide examples of where measures have been taken to ensure the preservation of intangible cultural heritage practices.

### **Belgium - Oostduinkerke horse fishermen**

Shrimp fishing on horseback is a form of traditional craftsmanship closely connected with nature: good knowledge of the sea and the sand strip and a high level of trust and respect for the horse, are essential. These fishermen fish in the sea with horses and net, looking to catch shrimp just off the coast. The craft has evolved through history and has adapted to the changing social, cultural and ecological contexts. Shrimp fishing is essentially a practical activity, which means that the most important method of passing it on is by practicing the craft on the beach. An experienced horseback shrimp fisherman teaches the beginner and demonstrates the techniques to him/her. Since knowledge is often passed on within households, families teach their children at a young age how to handle the horse in the specific conditions that the craft requires.

A whole series of practices, artefacts and instruments are connected to this traditional craftsmanship, which is supported by the households and families of the shrimp fishermen and, by extension, by the community of Oostduinkerke and Koksijde as a whole. **Efforts to preserve these practices** and share them with the wider public include workshops for net making/repair and events where shrimp fishing plays a role, such as the ‘Shrimp Festival’. It is a paradigmatic example of a **dynamic and sustainable approach to nature and to culture** that is transmitted from generation to generation.

### **Finland - Culturally Responsible Sámi Tourism**

In cooperation with the Sámi community, the Finnish Sámi parliament has produced community guidelines for Culturally Responsible Sámi Tourism. The process was funded by the Ministry of Education and Culture and the Finnish Sámi Parliament. During the project discussion and stakeholder engagement also took place with the national and regional tourism organisations.

In Finland, Sámi tourism may be tourism based on Sáminess, i.e., tourism service providers come from within the Sámi community. However, there also exists tourism utilising Sáminess, i.e., when tourism stakeholders from outside the culture with no connection to the Sámi community utilise different elements that are connected to Sámi culture. The development of symbols of the Sámi culture has been taking place in this way for decades. The commodified Sámi image in tourism utilising Sáminess rarely has much to do with authentic Sáminess.

The main objective of the Culturally Responsible Sámi Tourism project was **to develop ethical guidelines from the Sámi point of view in order to ensure the development of a socially, culturally and ecologically sustainable Sámi tourism product and presentation in Finland.**

## 4 Diagnostics of carrying capacity limits for sensitive cultural heritage sites

Carrying capacity literature is closely connected with overtourism and anti-tourism phenomena. What is clear from the current body of knowledge is that problems with carrying capacity can be diagnosed using:

1. objective quantitative data on acceptable carrying capacity limits and
2. subjective qualitative data based on local and tourist perceptions or value judgements on acceptable carrying capacity limits.

**The optimal approach in diagnostics is to use both objective data and subjective perception along three pillars of sustainability: economic, social and environmental.**

Based on the literature presented above, diagnostics within ECONOMIC PILLAR should include growth indicators and seasonality indicators. If we have significant growth of tourism supply or demand over time, sensitive cultural heritage sites can experience challenges related to carrying capacity limits. Seasonality is also related to tourism carrying capacity problems, specifically if most of the tourism demand is concentrated within a specific time frame. In order to indicate carrying capacity problems within the economic pillar based on the carrying capacity literature review, we propose the following approaches to diagnose acceptable limits of carrying capacity:

### **ECONOMIC PILLAR**

- **Demand growth indications:** average yearly growth rate of number of visitors or tourists (compound annual growth rate - CAGR) over a five-year period. The growth rate is a basic quantitative indicator. For example, if the number of visitors at a sensitive cultural site increases by more than 10% yearly over the five year period, it means that management needs to take action. Growth is not a negative indication per se, and the critical limit of growth depends on the specific situation. What is important is that demand is measured, monitored and management actions implemented if required.
- **Supply growth indications:** Supply growth usually follows demand growth and it can be measured using the quantitative indicators such as average yearly growth rate of guides who transmit intangible cultural heritage to visitors (compound annual growth rate - CAGR) over the five-year period of average growth rate of souvenir suppliers over the five-year period. Supply growth rates also have to be monitored and managed. An extensive growth of for instance new guides can affect the narrative and quality of experience transmitted to visitors.
- **Seasonality indications:** Seasonality is a long-term challenge. In tourism the seasonality index can be measured as a share of visitors, tourists or overnights in the top two months, compared to yearly number of visitors, tourists or overnights. At the sensitive cultural site level it can be calculated as the number of visitors in the busiest hour compared to number of daily visitors. It is important to measure and understand seasonality as a time and spatial concentration pattern. If most of the visitors visit a cultural site within a few hours (for example between 10am and 2.pm) than management measures must be implemented to avoid potential carrying capacity challenges.

