

Report on the most appropriate indicators related to the basic concepts



Smart Cultural Tourism as a Driver of Sustainable Development of European Regions

Deliverable
D4.1



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 870708

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Petrić, L., Mandić, A., Pivčević, S., Škrabić Perić, B., Hell, M., Šimundić, B., Muštra, V., Mikulić, D., & Grgić, J. (2020). *Report on the most appropriate indicators related to the basic concepts. Deliverable 4.1 of the Horizon 2020 project SmartCulTour (GA number 870708)*, published on the project web site on September 2020: <http://www.smartcultour.eu/deliverables/>



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No.870708

Deliverable D4.1

Title: Report on the most appropriate indicators related to the basic concepts

Due date: August, 2020

Submission date: September, 2020

Approved by Leader of Work Package: Dr Lidija Petrić, Full professor, WP Leader (FEBT Split)

Type: Report

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- | | | |
|-------------------------------------|------------|--|
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A bstract

SmartCulTour project aims “*to propose and validate innovative, community-led interventions directed at sustainable cultural tourism development contributing to the EU regions’ resilience and inclusiveness*”. Among several priorities, the objective number two strives to “*establish an improved indicator framework for cultural tourism impacts on sustainability and resilience and link these to an improved Tourism Area Life Cycle (TALC) model*”.

Within the work package (WP) 4, several tasks dedicated to the fulfilment of this objective have been outlined. This report reflects on **Task 4.1. Identification of the indicators related to the basic concepts** defined in WP2.

To deliver our conclusions, a systematic review of relevant literature, related to the concepts of sustainability, resilience and cultural tourism has been conducted. Particular reference was paid to the indicators most often used to measure these concepts. Additionally, the Report contains a review of the Tourism Area Life Cycle (TALC) - related literature. The conclusions of the TALC analysis will have an important role in the delivery of further tasks within this WP. With regard to each analysed concept, a proposal of the prospective methodology to be used in the Deliverable D4.2 is given, with the aim to create Sustainability-Resilience-TALC framework for cultural tourism destinations.

The report contains four sections, including the *introduction*; the *methodology* section – outlining the process of systematic review; the *analysis* section – delivering the overview of indicators related to fundamental concepts and guidelines for the selection of relevant indicators, including the *conclusion* after each part of the analysis, pointing out main findings; and *reference* section. At the end of the report there is also an Annex containing tables with elaborated sources of literature retained after primary selection based on relevant data bases.

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01 Introduction

The main objective of the SmartCulTour project financed by the *EC Horizon 2020 Research and Innovation Framework Programme* is to propose and validate innovative, community-led interventions directed at sustainable cultural tourism development contributing to the EU regions' (especially peripheral ones) resilience and inclusiveness. With that regard, the project focuses on (1) development of new and/or upgrading of the definitions of previously mentioned key concepts; (2) identification and testing of a framework of sustainability and resilience indicators (SRT Framework) and a Decision Support System (DSS) for measuring and monitoring cultural tourism and its impacts; (3) testing and presenting innovative and creative tools for stakeholder engagement in sustainable cultural tourism development.

Given the primary goal of this project, several objectives have been outlined, including the *objective No. 2* striving to “*establish an improved indicator framework for cultural tourism impacts on sustainability and resilience and link these to an improved Tourism Area Life Cycle (TALC) model*”.

To accomplish this objective and thus contribute to the overall project's goal fulfilment, within WP4, several tasks have been outlined, including:

- Task 4.1. Identification of the indicators related to the basic concepts
- Task 4.2. Identification of relationships between cultural tourism destination's sustainability and/or resilience indicators and the TALC model
- Task 4.3. Developing the SRT framework

This report, delivering **task 4.1.**, aims to identify critical indicators related to the basic concepts addressed in WP2, with particular reference to task 2.1 (see Matteucci & Von Zumbusch, 2020). The mentioned concepts are focused on measuring the impacts of cultural tourism development on tourism destinations, i. e. their sustainability and taking into account the position of the destination in the TALC, thus enabling destination stakeholders to plan, monitor and evaluate tourism development.

The conclusions are drawn from a systematic review of relevant literature, related to the concepts of sustainability, resilience, cultural tourism, and cultural tourism destinations. Particular reference was paid to the indicators most often used to measure these concepts. Additionally, the Report contains a review of the Tourism Area Life Cycle (TALC) - related literature. The conclusions of the TALC analysis will have an important role in the delivery of further tasks (4.2. and 4.3) within this WP.

02 Methodology

This section of the report briefly outlines the overall methodology of the analysis of literature related to key concepts to identify the most relevant indicators.

The report employed a systematic review approach. Systematic approaches for conducting reviews adopt a replicable, scientific and transparent process to minimise bias through complex literature searches (Transfield et al., 2003), aiming to identify all research addressing a specific concept. The fundamental characteristic that differentiates systematic literature review from other types of analysis concerns the methodological procedures involved in the synthesis of findings, providing unbiased searches with a high degree of efficiency and quality (Liberati et al., 2009).

To deliver a systematic review of relevant literature related to the main concepts we follow the guidelines proposed by Nightingale, (2009), taking into account the multiple limitations in the design, organisation and execution of the process in tourism studies, extensively discussed by Pahlevan-Sharif et al. (2019). To minimise the selection bias in the analysis we include a PRISMA (Liberati et al., 2009) flow diagram (Figure 1), with clearly defined selection criteria, the way studies were identified and the overall plan of the analysis. The specific keywords, as well as the exact number of retained publications in different stages of the process are outlined in the brief introduction of each of the subsections, namely, 3.1. Sustainability, 3.2. Cultural tourism, 3.3. Resilience, and 3.4. TALC.

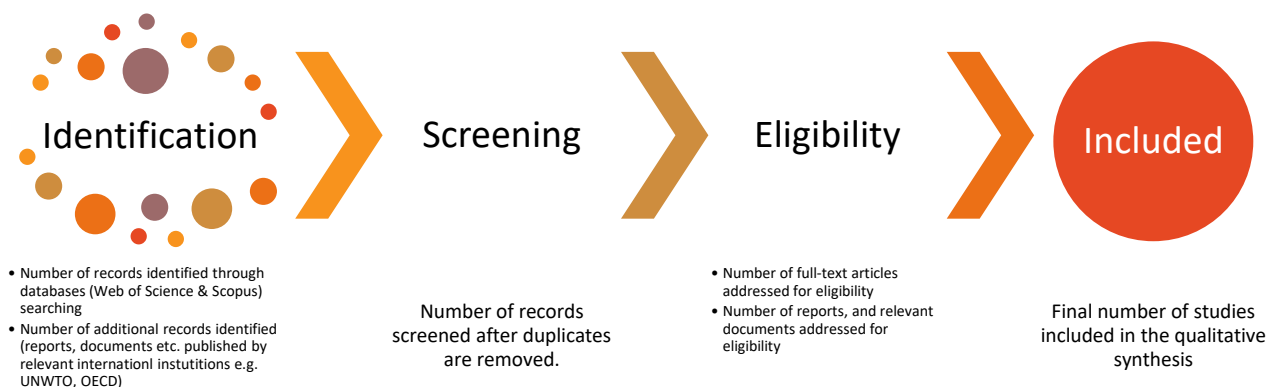


Fig 1. Flowchart illustrating the selection procedure of the systematic literature review based on PRISMA protocol

Given the scope of the task, we follow the suggestion by Rasoolimanesh et al. (2020) to retrieve in the report only full-length journal articles and book chapters published in Web of Science (WoS) and/or Scopus indexed journals and books. Additionally, given the contribution of relevant regional and international organisations, such as the United Nations (UN), UN World Tourism Organisation (UNWTO), UN Educational, Scientific and Cultural Organization (UNESCO), European Union (EU), and Organisation for Economic Co-operation and Development (OECD), , to the development of the concept of indicators, we extend the bibliometric analysis to include their relevant reports too.

03 Analysis

3.1. Sustainability of cultural tourism destinations

The global importance of sustainable tourism was acknowledged in 2017, that was proclaimed by the United Nations (UN) as the International Year of Sustainable Tourism for Development, "making tourism a catalyst for positive change". This declaration positioned tourism as a tool to advance the universal 2030 Agenda for Sustainable Development (Boluk et al., 2019: 3). However, such a claim needs to be met with critical thinking (Boluk et al., 2019), especially in light of the fact that UN 2030 Agenda for Sustainable Development resolution only mentioned tourism three times - in the context of natural resources use and conservation, employment generation and the promotion of local culture and products and sustainable use of marine resources to increase the economic benefits to small island developing states and least developed countries (Hall, 2019:3).

Despite a focus of attention, studies have demonstrated that the "global" sustainability of tourism development is questionable (Higgins-Desbiolles et al., 2019). Furthermore, at the local scale, concerns regarding the tourism contribution to sustainable development have also become an issue following a series of high-profile adverse reactions to tourism growth in destinations such as Barcelona, Venice, and Dubrovnik. Therefore, they have become incorporated into broader policymakers' response to the supposed "success" of tourism (Hall, 2019:3). In a recently published perspective article on tourism and its role in sustainable development, Sharpley (2020) particularly addresses these sustainable tourism concerns and emphasises sustainable degrowth as a path to individual and societal well-being on the global scale. The author suggests that many destinations are and will remain dependent on tourism as an economic sector. Furthermore, he acknowledges the need to rebalance tourism on a global scale, which requires rethinking of both the production and consumption of tourism. Higgins-Desbiolles et al. (2019: 17) offered a more radical approach suggesting that tourism should be reclaimed from an industry that has defined it as a business sector for their profit accumulation, to a human endeavour based on the rights and interests of local communities in welcoming tourists. The authors suggest that current conflicts related to overtourism in many, among other cultural tourism destinations, are a wake-up call. The United Nations World Tourism Organisation (UNWTO) (2018: 5) states that measures to "reset" tourism on a local scale cannot focus only on altering tourist visitor numbers and tourist behaviour, but should also focus on local stakeholders, which is in the core of SmartCulTour project with this deliverable included.

The section 3.1.1 of this chapter (3.1.) outlines the primary sources from which the indicators related to sustainability of (cultural) tourism destinations retained in the final framework, were drawn. The chapter ends with the concluding remarks (section 3.1.2) in which the authors illustrate the weighting process as an approach selected for the development of the cultural destination sustainability framework of indicators.

The analysis encompassed full-length research and review papers and book chapters published in journals, books and edited volumes between 2000 and 2020, indexed in Web of Science Core Collection. Additionally, official reports and publications of relevant international organisations (UN, UNWTO, OECD, EU) have also

been considered. A keyword search of the title, abstract and keywords was conducted using the terms *sustainable tourism*, *tourism destination*, *indicators*. The initial search (April 2020) resulted in 223 research papers identified. The initial screening resulted in 99 studies being retained for further analysis. An in-depth eligibility screening of each of these studies resulted in 26 of them being retained for inclusion in the final report. Additionally, 4 reports and documents published by relevant international institutions have been retained and included in the analysis.

Table 1 (Annex) summarises the indicators used in the retained publications, divided, due to the scope of the project, into the four broad categories, namely, *environmental*, *economic*, *cultural* and *social* indicators.

3.1.1. Indicators proposed by relevant international organizations

European Tourism Indicator System (ETIS) (European Commission, 2016)

The indicators were developed as an extension of the work of the Tourism Sustainability Group. They have been piloted, reviewed, tested in over 100 destinations, and have been fully revised. The core indicators included in the dataset gather the essential, key or baseline information any destination needs to understand, monitor, and manage its performance. The 43 indicators cover the fundamental aspects of sustainability monitoring and provide the basis for effective destination management. They also allow for comparison over time and for benchmarking between destinations. The indicators are designed to address: *destination management*, *economic value*, *social and cultural impacts*, and *environmental impacts of tourism development*. Along with the core indicators, ETIS provides additional indicators focused on *beach and maritime destinations*, *urban and cultural destinations*, *cruising destinations*, *recreational boating destinations*, *nature and ecotourism destinations*, and *several pilot area-specific indicators* which might be used.

Considering the focus of this project, and for reasons of brevity, we only provide the list of specific cultural tourism destination-related indicators from the ETIS project (Table 2, Annex). The 43 core indicators can be found in the ETIS documentation and have been considered, together with the additional indicators, in our final selection of sustainable cultural tourism indicators.

Indicators of Sustainable Development for Tourism Destinations (World Tourism Organization, 2004)

This Guidebook has been produced to help tourism managers obtain and use the best information possible in support of better decision-making regarding sustainable development for tourism. Indicators are proposed as crucial building blocks for sustainable tourism and as tools responding to the issues most important to tourism destinations' managers. While the primary focus of the Guidebook is at the destination level, some attention is also given to indicators that focus on issues at a broader scale, either on regional or national level, particularly as they may affect destinations. Reference is also made to the site or enterprise-specific issues, also tending to affect the sustainability of both tourism operators and respective destinations.

Sustainable tourism development guidelines and management practices are applicable to all forms of tourism in all types of destinations, including mass tourism and the various niche tourism segments. Sustainability principles refer to the environmental, economic and socio-cultural aspects of tourism development, and a

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suitable balance must be established between these three dimensions to guarantee its long-term sustainability.

The indicators proposed focus on following challenges: the *wellbeing of host communities, sustaining cultural assets, community participation in tourism, tourist satisfaction, health and safety, capturing economic benefits from tourism, protection of valuable natural assets, managing scarce natural resources, limiting impacts of tourism activity, controlling tourist activities and levels, destination planning and control, designing products and services, the sustainability of tourism operations and services.*

Although we have accounted for the UNWTO (2004) full list of sustainability indicators that are applicable across destinations and tourism types, considering the focus of this project, the report emphasises sustaining cultural assets indicators (Table 3, Annex).

Indicators of sustainable development (United Nations, 2007)

The newly revised Commissions on Sustainable Development (CSD) indicators contain a core set of 50 indicators. These core indicators are part of a more extensive set of 96 indicators of sustainable development.

The indicator set retains the thematic/sub-thematic framework that was adopted in 2001, encompassing: *poverty; governance; health; education; demographics; natural hazards; atmosphere; land, oceans, seas and coasts; freshwaters; biodiversity; economic development; global economic partnership; and consumption and production patterns.*

OECD Environmental Indicators Toward Sustainable Development (OECD, 2001)

The core set of about 50 indicators, covers issues that reflect the main environmental concerns in OECD countries. It incorporates major indicators derived from sectoral sets as well as from environmental accounting. Indicators are classified following the pressure-state-response (PSR) model: indicators of environmental pressures; indicators of environmental conditions; indicators of society's responses. In addition, OECD sets of sectoral indicators focus on specific sectors. Indicators are classified following an adjusted PSR model: sectoral trends of environmental significance, their interactions with the environment and related economic and policy considerations.

The environmental indicators cover climate change, ozone layer depletion, air quality, waste, water quality, water resources, forest resources, fish resources, biodiversity. Socio-economic indicators cover GDP and population, consumption, energy, transport, agriculture, expenditure.

Studies not included in the analysis, however, might contribute to delivering SRT framework

- *Cernat & Gourdon (2012) have selected the indicators based on assets, and following normalisation have created a composite indicator for each asset. The indicator values are used to compare different destinations.*
- *Ko (2005) used the general method of ecosystem description and assessment (AMOEBA) of tourism sustainability indicators (ATSI). This approach is appropriate when explaining the sustainability of individualised tourism indicators. The main purpose of this model is not to see if a tourist destination is doing better than others are, but if it is doing well on its own. The inter-destination comparison*

might be achieved if the destinations are similar, and the indicators used the same.

- Lee & Hsieh (2016) develop an indicator system for sustainable wetland tourism. They use fuzzy Delphi method to determine key dimensions and indicators and following the analytic hierarchy process to examine the relative weights of these dimensions and indicators. To determine the weights, they have created a panel of 22 experts, and have conducted the survey. Following the AHP methodology, they have constructed a matrix by using a proportional scale from 1 to 9 to compare pairs of weights.
- Navarro Jurado et al. (2012) deliver a carrying capacity assessment for a tourist destination. The methodology uses synthetic indicators and proposes specific indicators and thresholds to deliver carrying capacity assessment.
- Rio & Nunes (2012) deliver a framework of indicators for monitoring tourism development in rural destinations. The authors adopt the six relationships of natural resources, community and tourism evaluation framework developed by Tsaur et al. (2006).
- Romero-Padilla et al. (2016) discuss the indicators of creativity, which might be helpful for research if someone emphasises creativity as an important aspect in cultural destinations.

3.1.2. Conclusion of the analysis

The literature on sustainability in tourism is very abundant and burgeoning, addressing various aspects of tourism development, management and planning. Consequently, the initial screening of literature has yielded several hundreds of papers, and their number was downsized by using the focused keywords outlined in the introduction of 3.1. chapter. The sustainability indicators identified in the retained documents and included in the final analysis were distributed to four sustainability categories – *economic, environmental, social*, and, given the focus of the project, *cultural* sustainability. This conceptual divide of the notion of sustainability was discussed by Pan et al. (2018). The systematic review presented in Table 2 (Annex) yielded over 500 indicators distributed, unequally, between four notions of sustainability. At this stage, the authors have noticed the lack of cultural-sustainability related indicators. Thus, the decision was made to conduct the systematic review of cultural tourism-related literature (section 3.2), to identify, among others, the appropriate indicators which could be embedded within the framework. The process suggested by Nardo et al. (2008), and Lozano-Oyola et al. (2019) was followed (Figure 2), to deliver a site-specific sustainable cultural tourism framework of indicators.

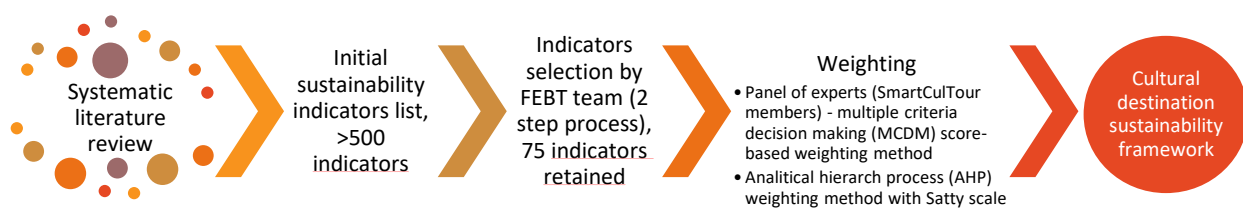


Fig 2. The flowchart illustrating the process of generating the cultural destination sustainability framework

After a detailed literature review, the first selection process of indicators was performed by two FEBTS (Faculty of Economics, Business and Tourism, Split) researchers. The reduction process was based on the goals of the project and following two criteria: (a) the relevance of indicator for cultural destination and

cultural tourism and (b) the possibility of indicator to be collected and applied on a local level to enable the framework testing in Living Labs. Both researchers analysed the whole list independently and selected the indicators. Two files were then compared and discussed. In the final reduced list, only indicators both researchers agreed upon were retained. It should be noted that assigning an indicator to one of the categories is not clear-cut for several indicators within the economic and social category of sustainability. By taking into account multiple options, such indicators were ultimately distributed following the aim and scope of the project and the discussion and agreement among the FEBTS research team. The reduced list consisted of 124 indicators (40 environmental, 37 economic, 35 social and 12 cultural). As suggested by Rasoolimanesh et al. (2020), the list included both objective as well as subjective indicators, with the former prevailing as they are recognized as more rigorous (Mearns, 2012).

In the second round, the FEBTS team agreed-upon criteria which will be used to evaluate the indicators and further reduce the list. The criteria were adapted from Blancas et al. (2010) and Tanguay et al. (2013). The primary criterion was *the relevance of indicator for the planning and management of cultural tourism and cultural tourism destination*. This was due to the scope of the project and this WP. The second criterion referred to the *availability of statistical data* to estimate the indicators in terms of *data source, time* and *spatial coverage*. Thus, FEBTS team members performed the internal rating of the primary criterion and the data collection in line with the secondary criterion. In the rating procedure, each member of the FEBTS team individually rated the proposed indicators on a scale from 1 (low) to 7 (high) regarding the perception of the importance and relevance of indicator for planning and management of cultural tourism and cultural tourism destinations. The average rates and weighted average for each of the proposed indicators, as well as information on data availability (the secondary criterion), were used to deliver the final list of indicators. *The final list of this round consisted of 75 indicators (Table 4, Annex), distributed as follows: environmental (24), economic (23), social (14) and cultural (14) aspect of sustainability.*

3.1.3. Development of the framework of indicators

In general, the systematic review of literature has demonstrated that weighting is the recent and most appropriate technique to select the sustainability indicators to be included in the framework. Gan et al. (2017) provide a literature review of weighting methods used in the empirical papers. They found that almost half of the papers used equal weighting method. This method is appropriate when no theoretical background about the importance of indicators exists. Another group of researches uses statistical-based methods (principal components analysis, factor analysis, etc.), usually named "'objective weighting' methods". Results obtained by using such methods are based on mathematical and statistical procedures (for example, variance and covariance of data). However, the adoption of statistical methods in weighting components of social indices has to be considered carefully because some results might not have any economic relevance (Land et al., 2011).

On the other hand, there are several subjective weighting methods. Most used subjective weighting methods are scoring, ranking and analytical hierarchy process (AHP) method with Satty scale (1990). Considering that the list of indicators we are dealing with is a result of an extensive and systematic literature review, a specific opinion about their relevance is already presumed. Therefore, equal 'indicators' method is not adequate for this research. Also, an additional reason for its rejection stems from the need for grouping indicators into four sustainability categories/groups and several relevant subgroups in each one of them. By using factor analysis, indicators belonging to different categories might be grouped into the same factor irrespective their internal logic. Therefore, in this research, we opt for using one of the subjective weighting methods belonging

to multiple criteria decision making (MCDM) methods. Gao et al. (2018) indicate that these methods lack transferability among different systems. However, this disadvantage may allow us to detect differences in specific groups of sustainability indicators with regards to their weightings.

Notwithstanding the popularity of the AHP method in sustainability research (Lee & Hsieh, 2016; Nesticò & Maselli, 2020), this method does not seem to be adequate in this stage of our process. Namely, since the list of each group of indicators is rather long, the number of comparisons is significantly high¹, i.e. $\binom{n}{2}$. Hence it is very difficult to expect that experts consistently compare all of the indicators. Additionally, index of Consistency Ratio (CR) has to be less than 0.1 to ensure consistency of responses (Song and Kang, 2016), which is why some experts would probably have to change (adjust) their results for several times in order to ensure consistency.

Given this, the step preceding the AHP process of weighting is the evaluation of indicators via scoring method by the panel of experts participating in the project. After evaluating indicators, an adequate weighting method is then employed to get the final, reduced list of adequate indicators, i.e. indicators with the highest scores.

First stage of the analysis

Cui et al. (2019) examined the efficiency of both the scoring and ranking processes. By using the scoring process with a scale from 0 to 10, they concluded that it outperforms the ranking process already at the level of eight indicators being weighted. Given that the number of indicators we are dealing with is significantly higher than 8, the scoring seems a logical choice for performing the weighting process in this stage of our research.

The expert group containing 15 researchers from 5 different Universities, and UNESCO and Visit Flanders (project partners) evaluated a list of 75 indicators. The evaluation of indicators was made bearing in mind the need to test the framework in the living labs at different stage of (cultural) tourism development. Regardless of the fact that the AHP method was not applicable to this stage of research, we formed the hierarchical structure of our indicators in categories and subgroups. Hierarchy structure allows experts to keep consistency in the scoring better than in the case without hierarchy structure (Brugha, 1998). Additionally, in this way we made a structure which would be suitable for Satty's (1990) method after reducing the number of indicators. Satty (1990) decomposes a complex decision-making process into a series of pairwise comparison. After establishing hierarchy structure, experts are focused on the small number of comparisons within each of the groups. Satty (1990) indicates that the most effective way to deal with this is to take a pair of elements and compare them on a single property without concern for other properties or other elements. On the other hand, in the case of a complex decision problem, this method requires a lot of time (Ossadnik et al., 2016).

¹ For example, if number of indicators in a group is 10, it is necessary to get the score of 45 pairs of indicators.

Table 1. The scale of relative preference

Numerical value	Definition	
1	Equally preferred	2, 4, 6, 8
3	Moderately preferred	Intermediate values
5	Strongly preferred	between the two
7	Very strongly preferred	adjacent judgements
9	Extremely preferred	

Source: Satty (1990)

The indicators were analysed on three levels, divided into the four categories, i.e. environmental, economic, social and cultural (Level 1). All categories were further divided into several subgroups (Level 2). The third level encompasses individual indicators. The task of each expert was to rate each of these four categories on the scale from 0 (low) to 10 (high), regarding his/her perception on the importance of each one of them. On the second level experts rated the importance of subgroups within each category while on the third level experts rated the importance of indicators within each subcategory.

Based on the scores obtained by 15 experts, weights for all categories, subgroups and indicators were calculated. If there was a missing data or a field incorrectly filled in, all the other scores given by the expert in the same subcategory have been excluded. However, the exclusion of the missing values hasn't jeopardised the analysis.

Considering that the number of indicators in the list was rather large, and that number of experts who rated the list of the scores was moderate, the results obtained at this stage of the analysis were used for ordering categories, subgroups and indicators by importance. Additionally, we were aware that a number of 75 indicators was too extensive. Therefore, the results of this analysis were used to shorten the list of indicators in a way that those with the lowest ranks were excluded from the list. Also, the authors agreed if two indicators were referring to the same issue or topic, to retain only one better suited (or more precise).

This stage of the analysis yielded two main results; (1) the weights for categories, subgroups and indicators proposed, and (2) substantially shortened list of indicators. The **final list encompassed 46 indicators** reflecting the sustainability of cultural tourism destination development (Table 5, Annex). An in-depth reflection on framework of indicators produced will be given in the paragraph below, following the AHP method.

Second stage of the analysis

The second step of the analysis was to determine final weights for each category, subgroup and indicator. At this stage of the analysis, the AHP method was applied to the reduced framework of indicators to determine weights. The indicators were considered at all three levels. Within each category, subgroup and group of indicators, it was necessary to conduct pair-comparisons to determine relative importance once again. This time, AHP required that the scores reflect mutual agreement, i.e. consensus of experts involved in the scoring process. The scores were determined by the scale of relative preference (Table 2) defined by Satty (1990). Results of the analysis were weights obtained for each category, subgroup within related category and indicators within the specific subgroup, eventually ending up with the final weights obtained as the product of each category's, and related subgroups' and indicators' weights. To deliver the analysis, the number of members of the Expert Group has been reduced to six, as each University was invited to nominate one representative with extensive experience in tourism development planning, sustainability-related projects

and respectful research track. Additionally, UNESCO nominated one expert.

The nominated experts have participated in the first stage of scoring; therefore, their personal opinions regarding the relative importance of specific category, subgroup or indicator were already embedded in results. As previously elaborated, the AHP approach requires a mutual agreement of all expert involved. That means that the experts were supposed first to designate scores, bearing in mind that the coefficient of the consistency is below 0,1. This process is expected to proceed until within each category all subgroups, and following within each subgroup, all indicators are compared among themselves. This is a challenging and time-consuming process, hard to deliver when dealing with 4 categories, 20 subgroups and 46 indicators. Therefore, the expert group from FEBT Split agreed to propose grades following Satty scale based on the weights obtained in the first step of the analysis. The Excel file containing proposed grades for all categories, subgroups and scores was sent to the designated members of the expert group. The file was accompanied by a detailed description of the results and instruction. The experts were given several days to analyse the grades proposed, and to suggest any changes that they considered should be made. During this period, some of the experts have required further explanation, which was provided via email and via zoom meeting. Finally, at the end of the process, a zoom meeting was organised to discuss the proposed changes. The final list of the retained indicators, as well as the weights reflecting the mutual consensus of all expert involved, is presented in the Table 2.

The analysis yielded a comprehensive framework of indicators that can be used to analyse the sustainability of cultural tourism development in various settings and destinations at different stages of cultural tourism development. The selection of indicators was influenced with somewhat conflicting project requirements, the need to retain the indicators for which the data could be easily obtained from official international statistics as Eurostat, as well as site-specific indicators that would truly depict the state of tourism development within the Living lab.

Despite its potentially significant contribution to the analysis of the sustainability of cultural tourism development, the FEBTS team considers this framework as a tool which should be adjusted to the needs of each of the pilot areas, i.e. Living labs, and which could be additionally improved during the next stages of the project, particularly its implementation. Bearing that in mind, all experts involved in the final stage of the weighting process will be required to monitor its implementation and to suggest revisions of the framework once applied in the pilot area. The monitoring is expected to ensure the adaptability of the framework and its final transformation into the valuable tool applicable in a different type of cultural tourism destinations at different stages of tourism development allowing their mutual comparison, transfer of knowledge and achievement of sustainability-related goals.

Brief reflection on framework of indicators

The framework integrated four aspects of sustainability; environmental, social, cultural and economic (Level 1). Although the aim should be the establishment of a balance between these four constituting dimensions, the results of the analysis suggest different as the highest weights were attached to social, and following the cultural aspect of sustainability. Despite being contradictory to initial discussions, such results may reflect the growing concerns regarding the negative social impacts of excessive tourism development which have been recently discussed under the discourse of overtourism and degrowth (Cheer, Milano and Novelli, 2019; Higgins-Desbiolles et al., 2019; Milano, Novelli and Cheer, 2019). Stronger emphasis of the culture might reflect from one side the growing role of the culture in the sustainable development (Wiktor-Mach, 2018) as

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well as the bias of the analysis due to the project focus on culture as the fourth pillar and driver of sustainability. Unfortunately, at this stage of the investigation, the results could not be compared to the results of the previous research extensively elaborated in the last section of the report, considering that a limited number of studies relied on AHP to discuss the weights attached to the pillars of sustainability and culture was poorly represented with only a few convenient indicators (Table 1, Annex).

Level 2 refers to subgroups integrating a series of indicators. The expert group from Split would like to emphasise that the names of the subgroups should be considered only bearing in mind the indicators attached to each of them. The list of the indicators on Level 3, distributed within four pillars of sustainability aims to enable the analysis of the sustainability of cultural tourism development at the local scale.

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Table 2. The framework of indicators of the sustainability of cultural tourism developments with weights

LEVEL 1 Category	LEVEL 2 Subgroup	LEVEL 3 Indicator	Weights: category	Weights: subgroup	Weights indicators within a subgroup	Final weights of indicators	D	LL
Environmental	0,190563241							
	Landscape and biodiversity protection	0,238069799						
		Completed impact assessment of environmental, social and cultural aspects of tourism (in terms of evaluating a tourism plan) (YES/NO)			0,408250717	0,018521254		LL
		Municipal expenses in environment per 1000 inhabitants			0,296673435	0,013459288		LL
		Existence and functioning of a representative coordinating mechanism for MSP/ICZM (YES/NO)			0,176272097	0,007996998		LL
		Construction density per unit area			0,118803751	0,005389812		LLP
	Energy usage	0,128366896						
		Percentage of renewable energy consumption with respect to the total attributable to tourism				0,024462012		LL
	Water management	0,153653731						
		Water consumption attributed to tourism				0,029280753		LLP
	Solid waste management	0,144094681						
		The volume of waste generated				0,027459149		LL
	Climate change	0,111091434						
		CO2 emissions per inhabitant.				0,021169944		D
	Tourism development intensity	0,056737084						
		Total number of tourists per square Km in key sites (daily number of sold entry tickets)			0,311904762	0,003372315		LL
		Daily number of tourists per 1 km2			0,49047619	0,00530303		D
		Accessibility of tourist attractions by public transport (YES/NO)			0,197619048	0,002136658		LL
	Reducing transport impact	0,082114908						
		Nº embarked and disembarked passengers of cruise ships			0,333333333	0,005216028		D
		Nº embarked and disembarked passengers – Airport			0,666666667	0,010432055		D
	Visitor perception	0,040956364						
		Tourists' evaluation of destination cleanliness (7point Likert scale)				0,007804777		LL
	Resident perception	0,044915102						
		Perceptions by the local population concerning environmental damage caused by tourism (7point Likert scale)				0,008559167		LL
Social	0,383843874							
	Perception of residents	0,375406347						
		Perception of the local population regarding whether the life quality increases due to the tourism (7point Likert scale)			0,411111111	0,059240053		LL
		Perception of the local population regarding whether the tourists have an undesirable effect in the region life style (7point Likert scale)			0,327777778	0,047231934		LL
		Perception of the local population regarding whether improved public services are results of tourism (7point Likert scale)			0,261111111	0,037625439		LL
	Tourism development intensity	0,098819659						
		Ratio of tourists to locals			0,442857143	0,016798156		D
		Tourist intensity (ratio of nights spent at tourist accommodation establishments relative to the total permanent resident population of the area)			0,387301587	0,014690861		D
		% seasonal percentage of non-resident employees in the total number of tourism employee			0,16984127	0,006442304		LL
	Inclusion/accessibility	0,189841331						
		% accessible rooms				0,072869432		LL
	Community outlook (participation)	0,335932663						
		Degree of stakeholder participation in the planning process(Low/medium/high, measured on a 7point Likert scale)				0,128945694		LL
Cultural	0,299876482							
	Protecting and enhancing cultural heritage (assets)	0,538961039						
		Evidence of active participation of communities, groups and individuals in cultural policies and the definition of administrative measures integrating heritage (both tangible and intangible) and its safeguarding (YES/NO)			0,28021978	0,045289609		LL
		Number of heritage properties with a Management Plan including a formalised framework for community participation			0,30021978	0,048522043		LL

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				Expenditure on the cultural heritage of municipalities (includes tangible and intangible and contemporary cultural activities)	0,16010989	0,025877239	D	
				Funding spent in restoration of historic buildings	0,16010989	0,025877239		LL
				Specific measures to promote the participation of minorities and/or indigenous groups in cultural life (YES/NO)	0,099340659	0,01605561		LL
		The intensity of cultural tourism development	0,297258297					
				N. of visitors to cultural attractions/places (n./day)	0,548484848	0,048892363	D	
				N. of visitors attending or participating in cultural events (n./year)	0,240909091	0,021474822		LL
				Share of visitors for cultural reason in the total number of visitors (%)	0,210606061	0,018773587		LLP
		Perception of residents	0,163780664					
				Percentage of the population that is very satisfied with cultural facilities in a destination	0,333333333	0,016371323		LL
				Perceptions by the local population concerning the stimulation of local crafts and culture due to tourism (7point Likert scale)	0,666666667	0,032742646		LL
Economic	0,125716403							
		Tourism flow (volume and value) at destination	0,1500777					
				Average spending by tourists and excursionists	0,45467033	0,008578369	D	
				Average length of stay	0,263049451	0,004963014	D	
				Total number of tourist arrivals	0,14114011	0,002662923	D	
				Number and origin of visitors to cultural sites per season (day, month, year)	0,14114011	0,002662923		LLP
		Tourism enterprise(s) performance	0,309207459					
				Ratio of low-season tourists to peak-season tourists (seasonality)	0,5	0,019436225		LLP
				Average occupancy rate for official tourism accommodation establishments	0,25	0,009718112	D	
				Tourism revenues	0,25	0,009718112	D	
		Sustainable tourism policy and planning	0,435081585					
				Existence of up to date tourism plans and policies (YES/NO)	0,311607143	0,017043942		LL
				Existence of performance indicators designated for evaluating the plan developed and used (YES/NO)	0,280357143	0,015334664		LL
				Existence of land use planning, including tourism (YES/NO)	0,280357143	0,015334664		LL
				Public investment in tourism as % of budget spent on tourism	0,127678571	0,006983621	D	
		Visitor perception	0,105633256					
				Global satisfaction level of tourists (destination) (7point Likert scale)	0,5	0,006639916		LLP
				Evaluation of the price-quality relationship by tourists (7point Likert scale)	0,5	0,006639916		LL

The FEBT Split team acknowledges the contribution of the previous WPs in the conceptual understanding of the critical concepts discussed in the project. However, due to statistical consistency, following terms which appear simultaneously in the table above should be considered as follows (Source: UNWTO Glossary: <https://www.unwto.org/glossary-tourism-terms>):

- Travel/traveller:** Travel refers to the activity of travellers. A traveller is someone who moves between different geographic locations, for any purpose and any duration (IRTS 2008, 2.4). The visitor is a particular type of traveller, and consequently, tourism is a subset of travel.
- Visitor:** A visitor is a traveller taking a trip to the main destination outside his/her usual environment, for less than a year, for any main purpose (business, leisure or other personal purposes) other than to be employed by a resident entity in the country or place visited (IRTS 2008, 2.9).
- Tourist (or overnight visitor):** A visitor (domestic, inbound or outbound) is classified as a tourist (or overnight visitor) if his/her trip includes an overnight stay (IRTS 2008, 2.13).
- The same-day visitor (or excursionist):** A visitor (domestic, inbound or outbound) is classified as a same-day visitor (or excursionist) if his/her trip doesn't include an overnight stay (IRTS 2008, 2).

The indicators related to resident and visitor perception if not specified differently should be measured on a 7point Likert scale. The questions for visitor and resident survey (following the indicators from top to bottom of the framework):

- Please evaluate the destination cleanliness on a 7-point Likert scale where 1 suggests extremely unclean and 7 extremely clean.
- Please evaluate the environmental impact of tourism development on your destination on a 7-point Likert scale where 1 suggests severely damaging and 7 extremely beneficial.
- Please evaluate the influence of tourism development on your life quality on a 7-point Likert scale where 1 suggests an extremely negative effect, 4 indicates neutral, and 7 suggests the extremely positive influence.
- Please evaluate if tourists have an undesirable effect in the region life style on a 7-point Likert scale where 1 suggests extremely negative influence, 4 indicates neutral, and 7 suggests the extremely positive influence.
- Please evaluate if tourism development has contributed to the improvement of public services in your destination on a 7-point Likert scale where 1 suggests extremely negative influence, 4 indicates neutral, and 7 suggests the extremely positive influence.
- Please evaluate the degree of stakeholder participation in the tourism development planning process on a 7-point Likert scale where 1 suggests extremely low and 7 extremely high levels of participation. (the question should be addressed by a representative of local tourism board or DMO).
- Please evaluate if tourism has enabled the stimulus of local crafts and culture on a 7-point Likert scale where 1 suggests extremely negative influence, 4 indicates neutral, and 7 suggests the extremely positive influence.
- Please, evaluate your overall satisfaction with tourism destination on a 7-point Likert scale where 1 suggests extremely low and 7 extremely high levels of satisfaction.
- Please evaluate the value for money in the destination on a 7-point Likert scale where 1 suggests extremely low and 7 extremely high value for money ratio.

The potential distribution of the indicators within the framework with regard to the project requirements: (1) D – the indicator suitable for dashboard; (2) LL – the site-specific indicator; (3) LLP – the site-specific indicator with smart proxy proposed.

The proposal of the “proxies” for site specific indicators which could be obtained via internet scrapping (following LLP designated indicators from top to the bottom of the framework)

- Number of accommodation units (hotels and P2P)
- Baseline water stress (Based on annual water withdrawal data, this indicator estimates projected future country-level water stress for 2020 under a business-as-usual (BAU) scenario, Travel and Tourism competitiveness report (TTCI), pg. 96)
- Number of reviews to historic sites compared to the total per destination (TripAdvisor)
- Cultural tourism digital demand (TTCI) - the number of online searchers index (TTCR, pg. 99. http://www3.weforum.org/docs/WEF_TTCR_2019.pdf)
- Number of units available for booking via relevant OTAs, e.g. booking.com, Airbnb)
- Average rating on TripAdvisor

3.2. Cultural tourism indicators

Based on the results of the search for sustainability indicators presented in the previous chapter (3.1), in this chapter (3.2) we are focused on the further selection of cultural tourism-related indicators in order to make a framework that may indicate the level of its development and impacts it has on the sustainability and resilience of a destination, outlined as one of the project's goals.

It is a common fact that culture is a complex, multidimensional concept that has important implications from a social, symbolic and economic perspective (Montalto et al., 2019). Indicators and data on the cultural sector, as well as operational activities have underscored that culture can be a powerful driver for development, and also an enabler that contributes to the effectiveness of sustainable development (UNESCO, 2012). Tourism on the other side, is also a complex phenomenon, which is, owing to its economic and other functions deeply embedded in the overall socio-economic life of a destination. According to Tourism Satellite Account Methodology (UN, 2010: 25), cultural activities (producing cultural services) is one out of 12 groups of tourism characteristic activities (producing tourism characteristic products/services). Hence, culture and tourism, being such complex phenomena are inherently interrelated, e.g. dependent on each other. Culture is a driver of tourism development and the main attractor to a destination, while tourism, by bringing visitors, generates flow of money into the cultural sector, needed for its conservation, restoration, presentation, interpretation as well as for enhancing overall cultural production. Being so intertwined, the concern on how to ensure their co-existence without sacrificing one over another, has been constantly on the agenda. Considering that the project is focused on measuring relationship between the two complex constructs, i.e. the impacts of cultural tourism development on tourism destination sustainability (with regard to its life cycle stage), it was a challenge to decide what indicates the 'level of cultural tourism development' (as an independent variable) on one side of this "equation", and how to express 'tourism destination sustainability' (as a dependent variable) on the other side. With this in focus, further analysis has been done.

3.2.1. Selecting cultural (tourism) development indicators

Drawing on the methodological approach used by Sowińska-Świerkosz (2017), an additional search was conducted (in April 2020) in the Web of Science Core Collection database, based on the following criteria:

- keywords: cultural heritage indicator or cultural indicator;
- document types: articles, proceedings paper and review;
- time span: between 2000–2020.

Since culture is a very broad concept (not necessarily related to the notion of culture central to this project), there were 739 articles found all together. In the second phase, a two-step evaluation was executed. First, 126 scientific papers that directly provided cultural indicators have been selected but they were referring mostly to the common sustainability indicators (most of which have already been identified in the chapter 3.1.). Second, the additional extraction of the papers was done based on the indicator categorisation (related to cultural sustainability). Finally, out of 12 selected papers, 5 were retained (elaborated in the following text), while the remaining 7 have been discarded due to recurrence of indicators. The review showed

different approaches, methods, and indicator types, mainly deriving from the diverse understanding of the term culture and its role in tourism development.