Carrying capacity challenges must also be monitored within the social pillar. The most relevant diagnostics within the social pillar are related to concentration of demand and supply, satisfaction of local residents, and satisfaction of tourists. Diagnostics of carrying capacity in the social pillar should take account of the following factors:

### **SOCIAL PILLAR**

- **Concentration of demand:** Concentration should be measured as the number of tourist/visitors/overnights per m<sup>2</sup> or per local resident. Concentration can also be measured as a share of comments on TripAdvisor for the 5 top attractions. Concentration is a result of continuous growth and is highly relevant indicator of carrying capacity in a certain cultural heritage site.
- **Concentration of supply:** Similar to the case of demand, concentration should also be measured on the supply side as number of operators, number of guides per m<sup>2</sup>, km<sup>2</sup>, or resident.
- **Satisfaction of local residents** is a highly important indicator related to carrying capacity limits. Local residents' satisfaction with tourism development is a value judgement of local residents perception and satisfaction with tourism development in a certain area. If local residents perceive more costs than benefits of tourism development, then this specific site or geographical area can experience potential carrying capacity challenges. Local residents' perception is measured within the primary research, by collecting the data on subjective perception about sensitive cultural heritage site development or intangible cultural heritage presentation. Specific questions on overcrowding are included and measured. Those studies are highly important since overtourism is reached when local residents perceive more negative than positive impacts from tourism and have enough of tourism.
- **Satisfaction of tourists** is another aspect that has to be incorporated into diagnostics of carrying capacity limits. It is highly relevant to know if tourists have a feeling of lack of space due to a high concentration of people at sensitive cultural heritage sites, or if tourists sense that intangible cultural heritage is being presented in a way customised for visitors. If either of these apply, then the limits of carrying capacities are tested and management activities have to be taken.

The next pillar that must be monitored is the environmental pillar. Within this pillar, diagnostics should evaluate the indicators described below.

### **ENVIRONMENTAL INDICATORS**

- **General evaluation of the quality of the environment** is a subjective perception of stakeholders on environment quality and possible degradation due to tourism.
- **Air quality** as an important environmental indicator and is usually measured with PM 10 level. Tourism is absolutely not the only contributor to air quality levels, but high tourism activity is associated with increased use of transport and so has indirect impact on air quality in the certain area.
- **Waste management** measured as kg of waste per resident or visitor or potentially, as a share of waste in the top two months compared to annual levels. Tourism is significantly related to waste production and monitoring waste management is important for reducing the environmental pressure specifically if the location is experiencing extensive amount of garbage in public areas.
- **Transportation** infrastructure is an essential part of the tourism offer. Quality of transportation can be measured as a perception of transportation quality

among the stakeholders, or quantitative indicators, such as number of parking places per resident or tourist; average waiting time for parking, etc.

In addition to the three pillars of sustainability, the political participatory pillar should be considered as well. This pillar is not always clearly communicated within the carrying capacity literature, yet it is present in several models and is becoming quite important in recent overtourism and anti-tourism debates. The following aspects of carrying capacity can be covered in this pillar.

#### **POLITICAL PARTICIPATORY PILLAR**

- **Participation** of local population can be measured as participation in tourism or % of residents working in tourism or in tangible and intangible cultural heritage sites. This can also be a subjective indicator of how willing the local population is to participate in (or support) the tourism development.
- **Political support** for development is another important aspect. Political support in this sense should be understood broader. For instance, groups of organised locals supporting the sensitive presentation of intangible cultural heritage is a form of political support as well as is a group of local residents actively protesting towards further tourism development (case of Venice, Barcelona etc.).
- **Media perception** is evaluation of media coverage about cultural heritage or intangible cultural heritage site. Media perception can be positive or negative and can also emphasise the challenges of overtourism and anti-tourism.

Carrying capacity challenges usually happen at critical areas or geographical points and in a specific time frame. The diagnostics of acceptable carrying capacity limits is crucial to inform management actions. Yet we have to keep in mind that there is no one size fits all solution, since each case has unique attributes.

## **5 Recommendations and implementation**

The diagnostics of carrying capacity limits form an essential step prior to making recommendations and implementing actions. Implementation will differ according to the specific characteristics of each site. In this report we reflect of existing implementation measures used globally and summarised them in following groups:

- Implementation measures **for improving awareness and communication** with different stakeholders;
- Implementation measures in the field of **efficient management**;
- Implementation measures related to **development of infrastructure**;
- Implementation of **regulation measures** related to conservation and protection;
- Implementation measures for **limitation of supply or demand**.