The remaining papers dealt with selected cultural indicators but have also gone a step further in elaborating their role in development, by proposing synthetic cultural indices aimed at measuring cultural performance in destinations of different types and territorial scope. Hence, in a recently published article on empirical approach to measure the cultural and creative vitality of European cities, Montalto et al. (2019) have discussed the conceptual framework of a dataset - the Cultural and Creative Cities Monitor (CCCM). The CCCM gathers 29 selected culture-related indicators which have been aggregated in Cultural and Creative Cities Index (C3 Index) as a synthetic measure of performance. The C3 Index is calculated as a weighted average of its three sub-indices: Cultural Vibrancy, Creative Economy and Enabling Environment. Multivariate analysis was performed to investigate correlation among variables and verify whether the available indicators can statistically be grouped to describe the multidimensional phenomenon. Montalto et al. (2019: 175) particularly address that “the indicators seem to be consistent with the multi-dimensional nature of culture argued in the recent literature” and concluded that “the CCCM succeeds in breaking from a narrow economic perspective of culture. Moreover, by including indicators on cultural participation, diversity, openness and trust, the CCCM recognises that a culture-based development approach should be based not only on a flourishing creative economy but most notably on a socially and culturally inclusive environment, as promoted by the European Commission itself in the “New European Agenda for Culture”. This approach is in line with the Culture 2030 Indicators framework (UNESCO, 2019).

Nocca (2017) and Guzman et al. (2017) emphasized the lack of cultural-sustainability indicators dealing with culture-led development. Nocca (2017) argues that impacts related to cultural-led projects are mainly interpreted in terms of tourism and real estate impacts. In his research on the role of cultural heritage in the sustainable development framework, the author analysed a set of multi-dimensional indicators for assessing the impacts of cultural heritage conservation and regeneration projects on cultural heritage and on the entire city system. The indicators have been subdivided into nine impact categories with related sub-categories that compose the comprehensive matrix: tourism and recreation; creative, cultural and innovative activities; typical local productions; environment and natural capital; community and social cohesion; real estate; financial return; welfare/wellbeing; cultural value of properties/landscape. Although the analysis often refers to sustainability, the author argues that there is an imbalance among the dimensions and in most cases, only the economic component is highlighted, leaving out the social and environmental dimensions. In the study on cultural heritage within the urban context, Guzman et al. (2017) confirmed that a more thorough conceptualization and more concrete correlations between cultural heritage management and the urban phenomena are still needed. Vecco & Srakar (2018) have developed a cultural heritage sustainability index for regions threatened by conflicts, with a particular focus on active war zones. They have used the method of multiple indicators and multiple causes (MIMIC) deriving from structural equation modelling and used GDP per capita, Global Peace Index and linguistic diversity index as the variables predicting the CHEDWC (cultural heritage sustainability due to war conflicts), while GDP per capita, level of tourism arrivals, number of objects of cultural heritage listed in World Heritage List and number of endangered objects of heritage in the World Heritage List were selected as variables affected by the CHEDWC. Herrero-Prieto & Gomez-Vega (2017) estimated the technical efficiency scores for regional destinations with regard to the production of cultural tourism flows. The authors adopted a two-stage procedure, measuring performance by non-parametric data envelopment analysis (DEA) method and in the next stage, analysing how other external variables might determine these efficiency ratios. They considered indicators representing reputation, accessibility, the omnivorous nature of cultural tourism as well as the scope to the regional cultural sector.

Except for the aforementioned papers, that usually put a stress on a few indicators specifically purposed, a more comprehensive framework of cultural (development) indicators is given by **UNESCO** in 2019, in its document, **Culture 2030 Indicators**.

The development of the Culture 2030 Indicators framework began in early 2017, with the review of existing methodologies to measure culture in relation to development in general. The review also included the methodologies developed and implemented by UNESCO and other partners globally in order to enhance existing instruments and data, including the Framework for Cultural Statistics (FCS), the Culture for Development Indicators Suite (CDIS), the Culture Conventions periodic reporting mechanisms and other monitoring mechanisms and methodologies in the specific context of the 2030 Agenda (UNESCO, 2019:10). Building on the outcomes of this review exercise, a framework of 22 indicators grouped into four thematic dimensions was developed: (i) Environment & Resilience, (ii) Prosperity & Livelihoods, (iii) Knowledge & Skills and (iv) Inclusion & Participation. The framework also responds to the “5 Ps” of the 2030 Agenda (People, Planet, Prosperity, Peace, and Partnerships) (UNESCO, 2019:10).

However, as stated by UNESCO (2019:25), initiative proposed by the document 'Culture|2030 Indicators' is **more aspirational than normative**, as it aims to assist countries and cities in assessing their own progress, recognising opportunities for aspiration and improvement“. That stated, they claim that the objective of the framework was to support national and local understandings of their culture’s specificities and their ability to identify and combine relevant data, for which purpose the indicators were targeted at two levels of administration: i) national and ii) urban, reflecting the overall aims of the SDGs and SDG 11 in particular.

Generally speaking, UNESCO has so far adopted three approaches regarding the role of culture in development: i) culture as a separate dimension of sustainable development, ii) culture as a driver of sustainable development, iii) culture as an enabler of sustainability (Wictor-Mach, 2018). The first one, as explained by Wictor-Mach (2018) treats culture as the 4th, self-standing pillar of sustainable development; another approach revolves around the discourse on ‘culture as a driver of sustainability’, perceiving cultural issues as development assets. The third approach, treating culture as an ‘enabler or prerequisite of sustainability’, is a distinct approach prevalent in recent UNESCO’s discourse, emphasising the need for making development strategies and projects more context-sensitive and addressing people’s needs and expectations. Finally, in 2030 Agenda UNESCO (2019: 12) stresses that “culture contributes both as a sector of activity in itself and as an intrinsic component present in other sectors”, thus confirming that culture can be addressed both as a driver that contributes directly to bringing about economic and social benefits, and also as an enabler that contributes to the effectiveness of development interventions.

That stated, in the following texts we shall refer to the indicators of culture/cultural tourism to be used to describe the actual level of cultural tourism development in a destination. To deliver this task, the DPSIR (Drivers-Pressures-State-Impacts-Responses) framework seems to be useful. It assumes a chain of causal links starting with ‘driving forces’ (economic sectors, human activities, or specific resources) through ‘pressures’ (emissions, waste) to ‘states’ (physical, social, biological, chemical) and ‘impacts’ on ecosystems (human health and functions, level of satisfaction, etc.), eventually leading to political ‘responses’ (prioritisation, target setting, laws, policy measures, etc.). Soon after its adoption by the European Environmental Agency in 1999 (based on the OECD Pressure State Response (PSR) model), the DPSIR framework has become a commune approach to analyse the genesis and persistence of environmental problems at scales ranging from global to local. In its essence, the concept is at the same time simple, comprehensive and evolving, limited only by the boundaries of researchers’ understanding and specifics of

phenomena explored (Pivčević et al., 2020).

Hence, in order to describe the level of cultural tourism development, indicators have been selected and grouped as those representing **Drivers-D** and **Responses-R**, which corresponds to the UNESCO's (2019) statement that culture is seen at the same time as the driver that contributes directly to bringing about economic and social benefits, and also as an enabler (Responses, i.e. policies) that contributes to the effectiveness of development interventions. On the other side, the set of indicators related to the Pressures (P), State (S), and Impacts (I), have been selected during the procedure described in the chapter 3.1. and allocated on the sustainability side of an equation, to act as a dependent variable showing how cultural tourism affects cultural destination' sustainability. The cultural tourism "D (drivers) and R (responses)" have been grouped into subdimensions following the UNESCO (2019) recommendations, to enable creation of the multidimensional cultural tourism development index. The list of potential cultural tourism development indicators is presented in the Table 3 .

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Table 3. Cultural tourism ‘development-state- of- the- art’ indicators

Dimension (SUBDIMENSION)	Indicator	Level National-N Local-L	Data source	Drivers -D Pressures-P State-S Impacts-I Responses-R	Explanation	(1) DB	(2) LL
A. Spatial indicators							
PRESENCE OF CULTURAL RESOURCES (in absolute numbers)	Number of monuments in national lists	N/L	Based on the inventory of the current state	D	Both, natural and cultural (tangible and intangible) heritage, as well as cultural events represent the key attractors to a destination, and hence may be considered drivers for cultural tourism development.	DB	
	Number of protected natural heritage sites in national lists	N/L	Based on the inventory of the current state	D		DB	
	Number of intangible cultural heritage in national lists	N/L	Based on the inventory of the current state	D		DB	
	Number of World Heritage Sites	N/L	Based on the inventory of the current state UNESCO data	D		DB	
	Number of elements inscribed on the UNESCO Intangible Cultural Heritage Lists	N/L	Based on the inventory of the current state UNESCO data	D		DB	
	Number of international cultural events (e.g. festivals, exhibitions) held every year	N/L	Based on the inventory of the current state	D		DB	
AVAILABILITY OF CULTURAL INFRASTRUCTURE	Number of museums per 1,000 inhabitants	N/L	Official statistics	D	Number and variety of cultural institutions make the milieu for not only local community cultural development, but also serve as an attractor for visitors and consequently a driver of cultural tourism development.		LL
	Number of theatres per 1,000 inhabitants	N/L	Official statistics	D			LL
	Number of public libraries per 1,000 inhabitants	N/L	Official statistics	D			LL
	Number of museums providing access to collections through Internet sites and percent of total museums	N/L	Official statistics	D		DB	
B. Prosperity and livelihood							
CULTURAL (TOURISM) BUSINESSES	Number of cultural (and creative) enterprises	N/L	Official statistics	D	Indicators concerning cultural sector business state of the art indicate its economic vitality and potential to satisfy needs of both residents and visitors through cultural tourism, which is why they are considered to		LL
	Number of new start-ups in culture sector	N/L	Official statistics	D			LL
	Number of artists (e.g. musicians, painters, etc.)	N/L	Official statistics	D			LL

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	Number of craft producers/artisans	N/L	Official statistics	D	be its drivers.		LL
	Ratio of total number of overnight visitors/ excursionists	N/L	Official statistics	D	Considering that each cultural destination prefers overnight visitors who spend more money in a destination and are more interested in different aspects of cultural offer, this ratio, indicating more overnight visitors per excursionist may be seen as a driver of cultural tourism development		LL
EMPLOYMENT	Number of cultural jobs per 1,000 population	N/L	Official statistics	D	Indicators concerning cultural sector employment state of the art, the same as with the business -related indicators, show its economic vitality and are considered to be its drivers.		LL
	Cultural and creative industry share in total GDP	N/L	Official statistics	D			LL
CULTURAL GOVERNANCE (INSTITUTIONAL FRAMEWORK)	Evidence of a Ministry of Culture or a Culture secretariat with ministerial/directorial status at the State/national level	N	National and local sources: administrative data, specific surveys and information systems for culture when available	R	These indicators must be seen as “enablers” (UNESCO, 2019) or Responses, according to the DPSIR methodology, as they create institutional framework for better governance of not only cultural sector but of all the other associated sectors including tourism, thus creating preconditions for cultural tourism development.		LL
	Evidence of a local authority responsible for culture at local level	L		R			LL
	Evidence of a culture based regulatory framework	N		R			LL
	Examples of initiatives designed through inter-ministerial cooperation to enhance culture’s impacts in other areas (tourism, education, communication, ICT, trade, international affairs, employment), such as regulatory frameworks, sector specific laws, etc.	N		R			LL
	Evidence for the use of Destination Management Organisation(s) to manage the impact of tourism on cultural values	L	Official statistics; administrative data	R	The contemporary role of DMOs is by no means limited to the marketing activities in a destination (such as promotion; image and brand creation; entrepreneurs’ attraction campaigns; information services development; reservation systems’ development), but is also recognized in creating appropriate environment for tourism development in a destination (through facility site planning; human resource development; development of technologies and support systems; complementary industries’ support) and in performing a number of operational activities (such as: enhancing visitor experience quality in a destination; product development; manifestation development, heritage and attractions development and management, development of	DB	

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					tourist routes and itineraries; tourist destination resources' and attractions' interpretative techniques development and alike (UNWTO, 2007).		
CULTURAL GOVERNANCE (POLICIES AND FINANCIAL FRAMEWORK)	Evidence of cultural management plan or alike strategic document	L	National and local sources: administrative data, specific surveys and information systems for culture when available	R	Management plans and/or other strategic documents represent the key policy tools (response/enablers) delineating vision, strategic goals and actions to be delivered in order to make the goals and vision realized, together with the monitoring process description.		LL
	Specific measures to support job creation in the culture and creative sectors	N		R	These are all policy measures (mostly economic/financial) aimed at stimulating production and efficiency of all the subjects (private and public) involved in creating cultural and creative products and services serving not only residents but also visitors, especially those belonging to the cultural tourism niche.		LL
	Specific measures to encourage the formalization and growth of micro/small and medium-sized cultural enterprises	N		R			LL
	Specific policy measures regulating public assistance and subsidies for the cultural sector	N		R			LL
	Specific policy measures dealing with the tax status of culture (tax exemptions and incentives designed to benefit the culture sector specifically, such as reduced VAT on books)	N		R			LL
	General government expenditure on culture per capita	N/L	National and local sources	R			LL
	Private and non-profit sector expenditure on culture per capita	N/L	National and local sources	R			LL
(CULTURAL) TOURISM GOVERNANCE	Coordination, cooperation and collaboration among Public Tourism Administrations (PTAs) at different levels of government (regarding cultural tourism)	N	National and local	R	This indicator (UNWTO, 2013) is a relevant Response indicator showing to what extent tourism related public institutions at different levels coordinate their activities among themselves, and to what extent they cooperate and collaborate with public institutions from culture and other associated sectors at different levels. This is a key precondition for development of an environment that is stimulating for cultural tourism development .		LL
	Establishment of cooperative and collaborative public - private	N/L		R	This indicator (UNWTO, 2013) is also a relevant Response indicator showing the existence of a		LL

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	relations (regarding cultural tourism)		sources: administrative data, specific surveys and information systems for tourism when available		stimulating environment for the development of public-private collaboration among partners from tourism and other associated sectors, primarily cultural sector, thus enhancing (cultural) tourism development		
	Cooperation and collaboration by public administrations with other nongovernmental actors and networks of actors (regarding cultural tourism)	N/L		R	This indicator (UNWTO, 2013), being a Response indicator specifies an institutional environment that promotes cooperation and collaboration of public institutions with the NGOs, potentially enhancing (cultural) tourism development.		LL
	Evidence of cultural tourism strategic documents	N/L		R	Cultural tourism strategic document represents a key tool (response/enabler) outlining cultural tourism development vision, strategic goals and actions to be delivered in order to make the goals and vision realized, together with the monitoring process description.	DB	
C. Knowledge							
CULTURAL EDUCATION	Number of tertiary education graduates (ISCED 2011) levels 5–8) in arts and humanities per 100,000 population	N	Official statistics	D	These indicators are typical drivers; namely, developed human capital in both, culture and tourism as complementary sectors, enable development of each one individually as well as of cultural tourism as a specific type of tourism.		LL
EDUCATION IN TOURISM MANAGEMENT	Number of tertiary education graduates (ISCED 2011) levels 5–8) in tourism management per 100,000 population	N	Official statistics	D			LL
D. Inclusion & Participation							
	Cultural attractions’ visitors Total number of cultural attractions’ tickets sold during the reference year divided by the total population and then multiplied by 1 000	N/L	Official statistics	D	These are the drivers. Namely, the higher the interest for visiting different cultural institutions /attractions, the more cultural production and the better financial effects are enabled in a destination.		LL
	Cultural events’ visitors Total number of cultural events’ tickets sold during the reference year divided by the total population and then multiplied by 1 000	N/L	Official statistics	D			LL
	Museum visitors Total number of museum tickets sold during the reference year divided by the total population and then multiplied by 1 000	N/L	Official statistics	D			LL
	Satisfaction with cultural facilities	L	Survey		Although tourists’ satisfaction with cultural facilities in a destination may indicate a state, we can also easily	DB	

D 4.1 – Report on the most appropriate indicators related to the basic concepts

	Percentage of tourists that is very satisfied with cultural facilities in a destination			D/S	translate it into a driver, of course if this percentage is high. Namely, considering that this information is easily widespread owing to social media, we may consider it being a driver of future demand and consequently of cultural offer development.		
PARTICIPATORY PROCESSES	Evidence of specific measures to promote active participation of communities, groups and individuals in cultural policies	N/L	National and local sources: administrative data, specific surveys and information systems for culture when available	R	By introducing measures to promote different ways of stakeholders' participation, an environment is created for enhancing co-creation process in culture and cultural tourism development		LL
	Evidence on active participation of minorities and/or indigenous groups in cultural life	L		D	Even the very existence of minorities and/or indigenous groups provides opportunities for creating a diverse and vivid cultural scene. Moreover, by involving them actively in the community's cultural life, the potential for the tourist attractiveness' enhancement of the destination grows significantly. This is why this indicator may be perceived as a driver of cultural tourism development.		LL
SOCIAL COHESION	Percentage of people who do not object to having a neighbour from another culture (subjective output) a. People of a different race b. Immigrants/foreign workers c. People of different religion	L	Survey	D	This is a benchmark indicator intended to evaluate the degree of tolerance and openness to diversity, and to provide insight into the levels of interconnectedness within a given society. It indicates specific cultural milieu that may be considered as stimulating to attract tourist		LL
	Degree of positive assessment of gender equality (subjective output)	L	Survey	D	This may indicate a mature and tolerant cultural milieu stimulating for both, cultural supply development as well as for attracting visitors who prefer such an environment.		LL
*The potential distribution of the indicators within the framework with regard to the project requirements: (1) DB – the indicator suitable for dashboard; (2) LL – the site-specific indicator							

3.2.2. Conclusion of the analysis

It is never an easy task to decide what indicators (and what type, quantitative or qualitative) should be selected. Most often authors choose quantitative indicators to more easily quantify impacts of culture on a destination. However, as seen in 'UNESCO Thematic Indicators for Culture in the 2030 Agenda', many indicators are of qualitative, i.e. subjective nature which makes them accessible only via empirical research. In the table 3, a combination of the most commonly used quantitative and qualitative indicators is presented. There are 26 quantitative indicators suggested and 17 qualitative ones, each one being described from either "driver or enabler" point of view.

While quantitative indicators must be accessible, measurable, and possible to calculate for different regions, the qualitative ones may be verified only at the local (site) level. The main sources of indicators that we relied on were mostly verified by UNESCO (2019) and EC (2016) (see table 2, Annex), while a few related to tourism governance are based on Duran's (2013) framework, verified by the UNWTO.

However, due to its size, the suggested framework does not necessarily have to be entirely utilized, i.e. all the indicators do not have to be used in the future S-R-T (Sustainability-Resilience-TALC) model. Namely, they can be selected depending not only on their availability but also on the type and characteristics of a destination (i.e. urban, rural, peri-urban, etc) under analysis, and of course on the method(s) employed.

In the end, the two proposed frameworks of indicators, one related to measurement of sustainability and another one dealing with cultural tourism drivers and policies (responses), give us opportunity to adapt the SRT framework to the site-specific situations.

3.3. Resilience

3.3.1. Theoretical considerations on the concept of resilience

Over the last three decades, resilience has become the most widely discussed stability concept of complex systems in different scientific fields (Grimm & Calabrese, 2011; Fiskel, 2006; Hall et al., 2018). Historical presentations of resilience have long been associated with the ability of a system to return to a normalised state after disturbance or change (Jones & D’Erico, 2019). Those historical presentations are mainly stemming from either engineering or ecology research fields, whose approaches to the concept of resilience differ in emphasis on the effects of disturbances that may occur (Fiskel, 2006).

The engineering concept of resilience is introduced by Holling (1973) who defines it as a system’s speed of recovery or return to its pre-disturbance position. The ecological concept defines resilience as “the capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure, identity and feedbacks” (Walker et al., 2004: 2). The engineering concept of resilience emphasizes resilience or robustness as recovery from disturbances, while ecological resilience additionally emphasizes adaptive capacity, which may lead to new equilibria (Carpenter et al. 2001; Miller, 2010; Pelling, 2010). Martin & Sunley (2015) specify that such a definition is not without uncertainty, since it does not clarify how much ‘reorganization’ and ‘change’ is permitted for the system to be regarded as still having essentially the same structure, identity and feedbacks. These doubts offered space for the new concept named “adaptive resilience”, defined as “the ability of the system to withstand either market or environmental shocks without losing the capacity to allocate resources efficiently” (Perrings, 2006; 418). This concept has also been acknowledged as “evolutionary resilience” defined in terms of a “bounce forward” concept rather than a “bounce back” concept (Simmie & Martin, 2010). The evolutionary approach understands resilience as the ability of a region to adapt over the short run following a disturbance (Martin, 2012) or to develop new growth paths over the long run (Boschma, 2015). According to Hall et al. (2018) the broad application of the concept of resilience has led to issues as to its definition and meaning.

Although empirical literature on resilience is very abundant, especially regarding regional resilience (e.g. Hill et al., 2008; Bristow, 2010; Pike et al., 2010; Martin, 2012; OECD, 2012; Boschma, 2015, Martin & Sunley, 2015, etc.), there has not yet been a common approach or consensus on the exact conceptualization of the term. As a result, several interpretations of “regional” resilience definition can be found in the literature (e.g. Martin 2012; Martin & Sunley; 2015; Modica & Reggiani, 2015, etc.). Martin & Sunley (2015: 5) have included all the relevant elements of the phenomena into their definition of regional resilience. According to them, “regional economic resilience is the capacity of a regional or local economy to withstand or recover its development growth path from market, competitive and environmental shocks by, if necessary, undergoing adaptive changes of its economic structures and its social and institutional arrangements, so as to maintain or restore its previous development path, or transit to a new sustainable path characterized by a fuller and more productive use of its physical, human and environmental resources”. In addition, Martin & Sunley (2015) underline that their definition has five crucial elements: **vulnerability** (the sensitivity or propensity of a region’s firms and workers to different types of shock); **shocks** (the origin, nature and incidence of a disturbance, and the scale, nature and duration thereof), **resistance** (the initial impact of the shock on a region’s economy); **robustness** (how region’s firms, workers and institutions adjust and adapt to shocks, including the role of external mechanisms, and public interventions and support structures); and **recoverability** (the extent and nature of recovery of the

region's economy from shocks, and the nature of the path to which the region recovers). Cellini & Cuccia (2015) note that “economic” resilience is a multifaceted concept that involves the ability of subjects (cities, regions, countries or sectors) to resist to the impact of a negative shock, and the ability to recover from the adverse consequences of the shock. They emphasise that recovery may mean the ability to re-gain the pre-crisis level or growth performance, or even the ability to find new, better, growth paths. Lastly, they stress that the length of time necessary to recover is a possible way to look at economic resilience. Fabry & Zeghni (2019) argue that the diversity of resilience definitions (from engineering, economic, social, regional, etc.) are not debatable, but the priority should instead be given to the way resilience is used (outcome, process, property). Conclusively, resilience is employed in various contexts (history, culture, economic development), different time period (before, during, after the crisis), and numerous locations and scales.

In general, resilience determines how vulnerable the system is to unexpected disturbances and surprises that can exceed or break that control (Holling & Gunderson, 2002: 51, cited in Grimm & Calabrese, 2011). Thus, by its very nature, **resilience assumes disturbance** (Hall, 2016a). According to Folke (2006:255) when resilience term is transferred to the social world, this means that uncertainty, variability in the environment, and surprise are “part of the game and you need to be prepared for it and learn to live with it”. In addition, Folke (2006) argues that the particular ‘twist’ given by including social dimensions of resilience is assumed in inclusion of **innovation, learning and transformability in the human system as parts of the adaptive capacity of people, communities and places to disturbance and change**. Consequently, the characteristics of resilient systems, including biological and socioeconomic entities, are captured within their **abilities to survive, adapt, and grow** in the face of **uncertainty and unforeseen disturbances** (Fiskel, 2006). Accordingly, the fundamental questions of complex systems are regarding their **stability, longevity, characteristic features, and sensitiveness to disturbance and change over time** (Hall et al., 2018).

Consequently, before **modelling the resilience of a complex system**, and in particular, different resilience's resistance, recovery, adaptation and renewal dimensions (or phases or paths) (Martin, 2012), the three fundamental questions should be answered (Faggian et al., 2018; Hall et al., 2018): Resilience “to what”? Resilience “of what”? and Resilience “over what period”?

Resilience “to what”?

The concept of resilience found a fertile ground in disaster studies but it has rapidly expanded to encompass other topics such as housing foreclosures, economic downturns, recessions, terrorism and pandemics (Faggian et al., 2018). The shock is an external stressor that informs the scope of the analysis. Consequently, besides conceptualizing the “nature” of a shock there is also a need to clearly categorize a “threshold” to define what constitutes a shock. The shock can be defined in terms of minimum change or minimum magnitude of change of variables of interest or minimum duration of negative disturbance, etc. Therefore, it is fundamental in any resilience study to clearly state the scope of the analysis.

Regarding cultural tourism destination, resilience “to what” is firstly considered as a way to improve sustainability after an ecological or environmental disaster and it offers an alternative to sustainable development (Lew, 2014). Whereas **sustainable development aims at anticipating a shock in particular fields, resilience aims at bringing an “answer to an expected or unexpected shock that is expansive in its direct and indirect impacts and asset losses”** (Hallegate, 2014). Destination communities experience external stress through *environmental change* as well as *a social, economic and political disturbance*. For example, rapid socio-economic and technological change, climate change and other forms of environmental change

and disasters provide existential risks to tourism destinations and businesses and the people within them (Hall et al., 2018). Therefore, the answer to the question of **resilience “to what”** should be considered in the **context of any potential shock that could occur in the future or that has occurred in the past, regarding environmental, social, economic or political disturbance in the cultural tourism destination.**

Resilience “of what”?

This second question is even more debateable than the first one, and consists of two issues (see Faggian, 2018). The first one is the issue of an **indicator**, i.e. what variable or variables are most appropriate to measure resilience, and the second one is the issue of a geographical area, i.e. how to define the **socio-economic system** under analysis?

It should be noted that there is lack of theoretical and empirical studies on cultural tourism destination resilience or a clear consensus on how it should be defined and measured. Uncertainty and environmental resilience may be incorporated as an uncertain ‘resilience threshold’ in environmental quality, below which tourism shifts or collapses to a fundamentally different state. Consequently, it is really a difficult task to elaborate the question - **resilience “of what”** - in the context of cultural tourism destination, although there is an emergent interest from both, governments and tourism industry regarding the capacities to adapt to and sometimes mitigate change and disturbance. While it is not difficult to identify the **geographic area** under the analysis, i.e. socio-economic system of **cultural tourism destination** (see definition in deliverable 2.1.), the ambiguity remains in defining **the indicators of resilience.**

Although the challenges in defining and interpreting the resilience are obviously enormous, its measurement is even more challenging (Carpenter et al., 2001). Resilience is the capacity of communities not just to cope with the adverse effects of tourism and other human or natural activities (Hopkins & Becken, 2014, cited in Bellini et al., 2017), but also to proactively achieve sustainable aspirational outcomes. According to Cheng & Zang (2019), since resilience is the dynamic evolutionary system to natural and human-induced shocks, defining indicators should be treated as a multifaceted, multilevel dynamic process, that is going to be in the focus of our further analysis.

Resilience “over what period”?

The appropriate temporal framework has to be assessed to analyse the correlation between short- and long-term resilience, if necessary. Additionally, more complete modelling of the complementarities and trade-offs between **different dimensions and types of resilience** represents a core knowledge gap on the frontier of resilience research (Faggian, 2018). Thus, the scope of this project could provide the insights into this research gap in the context of cultural tourism destination and its resilience.

3.3.2. Reflection on the literature review methodology

The quest for the most appropriate resilience indicators has started with an extensive desk research, that began with the identification of relevant studies, screening of the records and full-text articles for eligibility, and finally ended up with the synthesis of the studies included in the analysis.

The identification process started by searching published papers indexed in the Web of Science Core Collection, by grouping the key words in different manners. The criteria for screening the articles have been

set up as follows:

- key words (resilience and tourism; cultural tourism and resilience; tourism resilience and cultural destination, tourism, destination, resilience, indicators)
- research field refined (i.e. social sciences interdisciplinary or economics or hospitality, leisure, sport and tourism or geography or environmental studies)
- full papers, journal articles and book chapters published in the period 2000-2020.

Finally, 125 records have been screened, 54 of them addressed for eligibility, with 18 ultimately been included in the qualitative synthesis (presented in Table 6, Annex).

3.2.3. The framework for cultural tourism destination resilience indicators

The resilience of tourist destinations emerges from many features of both, its **tourism supply** as well as of **demand** and manifests itself at different scales and dimensions (Hall et al., 2018). Turton (2005) noted that some general types of resilience may be arguably universal while others may be place-specific. Lew & Cheer (2018) debate that tourism can be adverse for social and cultural resilience since it is demonstrably effective in fostering economic resilience through economic development but can be less effective in managing negative feedback (negative impacts or perceptions of tourism). Thus, while the economy may be doing well, the social and environmental sustainability of a destination may be in serious decline, requiring non-economic imperatives to be given greater emphasis (Lew & Cheer, 2018). According to Tyrell & Johnson (2008), tourism resilience or resilience applied to tourism is the "ability of social, economic or ecological systems to recover from tourism induced stress". On the contrary, Bellini et al. (2017) emphasise that questioning the role of tourism in resilience enforces to ex-ante accept the whole range of meanings of that notion, from the conservative understanding of the term to the transformational one. They do not perceive resilience as a feature or outcome, but rather a complex process that discloses many possible combinations of change and continuity. In addition, they propose the tourism innovation level to be the factor of and a measure for different regional types of resilience, i.e.: engineering resilience, when tourism innovation is seen as a way to maintain the role of tourism in the present economic structure; ecological resilience, when tourism innovation is seen as a factor that increases the economy's ability to absorb shocks; and evolutionary resilience, when tourism innovation is seen as a dynamic contributor to the system's ability to 'bounce forward' to a renewed economic structure.

Consequently, a **sound assessment of cultural tourism destination resilience** requires rigorous, yet comprehensive frameworks of analysis. Only a greater understanding of the many facets of resilience can lead to an improvement in the strategies, management and sustainable development of destinations in the long term (Hall et al., 2018). In addition, when the tourism development initiative comes in a mostly top-down manner, internal self-organizing within the community system is likely to be weaker, as is the development of complex adaptive thinking in addressing indigenous issues (Lew & Cheer, 2018).

The enormous growth of tourism flows over the last decades have imposed a detrimental effect on the stability and development path of cultural tourism destinations, especially considering an increasing number of different shocks. Nevertheless, there is a lack of studies that consider resilience in the context of cultural tourism destination, which is why defining indicators for cultural tourism destination resilience is an extremely difficult task.

Therefore, on the basis of the retained literature review we have firstly **identified the most common (or relevant) indicators of resilience in general** (more details in Table 6, Annex). Given the fact that resilience is treated as a multidimensional concept, assessing resilience by employing indicators is frequently proposed, and this method is recognized as an appropriate tool for the complex analysis of the problem. In addition, it should be noted that the most popular indicators are designed for the assessment of the resilience of large economies (I, II level of Nomenclature of Territorial Units for Statistics (NUTS I, II)), which limits their applicability while assessing the lower hierarchical level of socio-economic systems' resilience (NUTS III level, destination level, and similar) (see also Bruneckiene et al., 2019). An analysis of resilience indicators (see Table 6, Annex) revealed that it is not just the process of the identification of the factors determining the resilience but also the way they are inserted into the index itself, what makes them different from each other.

In the following text, the elaboration of the most relevant study results concerning resilience indicators are given with regards to the role of the chosen resilience indicators in the prospective Sustainability-Resilience-TALC (SRT) model that is to be developed and elaborated in the deliverable 4.2 of this Project. In that context, the indicators are grouped regarding the (unit) level of the resilience analysis and consequently, their corresponding units of comparison.

Indicators for comparison with other spatial units on EU level:

- The papers published by Cainelli et al. (2018) and Giannakis & Bruggeman (2019) offer dynamic and context adjustable indicators for measuring resilience on different spatial levels with easily accessible data.
- Giannakis & Bruggeman (2019) developed the framework focused on the differences in regional economic resilience and the drivers of resilience across the different regional hierarchy in the European Union. By implementing three different resilience indicators based on employment change, they offer versatile empirical framework for analysing resilience in different context. They explored the economic resilience of European regions in terms of employment growth rates, similar to the work of Faggian et al. (2018) in Italy. The authors stress that "the rationale for focusing on employment growth is related to the persistent effects of economic crisis on employment compared with the effects on output; employment typically returns to pre-crisis levels with a longer lag than output, thus better reflecting crisis' social impact (Reinhart & Rogoff, 2009)" (Giannakis & Bruggeman, 2019).
- Cainelli et al. (2018) focus on short-term regional resilience and the *role of industrial relatedness as a shock absorber*. They conclude that when controlling for macroeconomic policy, infrastructure, human and social capital variables, the existing industry structure is the most important determinant of regional resilience. According to them, industrial relatedness can take different forms at the regional level. They differ technological relatedness and vertical relatedness. First, local industries may require similar inputs, so that the level of technological relatedness among industries increases with the similarity in the composition of their inputs. Additionally, technological relatedness is expected to have a positive effect on regional resilience since skills, capabilities and technologies can be re-allocated rapidly across industries, thus, improving the capacity of a region to respond to an external shock. Second, local industries may be connected in terms of input–output relations: if a local productive system is highly vertically connected, then even a sector-specific shock can have a negative effect on regional resilience through propagation mechanisms. For this reason, vertical relatedness is expected to have a negative effect on regional resilience.

Indicators for a context-specific and place-based manner - Case-study approach:

- For multidimensional operationalization of destination resilience, indicators proposed in the paper by Bruneckiene et al. (2019) should also be considered. The authors present a methodology consisting of two parts: the model of capacity-related factors of a socio-economic system's resilience to economic shocks (Resilio model) and the index of a socio-economic system's resilience to economic shocks (Resindicis model). The Resilio model is based on the scientific analysis of the concepts of resilience and economic shocks and could be used as a universal methodological framework for analysing the resilience of the socio-economic systems of different levels (countries, regions, or cities). Meanwhile, the structure of Resindicis model can vary (i.e. the set of quantitative indicators) depending on the availability of and possibilities to gather the statistical information, despite the fact that the stages of the Resindicis calculation are universal.
- Also, cultural tourism impacts on a destination's resilience may be assessed by employing Strickland-Munro (2017) approach. The author develops a framework based upon resilience assessment guidelines (Resilience Alliance, 2010) and an earlier version developed by Strickland-Munro et al. (2010), which provides guidance for assessing the interactions among protected areas, tourism and surrounding communities, focusing on benefits for local communities. The four stages are: (i) system definition; (ii) system dynamics; (iii) current system state; and (iv) monitoring change. These stages construct an overall understanding of social interactions within the protected area tourism system, combining local input with other, multi-scalar stakeholder views and influences.

Considering all previously mentioned, and in the context of “resilience of what - to what”, we additionally propose the extension of Cochrane's approach (2010) (for details see Matteucci & Von Zumbusch (2020), i.e. Deliverable 2.1). His model emphasises three core elements: the ability to harness market forces, stakeholder cohesion and strong and consistent leadership. In that context Cochrane (2010) defines the determinants of resilience, while the measurement of resilience is missing, especially when questioning about “resilience of what to what?” (see Deliverable 2.1.). To fill this gap, we have developed the framework of the analysis, which targets the measurement of resilience of (cultural) tourism destinations.

The framework for modelling tourism destination resilience in this deliverable should be defined for cultural tourism destination, with the special focus on the aspects of tourism supply and demand. Additionally, the indicators should allow to advocate a multi-dimensional research approach in understanding the key processes and resilience dimensions of tourist destinations (Hall, 2008; Becken, 2013). Moreover, this enables interdisciplinary and post disciplinary thinking in tourism (Becken, 2013; Coles et al., 2006). Additionally, Luthe & Wyss (2014, cited in Hall et al., 2018) acknowledge how **assessing and planning resilience** is of growing importance since change processes and their interrelations have become more complex in a globalized, accelerated world, placing tourism under pressure to respond and adapt to various factors. In that context, this framework tries to define indicators of cultural tourism destination resilience, which would enable destinations to proactively plan adequate measures for corresponding stakeholders (organizations, business activities, etc.), keeping in mind that the ideal resilient destinations are those that ‘quickly recover from crises by adopting policies that acknowledge current and future risks’ (OECD, in Haxton, 2015: 33).

3.3.3. Conclusion of the analysis and further steps

The theoretical considerations on the concept of resilience and the framework for cultural tourism

destination resilience indicators presented in the preceding paragraphs determine the focus of this concluding paragraph. After elaborating the essence of the resilience concept, it is obvious that resilience thinking offers a valuable, novel tool for understanding interactions within tourism systems. Thereby, resilience thinking is premised on recognition of the complexity and continual change characterizing social and ecological systems, such as tourism destination (Strickland-Munro, 2017).

The framework should provide guidance for assessing the interactions among a cultural tourism destination system's actors, i.e. tourism supply and demand and surrounding communities, focusing on benefits for local communities in terms of resilience. Additionally, when focusing on resilience and resilience indicators the 3 focal questions, resilience to what, of what and over what period, should be targeted and answered. Four iterative, reflexive phases of research comprise a framework through which a progressive understanding of resilience of tourism system dynamics and governance can be developed based on the Strickland-Munro's (2017: 139) framework developed for the protected area tourism systems (being: system definition, system dynamics, current system state and monitoring). Her framework focuses on social interactions between system components, in line with newer inclusive and benefit-sharing paradigms guiding the management of protected areas and identified gaps in resilience thinking.

Thereby, our adaptation of the four stages of conceptual framework for assessing interactions within protected area tourism system defined by Strickland-Munro (2017), provides sound methodological framework for cultural destination's resilience indicator definition within this deliverable. Accordingly, Strickland-Munro's (2017) stages are adjusted and used to define the conceptual framework for resilience indicators in this WP, as follows:

(i) system definition:

- this is the stage where the first part of the answer to the question **“resilience of what”** is given. Thereby, this stage defines the geographical area or the unit of the analysis;

(ii) system dynamics:

- this is the stage where the definition of the disturbance or shock is determined, thus giving the answer to the question **“resilience to what”**. The disturbances or shocks represent the drivers, which are the fundamental factors underlying change (Walker et al., 2006). They may be socio-political (e.g. legislative change, land claims); economic (e.g. recessions); demographic (e.g. migration, visitor flux); biological (e.g. climate change, flooding); cultural (e.g. improved education, changing social norms); or technological (e.g. infrastructure development, improved Internet accessibility) (see Walker et al., 2006, Strickland-Munro, 2017). Thus, with the selection of the driver, the appropriate indicator to measure “the shock” needs to be selected from the Table 6, Annex. Additionally, parallel with the definition of a change or shock, the time frame for the analysis is considered. Indication of the period of the analysis assures that the question **“resilience over what period”** is answered.

(iii) current system state:

- this is the stage where, in the context of resilience, the second part of the question **“resilience of what”** is specified. Therefore, this stage defines the measure or indicators of resilience in line with the previous stages of the analysis.

(iv) monitoring change:

- this is the stage which offers the governance towards defined thresholds, and is part of the next

deliverable 4.2., so it is not going to be elaborated here. Nevertheless, this stage offers the analysis of determinants of resilience and sustainability. According to Cochrane (2017) by using resilience concepts as a framework, the factors which cause vulnerability in systems can be identified along with the factors which can enhance system capacity to absorb or withstand disturbance. Thus, this stage allows that through scenario analysis the development towards a desirable path is proposed and managed, and that the achievements of defined aims are possible. In conclusion, resilience framework adds the worth to the good governance for resilient and sustainable tourism development in (cultural) destinations.

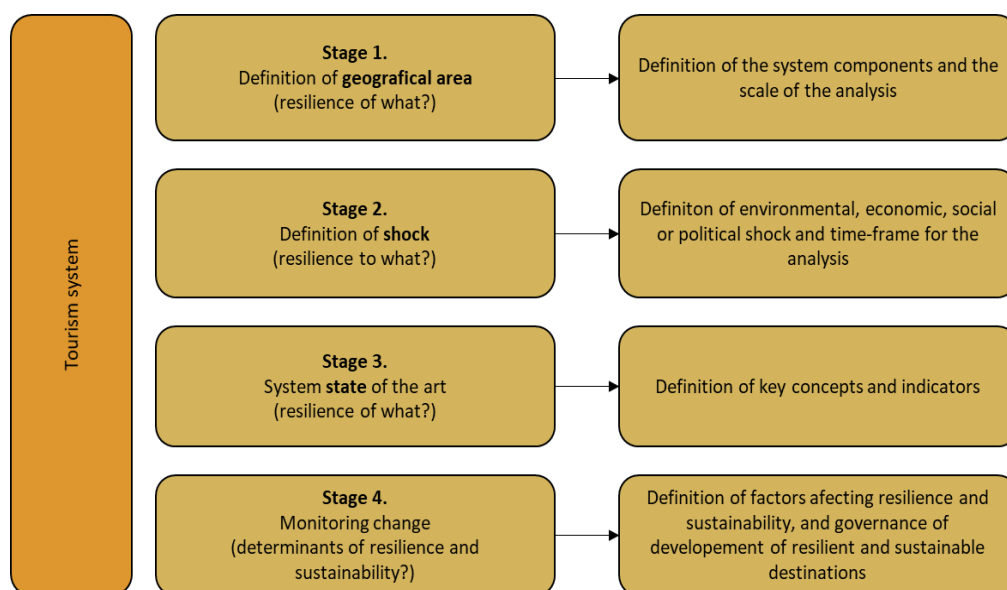


Figure 3. Conceptual approach regarding the framework for cultural destination's resilience indicators

Source: authors' adaptation of Strickland-Munro's (2017) conceptual framework

These stages construct an overall understanding of interactions within the tourism system, combining local input with other, multi-scalar stakeholder views and influences (Strickland-Munro, 2017; Strickland-Munro et al., 2010). Such an approach, in the context of the framework for cultural destination's resilience indicators, considers and accounts for system interactions and interdependencies across multiple scales and timeframes (for details see in Strickland-Munro, 2017; Resilience Alliance, 2010). Thereby, in the context of the future SRT framework, it represents a novelty for the field of cultural tourism destination's resilience and sustainability, by offering an alternative to existing linear methods.