The first set of implementation measures aims to improve awareness and communication with different stakeholders and inform them about the potential weaknesses and threats related to carrying capacity limits. Possible implementation measures include: organisation of public lectures and informing the local population about sensitive cultural sites; raising awareness and informing tourists about the sensitive cultural site; promotion of lesser known cultural sites and reducing pressure on popular sensitive cultural sites or intangible cultural heritage, etc. Communication

and awareness raising are efficient tools in the early phase of dealing with carrying capacity challenges.

Management measures involve active management to overcome carrying capacity challenges. Measures include: improving the quality of services; redistribution of visitor flows; introduction of entrance fees or additional charges for protection of sensitive cultural sites; introduction of smart devices monitoring the number of visits over certain periods of time etc.

The development of additional infrastructure is highly important but is often beyond the scope of site management. Measures in this field include improving parking infrastructure, improving destination transport accessibility, improving waste management, introducing sustainable transportation infrastructure such as bikes and e-bikes etc. There are also infrastructural solutions related to expansion of offer on broader area and providing more services (this is usually related with development of new infrastructure) in order to disperse visitors and reduce the overcrowds.

Measures in the field of regulation involve active collaboration between sensitive cultural site management and policy makers. Implementation measures can include: active collaboration in development of transport infrastructure (public transport and parking); active collaboration in spatial planning; regulations tackling sustainable mobility (trains, bikes, e-cars); regulation of the sharing economy; regulation of guide services etc.

The last set of implementation measures is limitation of demand or supply. This is implemented in the case when serious problems with carrying capacities are observed. Measures related to limitation include: limit to the number of organised tours (busses) per day at the sensitive cultural heritage site, limit to the number of daily visitors to sensitive cultural heritage sites, limit to the number of guides. Those measures are perceived as aggressive and are to be implemented if carrying capacities are absolutely overreached. Sites that are properly managed and have appropriate infrastructure do not come to the point when demand or supply limitation is needed.

## 6 Conclusion

Sensitive cultural heritage or intangible cultural heritage sites can experience carrying capacity challenges when they reach or exceed acceptable carrying capacity limits. If this happens a diagnostic of carrying capacity limits is required, as well as implementation of specific measures to mitigate the carrying capacity limits. Diagnostics should include evaluation of economic, socio-cultural, environmental and political-participatory components. If the exceeding of acceptable carrying capacity limits is diagnosed, then measures should be implemented in order to reduce the risk of overcrowding, environmental degradation, destruction of cultural heritage, visitor dissatisfaction and local dissatisfaction.



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## 8 About the authors



Ljubica Knezevic Cvelbar holds a PhD in economics. She has published more than 40 journal papers to date, most of them in top tier scientific journals. She serves as Editorial Board Member for 6 tourism journals including top journals such as: Journal of Travel Research, Journal of Sustainable Tourism and Tourism Economics. Knezevic has been invited to present her work at approximately 30 universities internationally. Her work won several national and international awards, most notably the international Sinclair Award for the best paper published in Tourism Economics in 2016, 2019 and University of Ljubljana Best Research Paper Award in 2018. She has strong industry links and was one of the key experts writing the Strategy for Tourism Development in Slovenia 2017-2023. She was also advisor to several international organisations including the United Nations Development Program (UNPD) and the German International Help Program (GIZ).

### **Martin Clarke**



Martin Clarke holds a degree in International and European Law, where he specialised in European Union law. At Panteia, Martin has carried out several studies in relation to European culture, and he is an assistant coordinator of the EENCA network. He has contributed to the Study to inform the Preparatory Action on Music in Europe 2018-2020 and to an impact assessment on the implementation of a 'sub-programme for culture' within a successor programme to the Creative Europe programme 2014-2020. Martin is currently involved in the MME studies on the feasibility of a European Music Observatory and on market trends and gaps in funding needs for the music sector.

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Amber van der Graaf has been working at Panteia since early 2012 where she works primarily on international studies. She has an interdisciplinary academic background, combining the areas of politics, media, international relations and culture. Projects have included studies on social policy relating to working life and work-life balance, education, sports and culture, as well as studies on (inclusive) entrepreneurship, media and communications. She has worked on a European evaluation of provisions of the Audiovisual Media Services Directive, and has also conducted the study for the European Parliament on Communicating Europe to its Citizens, which had a strong communication and cultural component in order to explore the concept of "Europe". Amber works on areas relevant to DG EAC's activities, including two studies for the European Parliament, on early school leaving and the Erasmus+ programme.