Table 4 summarizes the preceding discussion. Thereby, it gives the clarification of the prospective indicators proposed in the analysis of cultural destination resilience.

Table 4. Summarized dimensions of destination's resilience and prospective indicators

Focal questions	Explanation			Specification of indicators	Indicators
Resilience to what?	definition of disturbance	the "sources"	environmental	Depending on the type of a shock, its manifestation is	Decrease in production (GDP change; tourism

	<i>or shock and the indicator for shock</i>	of shock	economic ²	mainly globally captured in the loss of production (GDP), while this loss additionally expands, causing at the destination level reduction of public and private investments, tourist arrivals/overnights, tourist revenues, the share of tourism in GDP, etc.	industry revenues change; the share of tourism in GDP...) Loss of human capital Decrease in quantity or quality of environmental, heritage or socio-cultural resources (material damage, etc.)
			social		
			political		
Resilience of what?	<i>definition of the "unit" of the analysis and indicator</i>	units of the analysis	country	The downturns in the economy, affected by different types of shock, primarily manifest on the labour market, i.e. in the loss of jobs. Those effects are particularly evident for regional labour outcomes in the EU after the global recession in 2008, and nowadays, during the COVID-19 pandemic. Consequently, the vulnerability of a system is most appropriately captured through its labour market changes, i.e. its pre-shock, shock and post-shock employment levels. In this manner, the evaluation of the depth of the shock and the speed of the recovery is conceivable.	Employment level (relative change during Pre-shock, shock and post-shock period)
			region/NUTS level		
			destination/Living Lab area		
Resilience over what period?	<i>time scale of the analysis</i>	indicated after the definition of a shock	year	Mostly, the period consists of pre-shock, shock and post-shock phases and enables the analysis of the vulnerability, resistance, robustness, adaptability and recoverability of the units under analysis.	Pre-shock, shock and post-shock period, defined on the basis of the shock definition.
			period, etc.		

Source: authors' elaboration

For the next stage of the analysis, related to the operationalisation of the SRT framework, a detailed explanation of resilience index calculation for cultural tourist destination is going to be conceptualised and included into the prospective model .

² According to Bruneckiene et al. (2019) economic shock is an unplanned change in operational conditions, or economic, politic, social, and/or natural environment; it is a phenomenon or an event in regional, national, and/or international economics which, if disregarded or managed with consideration of the current development strategy, may determine a sudden and significant negative and/or possibly positive impact on a system's development.

3.4. Tourism Area Life Cycle (TALC)

3.4.1. Theoretical considerations on the TALC model

The Tourism area life cycle model (TALC) (Butler, 1980) has become one of the most cited models in tourism literature. It describes the evolution of a tourist area through six stages (Figure 4), namely, the 'exploration', 'involvement', 'development' and 'consolidation', signifying growth expressed by visitor numbers, while the 'stagnation' stage represents a gradual decline. The end of the cycle is marked by the 'post-stagnation' stage, which comprises a set of five options that a destination may follow (Muller et al, 2010).

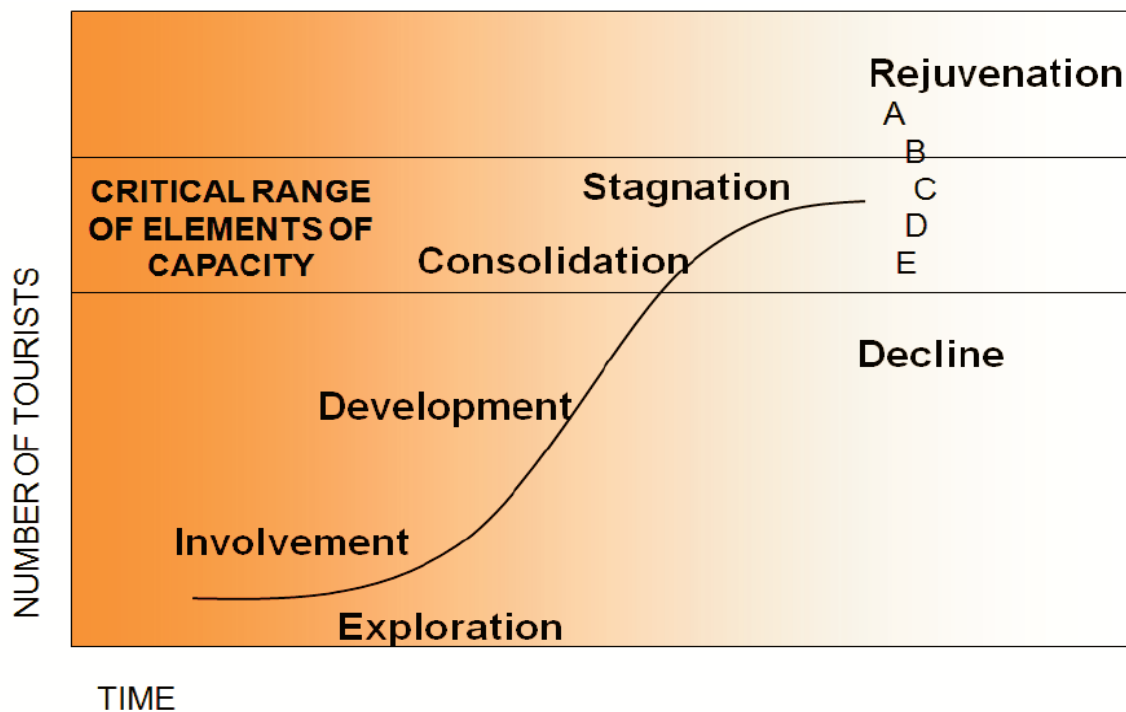


Fig 4. Hypothetical Tourism Area Life Cycle (Source: Butler, 1980)

As explained by Cole (2012), this evolutionary path is represented with an S shaped curve associated with the logistic function: $\frac{dV}{dt} = kV(M-V)$, where V is the number of visitors, t is time, M is the maximum number of visitors and K is an empirically derived parameter representative of the "telling" rate, or the spread of knowledge of the resort. The term $(M - V)$ determines that, as visitor numbers increase toward the level M , the rate of growth decreases which gives rise to the familiar S-shaped curve. Namely, by the time knowledge of a given destination is complete, there will only be a few people receiving the message for the first time and so the increase slows down, and as V approaches M , market penetration of a destination is complete. Thus, the most authoritative formulation of the TALC is a demand-side model.

Cole (2012) further explains that the above equation is the so-called Verhulst equation originally devised in 1838. Although originally conceived to describe the Malthusian growth of human populations faced with resource constraints, it has been applied across many natural and artificial systems including touristic ones, with endogenous growth and exogenous constraints, with a corresponding range of interpretations of the variables, their measurement and their meaning. In tourism, its extended version empirical testing was performed by Lundtorp & Wanhill (2001; 2006) on the cases of the island of Bornholm and the Isle of Man, using long run time series, from 1884 to 1912 and from 1912 to 1967 (without world war II), respectively. It

showed that even under the assumption of a uniform market that ignores the shifting patterns of tourist arrivals, the lifecycle curve can only be a truly representative aggregation if all tourists are repeating their visitation. Otherwise, the lifecycle model represents only a statistical approximation.

The purpose of the TALC model, as explained by Butler (2006; 2011), was primarily to draw attention to the dynamic nature of destinations and propose a generalised process of development and potential decline which could be avoided by appropriate interventions (of planning, management and development). Key to this was the concept of a destination's **carrying capacity**, in the sense that if it was exceeded, destination's relative appeal would decline, leading to the loss of its competitiveness, and consequently to declines in visitation, investment, and development. Butler (2006) also stresses that carrying capacity was always envisaged as having several components and not just a single number impractical to determine even in wilderness areas, let alone in such a varied setting as a resort or destination. As early as 1980 (p.10) he wrote that three critical factors were determining the TALC model, that is: "resident population", "tourists" and "tourism conditions, e.g. attractions and fixed capability", thus opening the quest for the most proper variables and indicators that may make the model more predictive.

However, only a few earlier papers ventured into statistical testing, e.g. by Getz (1992); Di Benedetto & Bojanic (1993); Lundtrop & Wanhill (2001;2006); Moore & Whitehall (2006), while in recent years an ever-growing number of authors undertake statistical testing and use different quantitative (statistical or mathematical) methods such as: Albaladejo & Martinez-Garcia, 2015; Yang, Yin, Xu & Lin, 2019; Lee & Jan, 2019; Lee & Jan, 2019; Albaladejo & Gonzalez-Martinez, 2019; Szromek, 2019; Zhang & Cheng, 2019, Cruz-Milan, 2019, etc. (Table 7, Annex). Yet, this is not always an easy task. As Zhong et al. (2008) stress, except for nature parks a major challenge in testing the TALC for many destinations is the difficulty in obtaining accurate long-term trend data of visitors, which additionally reduces the possibility of testing the basic hypothesis and modelling the curve for specific areas. As early as 1997, Agarwal pointed that data sets compiled by different research bodies were not based on identical or even similar criteria, which make it extremely difficult to use one data source alongside another in order to reconstruct holiday-making trends and patterns. Moreover, he reported that even methods of data collection were subject to modification over time ultimately causing trend analysis to being flawed. The situation today is pretty much the same.

Despite the unabated interest for the TALC implementation, it has been repeatedly criticized by researchers for a number of reasons, being summarized by Prideaux (2000):

- the (in)ability of one model to explain tourism development,
- problems with the concept of the product life cycle,
- conceptual limitations of "carrying capacity",
- the use of the cycle concept in tourism planning,
- a lack of empirical evidence to substantiate the concept,
- problems with determining the shape of the curve and turning points,
- the applicability of the model in practice, especially since only overnight stays and arrivals are used to position the destination in a particular stage.

To these general areas of concern Prideaux (2000) has also added the failure to take into account the operation of the economic market in destination areas.

As a response to TALC model's limitations and critics, some other approaches appeared, such as 'Innovation System Approach', the 'Path-Dependence Theory' and 'Chaos and Complexity Theory'. The first one was introduced by evolutionary scholars who expressed the need to consider a more holistic approach in

explaining destinations' evolution and development (Grabher, 2009). Hence, Sanz-Ibáñez & Anton Clavé (2014) stress the complexity of social phenomena and interaction between actors, while Prats et al. (2008) put the focus on the structure and quality of network ties. McLennan et al. (2012) point to the impacts of endogenous and exogenous factors, and unpredictable outcomes or chaos state, while Hjalager (2010) stresses importance of innovation and technology.

Chaos and Complexity Theory was initially proposed by Faulkner and Russell in 1997, as an alternative framework. It emphasizes the importance of entrepreneurs and planners as decision makers. Entrepreneurs are seen as actors of chaos while planners as regulators (Faulkner & Russell, 1997). The Chaos theory presumes that stability is not a normal state; usually, destinations develop under chaotic and uncertain circumstances, resulting in emergence of unpredictable outcomes that can cause a chain of reactions and will bring a phase shift in the evolution of the destination. As stressed by Russell (2006), by combining the TALC model with the principles of Chaos and Complexity it allows the somewhat paradoxical view of the evolution of destinations being both linear and complex, having both predictable and unpredictable outcomes. Additionally, Russell & Faulkner (2004) explained that stagnation stage of a destination, or an 'edge-of-chaos state' can be viewed as an opportunity to achieve productive change, which will push the destination into the next more innovative cycle. In line with the Chaos and Complexity theory postulates, Haywood (2006b) explains necessity to apply industrial ecology principles to tourism as a complex system for two reasons; first ecology provides a useful blueprint for designing destination and business strategies and second, lessons from ecology provide useful boundary conditions or constraints to destination's development.

Another alternative theory supplementing the TALC model is the Path-Dependence theory. It emerged as an attempt to explain the rise and decline stages of tourism areas that are perceived as a major weakness of the TALC model (Ma & Hassink, 2014). The Path-Dependence theory is focused on the historical evolution of the destination, and supports that 'history matters' in shaping development pathways. The main idea of Path Dependency is to show how actors' decisions are influenced by previous decisions from the past.

Given the aforementioned, and based on the results of the previous researches, our intention is to contribute to building up the body of knowledge related to the TALC model usage, e.g. to explore relationship among a (cultural tourism) destination's life cycle stage and its sustainability and resilience.

For that purpose, an extensive literature review was done (Table 7, Annex). However, in such an abundance of different information sources related to the TALC model, it was not an easy task to make an evaluation and choose the 'best' among them. One of the approaches, as suggested by Lagiewski (2006) may be to discuss each work as it appeared over time, which is rather time consuming. Another criterion is the author's attitude toward the model's usefulness and relevance, thus splitting the papers between those that support it against those that do not. Additionally, works could be broken down by methods employed or stages of the cycle addressed. Also, it might be useful to sort them with regard to variables/indicators used to describe life cycle stages. Given this, as Agarwal (1997) proposed, focus may be put on either one of two aspects: assessing the applicability of the model, and redeveloping the model to incorporate different issues. In the

end, a combination of these strategies, along with a broad division of the work based on broad themes may be used.

However, any of the approaches used to evaluate TALC related papers requires a great deal of efforts. That is why, for the purpose of delivering this report, it has been decided to run the search for the academic papers by using following approaches;

1. The first is by searching published papers indexed in the Web of Science Core Collection. The criteria employed with this regard are as follows:
 - Source of the analysis: Web of Science Core Collection
 - Indexes: SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC.
 - Document types: articles; proceedings paper; book chapter; book review; review
 - Timespan: 1980 (after Butler has published his seminal work on the TALC model) - 2020.
 - Key words: Tourism Area Life Cycle (Tourism Life Cycle)
 - Language: English
 - Results: 231 papers

The research areas included: area studies; urban studies; business; multidisciplinary sciences; development studies; geography physical; regional urban planning; ecology; geosciences multidisciplinary; social sciences interdisciplinary; humanities multidisciplinary.

The most relevant in terms of the number of papers: hospitality leisure sport tourism (109); environmental studies (25); management (25); economics (18); environmental sciences (16); sociology (15); geography (11). However, it is to be noted that some papers may have been attributed to more than one discipline (category) so the final score is not the same as the number of the papers analysed (231).

2. The second approach came from an additional search through SCOPUS to elaborate some important researches/studies not being listed in the WOS bases, as well as from an overview of two books edited by Butler (Vol I, Vol. II, 2006).

A review (performed in April, 2020) on the literature indexed in the WOS Core Collection showed 231 papers/studies that have employed Butler's (1980) TALC model, scrutinizing its dimensions and validity from different perspectives. The additional extraction of the papers specifically mentioning cultural tourism destinations has given us a list of 22 papers. However, as no clear criteria for cultural tourism destination were used in any of the analysed papers, we have decided to focus on the original list.

After examining the content of the papers listed and excluding those that do not fit into this analysis (being irrelevant with regard to the area of research, such as marine biology, climatology and alike, or content or language), the remaining papers that we considered as being of relevance are listed in Table 7, in Annex, briefly elaborating basic information about the paper, as well as those related to the methods used and results obtained/concepts explained. All in all, there are 62 retained papers analysed from the WOS Core Collection database and 26 from other sources (SCOPUS and books' edition).

3.4.2. Literature review results

Of all the papers presented (Table 7, Annex), thirty (30) are conceptual by their nature. Fifty-eight (58) papers are case studies, based on either qualitative (23), or quantitative (35) research methods. Methods used in *quantitative studies* range from descriptive statistics, through exploratory factor analysis (EFA), correlation analysis, regression analysis, panel data analysis, partial least squares structural equation modelling, cluster analysis (PCA), multiple regression modelling etc., while some papers use mathematical modelling.

The papers presenting cases follow a few or all of the Haywood's (1986; 2006a) six suggestions on how to make Butler's (1980) original tourist-area life cycle model operational, being:

- Determination of the unit of analysis,
- Determination of relevant market,
- Determination of pattern and stages of the TALC,
- Identification of the area's shape in the life cycle,
- Determination of the relevant time unit,
- Determination of the unit of measurement.

As for the **determination of the unit of analysis**, the model was implemented in many different tourism contexts. Hence, micro level case studies tended to focus on singular resorts or tourism attractions such as natural attractions (Getz, 1992; Johnson & Snepenger, 1993; Zhong et al., 2008; Liu et al., 2016; Ocampo, et al., 2019) and man-made artificial attractions (Di Benedeto & Bojanic, 1993). Other researchers implemented the model on the path of development of small districts or provinces (Agarwal, 1997; Dealbuquerque & McElroy, 1992; Karplus & Krakover, 2005; Oreja Rodríguez et al., 2008; Diedrich & García-Buades, 2009; Pratt, 2011; Lopez Guevara, 2011; Hazmi et al., 2012; Cole, 2012; Ma & Hassink, 2013; Garcia Sastre et al., 2015; Lundberg, 2015; Javier Baez-Garcia et al., 2018). Some are researching rural destinations (Golembski et al., 2010; Lee & Weaver, 2014; Yang et al., 2014; Kimmel et al., 2015) or mountain destinations (Tooman, 1997), while several studies are focused on heritage cities (Russo, 2005; Malcom-Davies, 2005; de Paula et al., 2016; Yun & Zhan, 2016). On the macro level, island nations (Lafferty & Fossen, 2005; Lundtorp & Wanhill, 2001; 2006; Moore & Whitehall, 2006; Diedrich & García-Buades, 2009; Hazmi et al, 2012; Cole, 2012; Omar et al, 2015; Baez -Garcia et al, 2018) and countries were studied (Harrison, 1995; Karplus & Krakover, 2005; Kristjansdottir, 2016; Peroff, et al., 2017; Kubickova & Li, 2017; Lee Tsung Hung & Fen-Hagh, 2019; Upchurch & Teivane, 2000; Kozak & Martin, 2012) and even a continent, e.g. Antarctica (Kruczek et al., 2018).

Regarding the **determination of relevant market**, opposite to the Butler's original idea of the total number of tourists over time as the measure of change/pressure, Haywood (1986) suggests that it may be more helpful to consider tourists by different market segments because they interact differently with the tourist area. Thus, some authors suggest the need to distinguish between individual and organised tourists (Berry, 2006), or between resident tourists and daily visitors/excursionists (Russo, 2006), or between repeaters and no-repeaters (Lundtorp & Wanhill, 2001; 2006) or they ask to divide markets based on psychographic analysis of motivation (Malcolm-Davies, 2006; Russo, 2006, etc.).

Concerning the **TALC pattern and stages**, Butler (1980) proposed the s-shaped logistic curve to explain tourist area life cycle, but at the same time he stressed (p.11) that: "the shape of the curve must be expected to vary for different areas, reflecting variations in such factors as rate of development, government policies, and number of similar competing areas." Concerning the TALC shape Haywood (1986) suggests to look at other evolutionary curves instead of the s-shaped curve solely, given that no two tourism life cycles are alike, since speed, process and extent of tourism developments differ from one locale to the next. Thus, he presents (p.157) different types of life cycle curves adjusted to specific areas/destinations such as: well managed and safe urban centre that enjoys variety of tourist attractions and continues to attract a consistent number of visitors; an instant resort complex that has strong drawing power; a regional area that peaks and falls in terms of visitations; an urban resort that adds a new major attraction. Berry (2006) explains that without appropriate intervention from responsible policy makers, it is likely that some tourism regions will not behave as the model suggests. With regard to the life cycle stages, some of the elaborated cases exhibit all the stages of development (Hovinen, 2006; Lundgren, 2006; Moore & Whitehall, 2006, etc.), while some focus on just

one or a few stages. Hence, Faulkner & Tideswell (2005), Manente & Pechlaner (2006), Kozak & Martin (2012), Javier Baez-Garcia et al. (2018) are focused on maturity and /or decline stage, Pritchard & Lee (2011) are dealing with the development stage while Malcolm-Davies (2006) focuses on rejuvenation stage. Coelho & Butler (2012) stress that not all destinations have to go through all the life cycle stages, while Hovinen (2006) elaborates how different stages could even coexist for a tourism destination. He gives an example of the Lancaster County, which is a diverse and culturally based tourism destination where different sectors of tourism combine to create what is now a mature industry where growth, stagnation, decline, and revitalization through reinvestment or new investment coexist. Similarly, Getz (1992) explains how Niagara Falls, as a single natural resource-based destination evolved into, what he calls “a permanent state of maturity in which aspects of consolidation, stagnation, decline, and rejuvenation are interwoven and constant” (p.752).

Furthermore, the literature review reveals that **time unit** used to observe a destination’s life cycle ranges from a few decades (as in: Di Benedetto & Bojanic, 1993, from 1949–1984) to a period of more than a century (Szromek, 2019; Albaladejo & Martinez Garcia, 2017; Lundtorp & Wanhill, 2001; 2006; Getz, 1992). Also important to stress is that there are many instances when it may be appropriate to develop a tourist-area cycle based on quarterly or monthly data, by using some form of moving average to deal with seasonal and other fluctuations (Haywood, 1986).

A great deal of the TALC related literature is narrowly focused on visitation as the **unit of measurement**. Butler (2006b) stressed that the TALC model had at its core the belief that if demand and visitation exceeded the capacity of the destination, however defined (physical, economic, environmental or psychological), then the quality of experience for visitors, quality of life for residents and the destination’s physical appearance would suffer, consequently causing the loss of attractiveness, and decline of visitor numbers. Although there is not a magic number for carrying capacity, he considered it being reasonable to assume that the stage of development of the destination will also affect the level of capacity, thus making these two concepts mutually affecting each other. Haywood (1986) uses the percentage change in the number of tourists to identify when an attraction moves from one stage of the lifecycle to the next. He suggested that a persistent decline of around one half of one standard deviation could indicate that the destination was in the decline phase, while an increase of a similar magnitude could delineate the development period. The stagnation stage would be evidenced by a decline in arrivals of between one half of one standard deviation and zero, while the consolidation period would be demarcated by zero growth or growth of less than one half of one standard deviation. Di Benedetto & Bojanic (1993) used tourist attendance as the unit of measurement in their model, and augmented it with a dummy variable to capture revitalization, the impact of new attractions, and environmental influences, such as the fuel crisis of 1974 and 1979, the World’s Fair, EPCOT Center and the Cuban missile crisis. Hovinen (2006a) emphasizes that carrying capacity indication a stagnation may be more a perceptual issue (significantly differing among residents, visitors and businesses), which is why he suggests that if the number of tourists is to be used as a measure, consideration should be given to some ameliorating variables as: the length of stay; dispersion of tourists within and throughout the tourist area; characteristics of the tourist; and the time of year in which the visit is made. Some authors use accommodation capacities as a kind of proxy for investments in a destination’s tourism (Cole, 2012). Karplus & Krakover (2005) used monthly bed-night data as a measure of demand. In a paper by Cruz & Peñarrubia Zaragoza (2019) (explored separately from those retained for analysis), Defert’s ‘tourist function index’ was mentioned as being used as a proxy for measuring tourism saturation. It actually measures the number of the total accommodation spaces per every 100 inhabitants. It suggests ranges of values indicating whether destination is more or less saturated, with the values greater than 100 indicating extremely high saturation, that coincides with the

stagnation or decline stage. However, Cruz & Peñarrubia Zaragoza (2019) do not see it as an appropriate indicator of saturation unless related to the level of tourist satisfaction. Romão et al. (2013) developed a simplified version of the tourism area life cycle model in order to identify different stages of tourism evolution among the regions of Southwest Europe (Italy, France, Spain and Portugal) using growth rate of nights spent by tourists and Location Quotient related to the employment in hotels and restaurants as a measure of importance of economic activities related to tourism. They included that information as a dummy variable in a panel data model, together with other variables related to sustainability (regional natural and cultural resources), regional innovative efforts and other elements related to tourism infrastructures and economic conditions that influence regional tourism performance. Diedrich and Garcia-Buades (2000) explore the perceptions of the residents about the impacts of tourism activities as signals of the evolution of tourism destinations, using them in order to prevent the negative consequences of excessive demand and pressure on local resources.

Haywood (2006a) points out that more and more researchers try employing more complex and/or non-traditional concepts such as the Balanced Scorecard, and different sustainability and life quality indexes. Thus, Lozano et al. (2008) have analysed the evolution of tourism destinations from the point of view of the economic growth theory, by using the dynamics of the number of tourists, tourism revenues, environmental quality, congestion of public goods and welfare. Coelho and Butler (2012) developed a Tourism Development Index (TDI) to identify the stage of the life cycle and, at the same time to show the level of development of a tourism destination in a competitive context. They also showed that through a random simulation, based on specific assumptions, it is possible to quantify the different stages of the life cycle. Hence, a decrease of the TDI shows the decline stage of the life cycle; a small TDI suggests the exploration stage, a middle value of the TDI suggests the involvement or development stages and a high value suggests the consolidation or stagnation stages. Johnson & Snepenger (1993) used visitation trends, growth of the service economy in the region, host residents' perceptions of current tourism development, and current biological indicators of the ecosystem for monitoring the tourism life cycle. Manente & Pechlaner (2006) point that it is insufficient to define 'decline' merely by actual decreases in guest numbers and turnover, which is why they developed IDES, i.e. Interactive Destination Evaluation System, a holistic diagnostic system acting as a Virtual Warning Machine which, once strategic variables have been selected and appropriate decline thresholds adopted, helps to anticipate decline and gives an input for the implementation of practical measures to face it (p.246). To make the system working five variables have been identified by a group of experts and validated by selected destination managers, being as follows: tourists- residents ratio; excursionist share; economic role of tourism (proxied by investment in tourist attractions); Gini seasonality index³; Gini demand structure index.

Two other variables, namely '*lack of co-operation*' (proxied by the percentage of operators and organisations involved in partnership and '*environmental impact*' (proxied by use intensity indicators such as the number of visitors/surface) have been added to this list in order to acquire more comprehensive insight into the destination.

Summarizing results of a number of case studies applying the TALC model, Ma & Hasink (2013: 93-94)

³ The Gini coefficient measures the inequality among values of a frequency distribution (for example, levels of income). A Gini coefficient of zero expresses perfect equality, where all values are the same (for example, where everyone has the same income). A Gini coefficient of one (or 100%) expresses maximal inequality among values (e.g., for a large number of people where only one person has all the income or consumption and all others have none, the Gini coefficient will be nearly one. It was proposed by the Italian statistician and sociologist Corrado Gini and published in his 1912. It may be equally used to measure inequalities among values of other variables such as seasonality and demand structure as in above explained IDES model.

conclude that the key factors affecting destination's life cycle can be categorized into three types: (a) physical factors, such as endowment with tourism resources, locational advantages, environmental conditions, natural disasters; (b) social factors involving changes in economic conditions, changes in the preference and needs of tourism and the political environment; and (c) human-oriented elements, including man-made attractions, tourism planning and management, resort marketing, transport accessibility, the capability of entrepreneurs and tour operators, tourism investment and government policies.

An equally important issue in the elaborated papers is the number of stages a destination passes during its lifetime. With this regard it was already Haywood (1986) who pointed out that the existence of a variety of non-S-shaped curve patterns implies that there are alternatives to the traditional stages to the tourist-area life cycle. Moreover, he said that even those who accepted the S-shaped curve as the dominant pattern of the tourist-area cycle-of-evolution, identified a varying number of stages and labels for these stages. Thus, Dealbuquerque & Mcelroy, (1992) suggest that Caribbean islands pass through three primary stages of tourist development: low-density exploration, rapid growth and consolidation, and high-density maturation involving the substitution of man-made for natural attractions. Prideaux (2000) argues that a new approach to the issue of resort development is required and proposes a new model, the Resort Development Spectrum, with the four life cycle stages. In his 'simplified' version of the TALC model, Romão et al. (2013) suggest three staged TALC model with the following criteria for measuring change along the stages: *exploration* -the regions with low (or negative) rates of growth, the level of specialisation has been calculated using a Location Quotient related to the employment in hotels and restaurants; *development* stage of a tourism destination is characterised by high tourism demand growth rates; *stagnation* - regions with higher specialisation in tourism activities were positioned in the 'stagnation' stage, meaning that tourism is economically important but growth rates are low.

In conclusion, despite obvious vagueness, the TALC model is considered to be useful in order to identify general tendencies, to anticipate problems and opportunities and to create adaptive strategies to respond to the evolution of tourism activity and its constraints.

3.4.3. Conclusion of the analysis and further steps

Considering all that has been explained so far, and bearing in mind the focus of the project, the following is the brief outline of the steps to be taken and methodology to be used to describe the role of the TALC in the future Sustainability-Resilience-TALC (SRT) model that is to be elaborated in the deliverable 4.2.

Further TALC research will be conducted towards the analysis of the structure of cause-consequence links among elements of a destination (tourist area) system. This means that the destination as a system will be further split into subsystems, each one of them specifically behaving, and while interacting with each other, shaping the destination's life cycle stages. For this purpose, the system dynamics methodology will be used.

Key constituents of the system dynamic models are feedback loops and delays that serve to connect data in an interactive manner, in accordance with the internal logic of the observed system. It was Richardson & Pugh (1981) who elaborated that all dynamic models were controlled by two types of feedback loops, each one of them behaving in a specific manner. Positive feedback loops amplify the momentum of action, while negative feedback loops limit action, consequently regulating the system. An example of each type of loops may be associated with the basic equation describing typical behaviour of the Butler's original TALC model.

Namely, in the original equation, $dV/dt = kV(M-V)$, the change of the number of tourists in time, dV/dt , is the product of the two expressions, e.g. $k * V$ and $(M - V)$. The variable dV/dt indicates change of the number of tourists ($dV = V_{t_2} - V_{t_1}$) in the time interval ($dt = t_2 - t_1$). The expression $k * V$ indicates that this change depends on the penetration coefficient (k) and the number of tourists V at time unit t_1 , or in other words, variable V grows exponentially in each subsequent time unit (step), because dV is attributed to variable V . The question arises as to how long the variable V (number of tourists) will grow. A look on the other expression $(M - V)$, shows that in each subsequent time unit its value is reduced. Namely, as V increases in each subsequent time unit, due to the first expression, $k * V$, the second expression, $M - V$, decreases. This indicates that the feedback loop (-) **FBL2** regulates the growth of the number of visitors in the observed destination, described by (+) **FBL1** (see Figure 5.a).

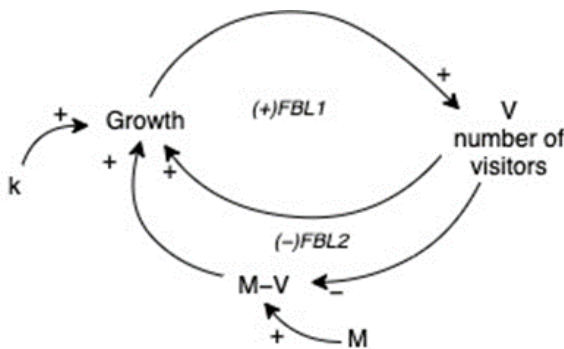


Figure 5.a) Structural scheme of TALC

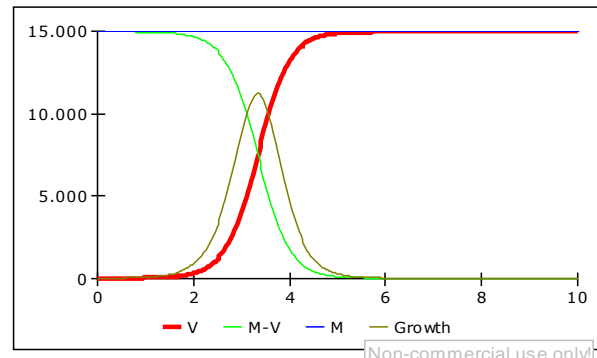


Figure 5b) Simulation scenario in Powersim of the hypothetical TALC model ($V_0=1$; $k=0,0002$; $M=15000$)

Such a combination of (+)FBL1 and (-)FBL2 results in the Butler's S-shape curve (Figure 5.b). In previous studies, the penetration coefficient k and the maximum number of visitors M were observed as constants. Haywood (1992) identifies them as a destination's carrying capacity, while Ioannides (1992; as cited in Lundtorp & Wanhill, 2001) concludes that there must be more than one 'upper limit'.

However, it has to be borne in mind that destinations develop over time, which is why, in order to get a comprehensive picture of their development, it is necessary to look at M not as a constant, but as a variable. Furthermore, the development of information-communication technologies (ICT) allows faster transfer of information, thus indicating that even k can be viewed as a variable. Given the aforementioned, these variables can be used to analyse in which way elements of a destination system can affect its life cycle dynamics. Hence, the next step in the deliverable D4.2, is to conduct a deeper analysis of the chosen elements (being both, causes and/or consequences) in order to develop the TALC model and make it fit with the SRT framework.

Development of a tourist destination as a system is usually seen as the result of the two interrelated subsystems, e.g. supply and demand (Hall, 2005; Jakulin, 2016, etc.). This implies existence of three important considerations contributing to the dynamics of a destination, being: changes in visitor preferences and needs (demand conditions), gradual deterioration and possible replacement of physical assets and facilities (supply conditions), and change or disappearance of original natural and cultural attractions responsible for the area's initial popularity (supply-demand interaction) (Fritz, 1989). Ever since Butler's seminal work (1980),

most of the researchers dealing with the TALC model (Haywood, 1986; Di Benedetto & Bojanic, 1993; Lundtorp & Wanhill, 2001, etc.) approached it from the demand side. In this research we intend to extend the model by approaching it from both demand and supply sides, for which purpose a combination of DPSIR (Drivers, Pressures, States, Impacts and Response) framework and system dynamics methodology will be used. The DPSIR framework will serve to better systematize sustainability indicators (Siwailam et al., 2019).

As presented in the Figure 6, the interaction between the subsystems of supply and demand takes place in their cross section. Simply put; a destination uses DRIVERS to attract VISITORS; increased number of VISITORS results in increased PRESSURES. Other elements of DPSIR describe the structure within the very destination system. By increasing PRESSURES, the STATES worsens and leads to negative IMPACTS, eventually causing negative effects on DRIVERS. Accordingly, Figure 6 shows the causal relationships with their (+ and -) signs that indicate direction and effects of an action (proportionality / inverse proportionality).

If a number and/or quality of the DRIVERS is reduced, the drop of the variable M on the demand side is expected. To mitigate such a situation, management tools and measures, observed as RESPONSES, must be introduced. By introducing RESPONSES, PRESSURES caused by an increased number of visitors (V) are reduced; STATES caused by an increase of PRESSURES are improved; IMPACTS generated by STATES are decreased, and DRIVERS affected by increased IMPACTS are enhanced.

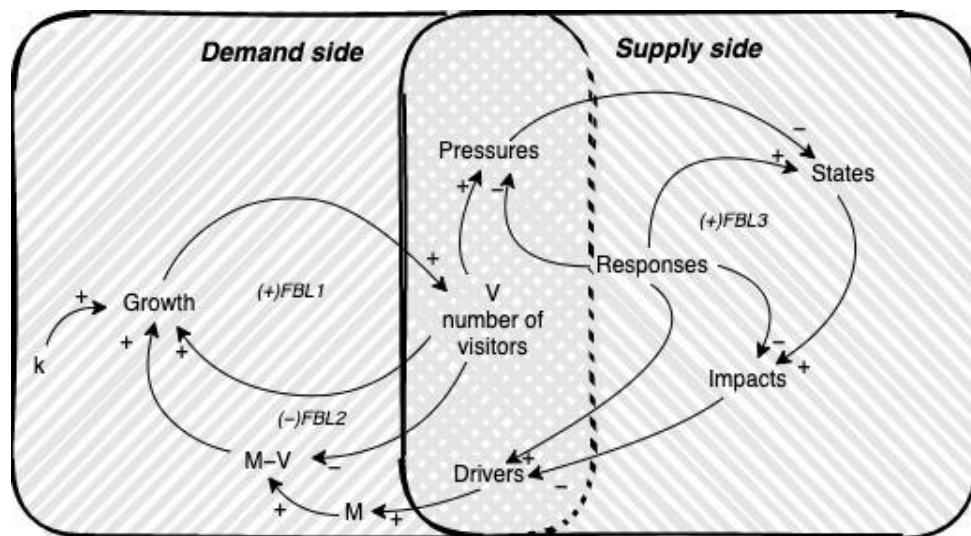


Figure 6. System dynamics approach to explanation of demand and supply subsystems' interaction

Based on the above-explained, it may be concluded that the overall shape of the TALC depends on three "main" feedback loops:

- (+) FBL1, described by the exponential growth of visitor arrivals (V);
- (-)FBL2, described by the self-regulating variable V, limited by the potential market (M) in a time unit t;
- (+)FBL3 described by the exponential growth of the residents' dissatisfaction (resistance) with regard to the growth of visitors.

Reaching the optimal number of visitors may be achieved by managing life cycles in order to establish balance among the three mentioned FBLs. Hence, a conceptual model to be delivered in the deliverable D4.2, is going to be based on a few sustainability indicators (environmental, social, economic and cultural) selected out of those presented in chapter 3.1.1., each one of them being assigned to either D, P, S, I, or R group.

Conceptualisation of the TALC as a system dynamic model is expected to provide new insights into demand and supply interactions. Moreover, it will enable:

- **Analysis of the limits of growth in terms of the number of visitors**, by introducing different factors affecting sustainability on the supply side; namely, development of the simulation macro-model will enable creation of development prognostic scenarios for tourist destinations, thus supporting better decision-making and eliminating uncertainties typical for the declining stage of the TALC model.
- **Determination of the TALC stages' thresholds** based on simulation of prognostic scenarios concerning the number of visitors and the duration of each stage, as explained by the Figure 5.b), maximum value of the function (variable) Growth coincides with the change in the shape of the TALC curve. Mathematically, the Growth function represents the first derivative of the variable V , which is the rate of change. Thus, the TALC curve can be divided into two periods: the period when the number of visitors grows and the period when it falls. Similarly, through the second derivation, it is possible to observe the acceleration of the change, which allows the TALC curve to be divided into five stages. In the research by Lundtorp & Wanhill (2001), this approach was applied up to the fourth derivation, but with only the demand side being observed. Extending the simulation model to the supply side will help in determining the causes/logic lying behind the threshold of each of the stages. Simply, instead of the stages being analysed based on the shape of the life cycle curve, the curve will be shaped according to the analysed life cycle stages' characteristics.
- **Simulation of the cultural tourism impacts** on the development of a destination with regard to its life cycle stage; by introducing indicators with regard to both, the DPSIR framework and feedback loops through the demand side, the presence of a circular impact on the supply side will be examined.
- **Examination of resilience of a destination** with respect to unpredictable shocks: For the purpose of testing the resilience of a destination, it is also possible to simulate shocks using available functions (e.g: STEP or PULS functions) on selected variables within the modelled system.

04 References

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Annex 1. Overview of the literature related to the basic concepts

Table 1. The analysis of the sustainable tourism development indicators

Type*	Reference	The indicators used	Data collection method and source
Sustainable environment	Navaro, Martínez & Jiménez, (2019)	<ul style="list-style-type: none"> Waste generated Population density by NUTS 2 Heating degree-days by NUTS 2 Motorway network by NUTS 2 regions, kilometres per thousand square kilometres Tourist density Coverage rate of municipal waste collection 	Official statistics – NUTS 2 level
	Qureshi, Elashkar, Shoukry, Aamir, Mahmood, Rasli & Zaman, (2019)	<ul style="list-style-type: none"> Ecological footprints Hectares Forest Area 1000 Hectares Mono-nitrous oxides Gigagrams CO2 equivalent NOx Carbon dioxide emissions CO2 Greenhouse gas emission GHG Sulfur dioxide emission 	UNEP (2016)
	Lozano-Oyola, Blancas, González & Caballero, (2019a)	<ul style="list-style-type: none"> Percentage of the destination's surface considered to be a protected natural area Number of species in the destination Final energy consumption attributable to tourism Percentage of renewable energy consumption with respect to the total attributable to tourism Water consumption attributed to tourism Volume of reused Volume of treated wastewater Management of solid urban waste Volume of waste generated Volume of recycled waste compared to total volume of waste Number of paper and cardboard recycling bins Volume of collected paper and cardboard Number of glass recycling bins Atmospheric pollution Daytime noise levels Night-time noise levels Pollutant emission levels Construction density per unit area Total area of natural landscape Unoccupied buildings Total tourists per unit area Existence of an environmental administrative unit 	Statistical information and via field work
	Lozano-Oyola, Contreras & Blancas, (2019b)	<ul style="list-style-type: none"> Protected natural surface in the destination Biodiversity: number of species Final energy consumption attributable to tourism Percentage of renewable energy consumption attributable to tourism Water consumption attributed to tourism Volume of reused water Volume of wastewater receiving treatment Volume of waste generated Volume of recycled waste compared to total volume of waste Provision of containers for paper-cardboard collection Paper and cardboard collected: volume Provision of containers for glass collection Construction density per unit area Total area of natural landscape 	Statistical information and field work

Sevinc, Konakoglu, Heldak, Kurdoglu & Wysmulek, (2019)	<ul style="list-style-type: none"> ■ Unoccupied buildings ■ Daily number of tourists per 1 km² ■ Local mobility: types of means of transport ■ Maximum population density (peak season) per km² ■ Beds in secondary residences (in % of total lodging capacity) ■ Ratio of built-up area to natural areas ■ Size of protected natural areas (in % of total destination area) ■ Evolution of different leisure time activities with intensive use of resources: ■ Number of snow canons, ■ Area covered with artificial snow, ■ Capacity of lifts, cable cars and similar transport facilities ■ Percentage of renewable energy in total energy consumption (entire destination, locally produced or imported) ■ Energy use by type of tourism facility ■ Sustainable use of water resource - Ratio of water imported (pipelines, ships etc.) ■ Percentage of houses and facilities connected to waste water treatment plants ■ Percentage of solid waste separated for recycling % ■ Total of solid waste land-filled and/or incinerated ■ Monthly table of waste production Tons/month 	Official statistics, own observations and interviews with local authority representatives
Weng, He, Liu, Li & Zhang, (2019)	<ul style="list-style-type: none"> ■ Government protects historical and cultural resources of Pingyao ■ Government helps improve quality of life of residents ■ The arrival of tourists pollutes the environment ■ The attractions of Pingyao can attract my attention ■ Residents' pressure on government due to tourism activity ■ Residents' activities pollute the environment ■ Tourism resources are protected by limiting the number of tourists ■ Managers of Pingyao pay attention to protecting tourism resources ■ Tourists protect the environment of Pingyao ■ Oversupply of tourists during peak periods destroys environment ■ The development of tourism reduces the environmental quality ■ Tourists' weak environmental awareness destroys the environment ■ Tourism enterprises put the protection of resources first ■ Enterprises' pressure on government in developing tourism ■ Local tourism enterprises pollute the environment 	Survey of resources administration, residents, tourist and enterprises
Farinha, Jos, Silva, Lança, Pinheiro & Miguel, (2019)	<ul style="list-style-type: none"> ■ Average air temperature ■ Temperature extremes ■ Nº beaches and marinas with blue flag ■ Nº bathing water and quality classes ■ Municipal expenses in environment per 1000 inhabitants ■ Nº embarked and disembarked passengers – Airport ■ Nº passenger-kilometres carried by enterprises exploring inland transportation ■ Nº embarked and disembarked passengers of cruise ships ■ Movement of passengers in inland waterways ■ Nº and location of charging stations for electric vehicles ■ Daily traffic on A22 and EN125 ■ Electricity consumption per inhabitant ■ % gross electricity production ■ Car fuel consumption per inhabitant ■ % Safe water ■ Water consumption per inhabitant ■ % Wastewater treated ■ Quality indicators of the wastewater sanitation service 	75% of the selected indicators can be directly obtained, or calculated, using available and reliable source information

	<ul style="list-style-type: none"> ■ % Urban waste prepared for reuse and recycling ■ Urban waste selectively collected per inhabitant ■ Burnt area ■ Investments on protection of biodiversity and landscapes of municipalities ■ Nº Green spaces for public use ■ % Reconstructed total area ■ Air quality index 	
Thongdejsri & Nitivattananon, (2019)	<ul style="list-style-type: none"> ■ Quantity of water use in accommodation places ■ Quantity of water use in attractive places ■ Weight of waste generated (kg/month) ■ Quantity of raw ingredient of food products ■ Quantity of mineral used as raw ■ Fuel used in production 	Different primary collection methods (questionnaires, observations, interviews, group discussions) with different stakeholders (tourists, enterprise owners, communities, local government agencies)
Torres-Delgado & López, (2017) based on previous work Torres-Delgado & Palomeque, (2014)	<ul style="list-style-type: none"> ■ Energy consumption kW h/PTP/day ■ Water consumption litres/PTP/day ■ Waste generation kg/PTP/day ■ Land use distribution % urban land use ■ % environmentally certified tourism establishments ■ Number of tourism plans incorporating environmental criteria 	Various sources – statistical institutions, sectoral bodies, town councils, published works, GIS and field work
Blancas, Javier, Lozano-Oyola, González & Caballero, (2018)	<ul style="list-style-type: none"> ■ Percentage of the destination's surface considered to be a protected natural area ■ Number of species in the destination ■ Final energy consumption attributable to tourism ■ Percentage of renewable energy consumption with respect to the total attributable to tourism ■ Water consumption attributed to tourism ■ Volume of reused water ■ Volume of treated wastewater ■ Volume of waste generated ■ Volume of recycled waste compared to total volume of waste ■ Number of paper and cardboard recycling bins ■ Volume of collected paper and cardboard ■ Number of glass recycling bins ■ Daytime noise levels ■ Night-time noise levels ■ Pollutant emission levels ■ Construction density per unit area ■ Total area of natural landscape ■ Unoccupied buildings ■ Total tourists per unit area ■ Existence of an environmental administrative unit 	Various sources: 61.54 official statistics, 26.15% requested and compiled from the Institute of statistics, 12.31% field work
Pérez, Santoyo, Gurrero, León, da Silva & Caballero, (2017)	<ul style="list-style-type: none"> ■ Tourists' evaluation about destination cleanliness. ■ Tourists' evaluation about the offer of activities involved with the natural resources of the destination. ■ Perception of local residents about the effects in the environment and impairments of natural spaces caused by tourists. ■ Perception of local population about whether the tourist stimulates local crafts and culture. ■ Tourists' evaluation about the conservation of cultural resources and heritage in the destination. 	Tourists' and residents' survey
Ziaabadi, Malakootian, Reza, Mehrjerdi & Jalaei, (2017)	<ul style="list-style-type: none"> ■ The percentage of the local people who have access to clean and healthy water ■ Quality evaluation of water of tourism regions (water pollution) (0–10) ■ Waste produced by the tourism sector - waste per capita (daily) ■ Noise pollution ■ Annual emissions of greenhouse gases per capita ■ Tourists evaluation of environmental health (0–10) ■ li6(+) ■ People imagination from tourism environmental damages (0–10) ■ The percentage of protected natural regions/total natural regions Biodiversity and species diversity of flora and fauna (per unit area) ■ Energy consumption daily (per capita) ■ Water consumption daily (per capita) ■ Construction density in area unit 	Secondary data, questionnaire

	<ul style="list-style-type: none"> ■ The rate of region erosion ■ The percentage of the region's natural landscapes ■ The number of natural attractions to region area ■ The percentage of agricultural land to total region area ■ The number of tourists in region unit area ■ Disserted villages/total number of villages ■ The number of tourists in protected region unit area ■ An environmental administrative unit ■ Assessment of promoting environmental awareness (0–10) ■ Budget of cultural heritage-historical (per capita) ■ Percentage of the region vegetation ■ The number of rare plant species (per unit area) ■ The diversity of plant species (per unit area) ■ Rare animal species (per unit area) ■ The diversity of animal species (per unit area) 	
Önder, Wober & Zekan, (2017)	<ul style="list-style-type: none"> ■ Seasonality based on total foreign and domestic bed-nights (economic/environmental/social) ■ Density (environmental) 	Official statistics (MIS)
Pérez, Guerrero, González, Pérez & Caballero, (2013)	<ul style="list-style-type: none"> ■ Energy consumption by tourist per day ■ Energy consumption of renewable sources per year attributable to tourism ■ Volume of daily water consumed by tourists ■ Percentage of local population with access to clean water ■ Volume of solid waste attributable to tourism. ■ Reduction of solid waste attributable to tourism. ■ Tourist evaluation of cleanliness at the destination ■ Size of the area dedicated to tourism ■ Number of tourists per square kilometre ■ Tourist evaluation of activities related to natural resources at the destination ■ Perceptions by the local population concerning environmental damage caused by tourism 	Official statistics, resident survey.
Gössling, (2015)	<ul style="list-style-type: none"> ■ Renewable water resources per guest night in peak season. ■ Area of irrigated land per bed ■ Area of pool per bed ■ Amount of meats and dairy products per guest night ■ Energy use per guest night ■ Share of rooms fitted with low-flow options ■ kg of laundry used per guest night 	Field survey, official statistics.
Bhuiyan, Siwar & Ismail, (2016)	<ul style="list-style-type: none"> ■ Ecotourism conserving natural resources ■ Ecotourism providing sustainable harvest ■ Improving residents' living environment and quality ■ Local residents are interfering with resources in tourism area ■ Residents have no pressure for resource exploitation ■ Residents have no pressure for surrounding development ■ Tourism activities degrading the environment ■ Activities of residents' livelihoods threat to tourism areas' ecosystem ■ This site has provided exceptional sense of appreciation ■ The site has attracted my consciousness for protecting environment ■ Ecotourism destroying environmental quality ■ Ecotourism not creates overloading capacity in peak periods ■ Ecotourism polluting local environment 	Resident survey, visitor survey.
Blancas, Lozano-Oyola, González & Caballero, (2016); Blancas, Javier, Lozano-Oyola & González, (2015)	<ul style="list-style-type: none"> ■ Percentage of the destination's surface considered to be a protected natural area ■ Final energy consumption attributable to tourism ■ Percentage of renewable energy consumption with respect to the total attributable to tourism ■ Energy intensity attributable to tourism ■ Water consumption attributed to tourism ■ Number of urban wastewater treatment plants per 1000 inhabitants ■ Percentage of population connected to wastewater treatment systems 	Official statistics. National statistics and Eurostat.

	<ul style="list-style-type: none"> Volume of waste generated Volume of waste treated Percentage of waste managed by recovery with respect to waste managed Percentage of waste managed by energy recovery with respect to waste managed Percentage of waste managed by incineration with respect to waste managed Percentage of waste managed by disposal with respect to waste managed Volume of recycled packaging waste Percentage of recycled packaging waste with respect to what is recovered Percentage of total population affected by noise from neighbours or from the street Annual emissions of air pollution (sulphur oxides, nitrogen oxides, ammonia, non-methane volatile organic compounds) per person and day CO2 emissions per inhabitant Built area Total area of natural landscape Road network density Total tourists per unit area Government expenditure on environmental protection per inhabitant Domestic material consumption 	
Iliopoulou-Georgudaki, Kalogeras, Konstantinopoulos & Theodoropoulos, (2016)	<ul style="list-style-type: none"> Protection of natural/cultural heritage Water supply capacity Coastal/inland water quality Wastewater treatment 	
Jurigova & Lencsesova, (2015)	<ul style="list-style-type: none"> Existence of land use planning and regulation Existence of building regulations and environmental impact assessment procedure Modes of public and environmentally friendly transport to reach the destination (frequency, capacity, occupancy rates, price) % of sites and tourism enterprises accessible by public and environmentally friendly transport % of visitors arriving by means other than car or plane % visitor use of public and environmentally friendly transport when in the destination % of enterprises with recognized environmental certification Environmental state of selected sites Number and size of protected sites and land area Percentage of selected types of precious landscape area (e.g. ski slope) that is built upon Number of buildings, commercial signs, infrastructure, that can be seen from viewpoints, along scenic roads % of area with traditional land use % of ski lifts in eroded conditions % of enterprises reporting that they are taking 	
Lozano-Oyola, Blancas, González & Caballero, (2012)	<ul style="list-style-type: none"> Percentage of the destination considered to be a protected natural area Energy consumption Percentage of energy consumption from renewable resources Total volume of water consumed per day Volume of reused water attributed to tourism Volume of treated wastewater Existence of wastewater treatment plans Volume of waste produced at the destination Volume of recycled waste compared to total volume of waste Evaluation of the cleaning services by tourists Existence of solid waste treatments installations Number of paper and cardboard recycling bins per unit area Volume of collected paper and cardboard number of glass recycling bins per inhabitant Daytime noise levels 	

		<ul style="list-style-type: none"> Night-time noise levels Pollutant emission levels Construction density per unit area Total surface area with erosion problems Total area of natural landscape Road network density total tourists per unit area Unoccupied buildings Existence of an environmental administrative unit 	
	Tanguay, Rajaonson & Therrien, (2013)	<ul style="list-style-type: none"> Use of renewable energy sources Number of establishments that participate in water conservation Energy consumption (tourism sector) Canopy cover index Area of natural protected space Environmental vulnerability Volume of waste recycled Number of people encroaching on vulnerable sites Water consumption (tourism sector) 	
	Blancas, Javier, González, Lozano-Oyola & Perez, (2010)	<ul style="list-style-type: none"> Number of tourists per square metre of beaches in coastal zone Number of peak season tourists per square metre of beaches in coastal zone Waste volume produced by destinations in coastal zone Volume of glass recycled in coastal zone Volume of sewage from coastal zone receiving treatment Percentage of coastal zone considered to be in eroded state Percentage of beach area considered to be in high urbanization state in coastal zone Percentage of sampling points with good sanitary qualification in coastal zone Percentage of beach area with Blue Flag Status in coastal zone Percentage of beach area with cleaning services in coastal zone Percentage of beach area considered to be protected natural area Percentage of beach area considered to be in high occupation state in coastal zone 	
	Lin, Zhang & Geertman, (2015)	<ul style="list-style-type: none"> Pollution stock Tourism resources stock 	
	Pérez, Guerrero, González, Pérez & Caballero, (2013)	<ul style="list-style-type: none"> Perceptions regarding quality-price ratio of lodging at the destination (private and non-private). Perception of quality-price ratio of restaurants at the destination. Evaluation of the quality of tourism workers (in hotels, restaurants, and tourist information points). Occupancy ratio of official accommodation. Proportion of tourists in the months of maximum and minimum affluence Average tourist stay Percentage of seasonal employees in tourism. Tourist offer. Tourist evaluation of accessibility and attractiveness. Number of tourists. Tourist spending. Destination profitability. Average tourist-day expenditure. Percentage of general economic plan completed according to desired aim. 	Visitor survey, official statistics.
Sustainable economy	Navaro, Martínez & Jiménez, (2019)	<ul style="list-style-type: none"> Number of hotels and similar accommodation Number of camping grounds, recreational vehicle parks and trailer parks Number of bed-places in hotels; holiday and other short stay accommodation; camping grounds, recreational vehicle parks and trailer parks Percentage of employment in wholesale and retail trade, transport, accommodation and food service activities (15 years or over) 	Official statistics – NUTS 2 level

	<ul style="list-style-type: none"> Nights spent at tourist accommodation establishments (Per thousand inhabitants) Total nights spent by non-residents (Percentage of total) Total tourist arrivals Net occupancy rate of bed-places and bedrooms in hotels and similar accommodation Number of local units in Transportation and storage Number of local units in Accommodation and food service activities 	
Lozano-Oyola, Blancas, González & Caballero, (2019a)	<ul style="list-style-type: none"> Total number of tourist arrivals Average length of stay Tourism revenues Proportion of employees in the service sector Unemployment rate Declared net income per inhabitant Global satisfaction level of tourists Evaluation of the price-quality relationship by tourists Existence of land use planning, including tourism Vacancies in official tourism accommodation establishments High quality vacancies of official tourism accommodation establishments Number of non-official tourism accommodation establishments Vacancies offered in restaurants Number of tourist information offices per tourist Existence of a website that provides information about the destination Varied offer of experiences (number of tourist attractions) Percentage of official tourism accommodation establishments that are open all year Ratio of low-season tourists to peak-season tourists Ratio of low-season tourism employment to peak-season tourism employment Total number of individuals employed in the tourism sector Percentage of employees in the tourism sector relative to total employment Number of passenger transport vehicles per inhabitant Density of roads Average occupancy rate for official tourism accommodation establishments 	Statistical information and field work
Lozano-Oyola, Contreras & Blancas, (2019b)	<ul style="list-style-type: none"> Tourist demand: number of visitors Average stay per tourist Revenue from tourism Employment in the service sector: proportion of employees Total unemployment rate Level of satisfaction of tourism demand: global evaluation Perception of the quality-price ratio by the visitor Territorial planning plan that includes tourism: existence Official tourism accommodation places offered Vacancies offered in high quality tourism accommodation establishment: percentage Establishment of restaurant services: per capita number Tourist information offices: relative endowment Existence of a website for the destination Experiences offered: number of tourist attractions Seasonality of the tourist offer: accommodation establishments with activity throughout the year Seasonality of the tourist demand: ratio of low-season tourists to peak-season tourists Seasonality of tourism employment: ratio of low-season to peak-season Tourism employment: number of employees Percentage of employees in the tourism sector relative to total employment 	Statistical information and field work

		<ul style="list-style-type: none">Occupancy rate for official tourism accommodation establishments: average level	
Sevinc, Konakoglu, Heldak, Kurdoglu & Wysmulek, (2019)	<ul style="list-style-type: none">Seasonal variation of tourism-related employmentSeasonal variation of occupation of the accommodation (beds)Volume of accommodation (beds) per 1 residentNumber of beds (reported/number of residentsAverage duration of stay	Official statistics, own observations and interviews with local authority representatives	
Weng, He, Liu, Li & Zhang, (2019)	<ul style="list-style-type: none">Residents can share the tourism revenueTourism promotes the development of PingyaoTourism creates considerable economic income for local communityTourism creates employment opportunities for the residentsThe occupation of most residents is tourism-relatedTourism enterprises provide economic benefits to local communityTourists make economic contribution to environmental protectionTourism enterprises make economic contributions to PingyaoTourism makes considerable economic contributions to enterprises	Survey of resources administration, residents, tourist and enterprises	
Farinha, Jos, Silva, Lança, Pinheiro & Miguel, (2019)	<ul style="list-style-type: none">Gross value added of hotel establishments, restaurants and similar to the destination economyApparent labour productivityInflationCorporate structurePer capita purchasing powerSectoral employmentEmployment by genderSeasonality rateSeasonal employeesEstablishments open all yearLodging capacity in hotel establishmentsNights in hotel establishmentsRevenue per available room (Rev Par) of hotel establishmentsAverage stay in hotel establishmentsAverage spending by tourists and excursionists	75% of the selected indicators can be directly obtained, or calculated, using available and reliable source information	
Thongdejsri & Nitivattananon, (2019)	<ul style="list-style-type: none">Net income of accommodation places (THB/month or THB/ tourist)Net income of local enterprises (THB/month or THB/tourist)Income of suppliers of accommodation places (origin-unit) (THB/month)Net income of attractive places (Network of accommodation places: mid-unit) (THB/month)Community income (end-unit) (THB/month)	Different primary collection methods (questionnaires, observations, interviews, group discussions) with different stakeholders (tourists, enterprise owners, communities, local government agencies)	
Torres- Delgado & López, (2017) based on previous work Torres- Delgado & Palomeque, (2014)	<ul style="list-style-type: none">Seasonality of tourism offer - % tourism places available (annual mean)Presence of second homes - % second homesPublic investment in tourism as % of budget spent on tourism	Various sources – statistical institutions, sectoral bodies, town councils, published works, GIS and field work	
Blancas, Javier, Lozano-Oyola, González & Caballero, (2018)	<ul style="list-style-type: none">Total number of touristsAverage length of stayTourism revenuesProportion of employees in the service sectorUnemployment rateDeclared net income per inhabitantGlobal satisfaction level of touristsEvaluation of the price-quality relationship by touristsExistence of land use planning, including tourismVacancies in official tourism accommodation establishmentsHigh quality vacancies of official tourism accommodation establishmentsNumber of non-official tourism accommodation establishmentsVacancies offered in restaurantsNumber of tourist information offices per tourist	Various sources: 61.54 official statistics, 26.15% requested and compiled from the Institute of statistics, 12.31% field work	

	<ul style="list-style-type: none"> Existence of a website that provides information about the destination Varied offer of experiences (number of tourist attractions) Percentage of official tourism accommodation establishments that are open all year Ratio of low-season tourists to peak-season tourists Ratio of low-season tourism employment to peak-season tourism employment Total number of individuals employed in the tourism sector Percentage of employees in the tourism sector relative to total employment Number of passenger transport vehicles per inhabitant Density of roads Average occupancy rate for official tourism accommodation establishments 	
Pérez, Santoyo, Gurrero, León, da Silva & Caballero, (2017)	<ul style="list-style-type: none"> Perception of the relation quality—price of lodging in destination (state or private). Perception of the relation quality—price of restaurants in the destination. Evaluation of the quality of tourism's employees (Lodging, gastronomy and tour guides). Evaluation of the tourists about the quality of access roads and events signalization. Quality of tourist offer in the destination. 	Tourists' and residents' survey
Ziaabadi, Malakootian, Reza, Mehrjerdi & Jalaei, (2017)	<ul style="list-style-type: none"> Number of tourists Average of length of stay The expense of one -night stand of tourists Income distribution Gini coefficient The satisfaction of domestic tourists from the region (0–10) The satisfaction of foreigner tourists from the region (0–10) Positive satisfaction of tourists from the relationship between quality and services price in the region (0–10) The satisfaction of tourists from the relationship between quality and accommodation price (0–10) The satisfaction of tourists from the relationship between quality and restaurant price (0–10) Assessment work quality of staff in the tourism sector (hotels, restaurants, etc.) (0–10) Tourist's satisfaction from protected collections and regional cultural collection Tourists assessment of transparency of tourism information (0–10) The percentage of currency rate changes (foreigner tourists) Telecommunication and post facilities (per capita) Online communication (ADSL) (per capita) Evaluation of tourism planning in region (0–10) Evaluation of government participation with non-governmental organization about local tourism activities (0–10) Evaluation of people participation rate and local organization for providing and executing tourism plans (0–10) Hotel and motel per capita Three, four- and five-star hotels per capita Restaurant per capita Information centres for tourists (per capita) Regional tourism websites The number of newspapers and local magazines Assessment tourism pace in national and regional region (0–10) The ratio of low season tourists to high season Number of hotels' employed staff Hotel employment to total employment The percentage of employed women in tourism sector Local employment people in tourism sector 	Secondary data, questionnaire

	<ul style="list-style-type: none"> Service sector employed/total employment Transportation equipment per capita Having or not having airport Highway length/total area of region Road length/total area of region Having or not having railroad Average of occupation rate The number of natural and historical attractions/region area Total road length network/region area Budget of renovation and restoration of cultural heritage (per capita) Evaluation of access to required credit for tourism agencies (0–10) Evaluation of local people's views from the impact of tourism on booming regional crafts (0–10) 	
Önder, Wober & Zekan, (2017)	<ul style="list-style-type: none"> Total foreign bed nights Average percentage change in total foreign bed-nights between 2009 and 2014 Seasonality based on total foreign and domestic bed-nights (economic/environmental/social) Density (environmental) 	Official statistics (MIS)
Bhuiyan, Siwar & Ismail, (2016)	<ul style="list-style-type: none"> Ecotourism making economic contribution for conservation. Community has shared in the distribution of tourism revenue. Ecotourism improving regional construction. Ecotourism creating acceptable incomes. Ecotourism creating employable opportunities. Most of tourism-related employment will be local people. 	
Blancas, Lozano-Oyola, González & Caballero, (2016); Blancas, Javier, Lozano-Oyola & González, (2015)	<ul style="list-style-type: none"> Total number of tourist arrivals Average length of stay Tourist expenditure Percentage of employees in the service sector with respect to total employment Percentage of full-time employees in the service sector Quarterly unemployment rate in high season with regard to the unemployment rate registered in low season Information technology expenditure (percentage with respect to GDP) Percentage of tourism enterprises with internet access Net national available income per inhabitant Percentage of GDP attributable to the activities of Hotels and Restaurants Rating average obtained by the destinations of the country, including in the international ranking of National Geographic Traveller associated with the stewardship index for well-known destinations Ratio for the tourist service harmonised price index and the harmonised price index (all products) Percentage of soil surface intended for services and residential uses Vacancies in official tourism accommodation establishments per inhabitant Percentage of high-quality vacancies of official tourism accommodation establishments with respect to the total of the official accommodation offer Percentage of tourist trips in which the visitor uses official accommodation establishments Number of companies dedicated to food-related activities per 1000 inhabitants (restaurant and mobile food services) Number of different attractions in a destination (activities classified as “tourist attractions” in the world of tourism guides: The Green Guide Michelin Travel) Ratio of low-season tourists to peak-season tourists 	Official statistics. National statistics and Eurostat.

		<ul style="list-style-type: none"> Ratio of low season tourism employment (hotel and restaurants) to peak-season tourism employment Number of tourist events held in mid-low season Total number of individuals employed in the tourism sector employment (hotels and restaurants) Percentage of employees in the tourism sector with respect to the total volume of employment Percentage of tourist employees hired full-time Incidence rate of accidents at work in the tourism sector (hotels and restaurants) Average length of service of the tourism employees with the same employer Average annual gross income in tourism jobs Ratio of average annual gross income in tourism jobs regarding the average for other economic activities Number of seats for passenger transport (motor coaches, buses, and trolleybuses) road and rail per 1000 inhabitants Total volume of the fleet of aircrafts for the air transport of passengers per 1000 inhabitants Density of network of roads and railways Number of public use airports Percentage of tourist trips in which the visitor uses air transport Percentage of tourism trips in which the visitor uses rail transport Percentage of tourism trips in which the visitor uses road transport Average occupancy rate for official tourism accommodation establishments 	
	Franzoni, (2015)	<ul style="list-style-type: none"> Average index of operating profitability of a homogeneous group of firms of a destination Average index of liquidity of a homogeneous group of firms of a destination Average index of stability of a homogeneous group of firms of a destination Average index of development of a homogeneous group of firms of a destination (growth rate in sales, of invested capital, etc.) Rate of employment Rate of employment during low season Ratio of part time to full time employment in tourism Longevity of tourism firms (rate of turnover) Occupancy rates in accommodation establishments No. of new recruitments No. of arrivals of tourists per day, per week, per month, per year No. of arrivals during the current year compared with the previous year, to three years and to five years No. of presences during the current year compared with the previous year, to three years and to five years No. of attractions developed for the destination in a year and the previous three years Average degree of saturation of the carrying capacity of the structures involved in the year Ability to overcome seasonality thanks to new services or attractions developed 	
	Iliopoulou-Georgiadaki, Kalogeras, Konstantinopoulos & Theodoropoulos, (2016)	<ul style="list-style-type: none"> No. of tourists per year Annual no. of tourists/km coastline Access – road network Local enterprises/foreign enterprises Occupancy rate of accommodation facilities Contribution of tourism to local economy 	
	Jurigova & Lencsesova, (2015)	<ul style="list-style-type: none"> Annual profit of tourism businesses Profitability of tourism enterprises Total visitor arrivals per month Average length of stay Average spending per visitor Annual average occupancy of accommodation (%) Local spending (or GDP) generated by tourism Number of tour operators serving the destination 	

		<ul style="list-style-type: none"> Amount of revenue raised from tourism and used for the maintenance of public areas and infrastructure 	
	Lozano-Oyola, Blancas, González & Caballero, (2012)	<ul style="list-style-type: none"> Total number of tourist arrivals Average length of stay Tourist expenditure Property value of real estate Proportion of employees in the service sector Unemployment rate Volume of restarted service sector investment Number of telephone lines in service Number of RDSI lines in service per 1000 inhabitants Number of ADSL lines in service per 1000 inhabitants Declared net income per inhabitant Global satisfaction level of tourists Evaluation of the price-quality relationship by tourists Percentage of return visitors Level of satisfaction with the visit to cultural sites of the destination Existence of land use planning, including tourism Vacancies in official tourism accommodation establishments High quality vacancies of official tourism accommodation establishments Number of non-official tourism accommodation establishments Vacancies offered in restaurants Number of tourist information offices per tourists Existence of a website that provides information about the destination Percentage of official tourism accommodation establishments that are open all year Ratio of low-season tourists to peak season tourist Ratio of low-season tourism employment to peak-season tourism employment Total number of individuals employed in the tourism sector Percentage of employees in the tourism sector relative to total employment Number of passenger transport vehicles per inhabitant Access time from the closest airport Access time from the closest highway Access time from the closest road Access time from the closest railway station Density of roads Average occupancy rate for official tourism accommodation establishments Number of tourist routes that include the destination in their itinerary Number of expert tourist guides Funds for building renovation Number of routes and itineraries within the municipality 	
	Tanguay, Rajaonson & Therrien, (2013)	<ul style="list-style-type: none"> % of revenues generated by tourism in the community Local unemployment rate during low season Local population working in the tourism sector Ratio of jobs in tourism over total jobs % of businesses and establishments open year-round Spending by tourists Occupancy rate of the main accommodation and restaurants Volume of tourists Average stay of tourists Total number of tourist arrivals (annual average and in high season) 	
	Blancas, Javier, González, Lozano-Oyola & Perez, (2010)	<ul style="list-style-type: none"> Total number of tourist arrivals in coastal zone Daily average expenditures of sun and beach tourists Ratio of peak month tourists to low month tourists Occupancy rate for official accommodations Ratio of average peak season occupancy rate to average low season occupancy rate for official accommodations 	

		<ul style="list-style-type: none"> Percentage of official tourism accommodation establishments which are open all year Ratio of tourism employment to total employment in coastal zone Public investment in coastal issues (access, beaches, dunes, defence of coasts, boardwalk, etc.) 	
	Zhang, Ji & Zhang, (2015)	<ul style="list-style-type: none"> Tourism income Tourism enterprise fixed assets Tourism employees Tourist numbers 	
Sustainable culture	Pérez, Guerrero, González, Pérez & Caballero, (2013)	<ul style="list-style-type: none"> Intensity of use of cultural sites Tourist evaluation of the conservation of natural resources and heritage at the destination Perceptions by the local population concerning the stimulation of local crafts and culture due to tourism 	
	Blancas, Lozano-Oyola, González & Caballero, (2016); Blancas, Javier, Lozano-Oyola & González, (2015)	<ul style="list-style-type: none"> Number of cultural properties inscribed in the UNESCO World Heritage List and number of cultural practices and expressions inscribed in the UNESCO World Intangible Heritage List Number of cultural properties included in the Tentative List to be considered for a nomination for inscription in the UNESCO World Heritage List. 	Official statistics. National statistics and Eurostat.
Sustainable society	Pérez, Guerrero, González, Pérez & Caballero, (2013)	<ul style="list-style-type: none"> Perception by the local population that an improvement in highways and transportation infrastructure is because of tourism. Perception by the local population that an improvement in public services is because of tourism. Proportion of tourists to the local population (during the month of maximum affluence). Perception by the local population that tourists have an undesirable effect on lifestyle at the destination. Perception by the local population that tourism contributes to preventing young people from leaving the municipality. Number of local employees in tourism. Percentage of women employed in the tourist sector. Percentage of local population working in the tourist sector. Perception by the local population that the quality of life has increased because of tourism. Tourist evaluation of safety at the destination. Tourists' perceptions of the quality of public services (illumination, transport, bank services, etc.). 	Resident survey, visitor survey, official statistic.
	Navarro, Martínez & Jiménez, (2019)	<ul style="list-style-type: none"> Arrivals of non-residents/total Number of hospital beds per hundred thousand inhabitants Number of medical doctors per hundred thousand inhabitants Rail network by NUTS 2 regions, kilometres per thousand square kilometres Air transport of passengers by NUTS 2 regions Maritime transport of passengers by NUTS 2 regions Crimes recorded by the police by NUTS 3 regions Percentage of foreign population Stock of passenger cars and buses Ratio of tourist to locals (/arrivals of non-residents/total population) Population density 	Official statistics – NUTS 2 level
	Lozano-Oyola, Blancas, González & Caballero, (2019a)	<ul style="list-style-type: none"> Health care equipment Number of passenger transport vehicles per inhabitant Number of services sector establishments per inhabitant Number of pharmacies per inhabitant Evaluation of destination safety by tourists Number of accidents involving fatalities on urban roads per 1000 persons Number of protected designated sites Pressure on cultural heritage Number of festivals and customs preserved Variation of population level Percentage of young population 	Statistical information and field work

	<ul style="list-style-type: none"> Percentage of non-active older population Number of individuals per unit destination area Net migration rate Rate of natural increase Percentage of foreign population Ratio of tourists to locals Variation of available income Percentage of population enrolled in non-compulsory education General demographic dependency index Cadastral value of real estate per inhabitant 	
Lozano-Oyola, Contreras & Blancas, (2019b)	<ul style="list-style-type: none"> Provision of health facilities to the population Relative number of passenger transport vehicles Establishments for the service sector activities Security in the destination: evaluation of visitors Accidents with victims on urban roads: number per person Cultural heritage: number of protected sites Pressure on cultural heritage Festivities and customs preserved with tourist interest Percentage of resident foreign population Destination social carrying capacity: tourist per inhabitant Inter-annual variation of disposable income Population enrolled in non-compulsory levels: percentage Demographic dependency: general index Cadastral value of real estate per inhabitant 	
Sevinc, Konakoglu, Heldak, Kurdoglu & Wysmulęk, (2019)	<ul style="list-style-type: none"> % of seasonal non-resident employees in total number of tourism employee Average length of contracts of tourism personnel: average length of contracts of tourism personnel month (5 months; 2 months) Percentage of land owned by non-residents Number of recorded thefts Tourist/host population ratio 	Official statistics, own observations and interviews with local authority representatives
Weng, He, Liu, Li & Zhang, (2019)	<ul style="list-style-type: none"> Daily life is disturbed and affected by tourism development Destination X provides residents with environmental education Destination X improves environmental awareness of residents Government has good interaction with the residents Government provides economic benefits to local community Tourism promotes local social welfare Tourism affects daily activities of residents during peak periods Tourism development has increased public safety risks Tourism development has destroyed traditional culture I am satisfied with tourism development of Destination X Enterprises have good interaction with residents Enterprises provide employment opportunities for residents Enterprises improve the living environment of residents Local community provides me with a rich cultural experience Residents have good interaction with me Enterprise owners introduce me to the tour of Destination X Pingyao can provide me with an historical and cultural experience Government increases the environmental awareness of tourists Government provides good experiences to me Government promotes environmental protection to me My visit in Pingyao is very enjoyable 	Survey of resources administration, residents, tourist and enterprises

	<ul style="list-style-type: none"> I really like the attractions of Pingyao The shortage of staff in Pingyao leads to the work not going well I really like the tourism industry in Pingyao Tourism enterprises in Pingyao provide me with a rich experience I have a good interaction with enterprise owners Tourism enterprises in Pingyao provide help for my travels Residents pay attention to protecting tourism resources Residents can participate in the planning and protection Daily activities of residents affect resource development Excessive tourists make infrastructure supply insufficient Pingyao has perfect tourism infrastructure and supporting facilities Enterprises can participate in the planning and protection Enterprises support the decisions of the government Enterprises offer business information to the government Government provides policy for tourism enterprise development Government has good interaction with enterprises Government can actively help enterprises solve problems Government can trust local enterprises Tourism promotes the development of Pingyao's enterprises Tourists interact well with local enterprises Tourists can provide advice on tourism enterprise development Residents interact well with enterprises Residents are willing to participate in enterprise development Residents can provide advice on enterprise development Residents trust tourism enterprises 	
Farinha, Jos, Silva, Lança, Pinheiro & Miguel, (2019)	<ul style="list-style-type: none"> Tourists who repeat their visit to Portugal Wellness in Destination - Units classification (booking and TripAdvisor) Tourist intensity Lodging capacity in hotel establishments by 1000 inhabitants Tourist density % accessible rooms Nº accessible beaches Nº cultural properties Expenditure on cultural heritage of municipalities Population aged 15 and over by level of schooling Nº hospital beds Crime rate Nº registered crimes Regional development composite index (Cohesion) Beneficiaries of the social integration income Nº secondary Houses per 100 Houses Resident population Annual population growth: total, natural and migratory Foreign population with status of residence 	75% of the selected indicators can be directly obtained, or calculated, using available and reliable source information
Thongdejsri & Nitivattananon, (2019)	<ul style="list-style-type: none"> Number of local employees (person) Local management of ecotourism and/or cultural tourism Impact to local culture Being a good host 	Different primary collection methods (questionnaires, observations, interviews, group discussions) with different stakeholders (tourists, enterprise owners, communities, local government agencies)
Torres-Delgado & López, (2017) based on previous work Torres-Delgado & Palomeque, (2014)	<ul style="list-style-type: none"> Tourist population - % seasonal tourist population Diversification of tourist attractions and resources - number of different types of tourism resources 	Various sources – statistical institutions, sectoral bodies, town councils, published works, GIS and field work

	Blancas, Javier, Lozano-Oyola, González & Caballero, (2018)	<ul style="list-style-type: none"> Tourism products accessible to disabled - Number of different types of adaptations for the disabled Health care equipment Number of passenger transport vehicles per inhabitant Number of services sector establishments per inhabitant Number of pharmacies per inhabitant Evaluation of destination safety by tourists Number of accidents involving fatalities on urban roads per 1000 persons (including resident and visiting population) Number of protected designated sites Pressure on cultural heritage Number of festivals and customs preserved Variation of population level Percentage of young population Percentage of non-active older population Number of individuals per unit destination area Net migration rate Rate of natural increase Percentage of foreign population Ratio of tourists to locals Variation of available income Percentage of population enrolled in non-compulsory education General demographic dependency index Cadastral value of real estate per inhabitant 	Various sources: 61.54 official statistics, 26.15% requested and compiled from the Institute of statistics, 12.31% field work
	Pérez, Santoyo, Gurrero, León, da Silva & Caballero, (2017)	<ul style="list-style-type: none"> Perception of the local population regarding whether improved roads and transport infrastructure are results of tourism Perception of the local population regarding whether improved public services are results of tourism. Perception of the local population regarding whether the tourists have an undesirable effect in the region life style. Perception of the local population regarding with what the tourism contributes to keep the young population in the city. Perception of the local population regarding whether the life quality increases due the tourism. Evaluation of the tourists about the destination's security. Evaluation of tourists about the quality of public services (lighting, transport) 	Tourists' and residents' survey
	Ziaabadi, Malakootian, Reza, Mehrjerdi & Jalaei, (2017)	<ul style="list-style-type: none"> Sport gyms per capita Hospitals and clinics per capita Transportation vehicles per capita Banks per capita Pharmacies per capita Distribution of tourism benefits for locals (0–10) Distribution of tourism benefits for tourists (0–10) Distribution of tourism benefits for environment (0–10) Number of agencies and tour centres in area (per capita) People motivation for participation and cooperation with local tourism organization (0–10) The motivation of non-governmental organization for participation in local tourism activities (0–10) Assessment Management of cultural tourism activities in the region (0–10) Assessment Management of ecotourism activities in the region (0–10) Assessment Management of agricultural tourism activities in the region (0–10) Tourism activities share in different economic sectors Safety assessment of destination by tourists (0–10) The per capita of region safety equipment (ambulance, road emergency) 	Secondary data, questionnaire

	<ul style="list-style-type: none"> Assessment the tension rate between tourists and residents (0–10) The number of recorded crimes in the region (per capita) Evaluation of military cooperation and local or governmental law enforcement agencies to provide security for tourists (0–10) Awareness and positive publicity in the tourism region (0–10) Negative publicity for southern regions of the country (southern cities of province) (0–10) Budget of region cultural heritage (per capita) The number of tourists to Antiquities area and cultural heritage The number of cultural exhibitions (per capita) Increasing attention of agencies to sustainable tourism (balanced) (0–10) Increasing attention level of policy makers to sustainable tourism (0–10) Tourists motivation for sustainable tourism (0–10) Innovation for sustainable tourism (0–10) Changing attitudes toward environment and the importance of protecting attractions (0–10) Instability level of the region's population The percentage of young population of the region The percentage of old population of the region The number of people per unit area The net rate of region migration Natural rate of population increase The percentage of foreign population like Afghans in the region Tourists rate to the region's population (host community) Life expectancy The income per capita The family percentage using social utilities in region (electricity) Mutual understanding and cooperation of local people with tourists (0–10) Assessment of elderly care facilities in tourism regions (0–10) Assessment of children care facilities in tourism regions (0–10) Unemployment rate of region Local people imagination from services improvement because of tourism (0–10) Local people imagination from the adverse effects of tourism on local people's lifestyle (0–10) Local people imagination from tourism impact on avoiding local people exit from region (0–10) Local people imagination from life quality improvement because of tourism increase in region (0–10) Tourists impression of quality of public services (accommodation and transport facilities) (0–10) Hospitality assessment and willingness to receive tourists in the local community (0–10) Conservation budget, reconstruction and restoration of monuments and cultural heritage (per capita) (0–10) Green space per capita Evaluation of improving women's rights (0–10) Evaluation of improving labour rights and social security (0–10) Universities and higher education centres Population literacy rate Evaluation of the number and variety of handicrafts to attract tourists (0–10) The number of cultural-historic sites (per unit area) Local-traditional cultures 	
Önder, Wober & Zekan, (2017)	<ul style="list-style-type: none"> Seasonality based on total foreign and domestic bed-nights (economic/environmental/social) 	Official statistics (MIS)

Bhuiyan, Siwar & Ismail, (2016)	<ul style="list-style-type: none"> Residents' daily living was disturbed by the ecotourism Ecotourism provides residents with environmental education opportunities Ecotourism improves residents' environmental consciousness Maintain good interaction between ecotourism area and residents Ecotourism providing economic benefits to community Residents support tourism resource conservation. Residents participate in tourism resource management & planning Residents participate in interpretation service in tourism area Ecotourism provides adequate interpretative facilities Ecotourism provides understandable interpretative facilities Providing excellent environmental education experience Providing excellent natural and humanistic experiences The site provides educational opportunities to the tourists I am satisfied with interpretative facilities I am satisfied with interpreter service This visit has increased my environmental awareness I am satisfied with whole recreational quality I have participated in conservation activities Local community provides experiential opportunities for tourist Ecotourism providing diverse cultural experiences Ecotourism providing cultural exchange opportunities I feel good interaction between residents and tourists Ecotourism promoting social welfare Ecotourism increasing congestion sense of residents Ecotourism not causing traffic jam in peak periods Ecotourism destroying public security Causing loss of traditional culture I am satisfied for tourism development 	Resident survey, visitor survey.
Blancas, Lozano-Oyola, González & Caballero, (2016); Blancas, Javier, Lozano-Oyola & González, (2015)	<ul style="list-style-type: none"> Number of hospital beds per inhabitant Staff employed in hospitals per inhabitant Number of passenger transport vehicles per 1000 inhabitants Number of enterprises related to railways, taxi operations and other scheduled passenger transports by land, renting of automobiles and air passenger transport per 1000 inhabitants Number of crimes recorded by the police in the destination per 1000 inhabitants General government expenditure by public order and safety (percentage of GDP) Number of police officers per 1000 inhabitants Percentage of air and rail accidents with respect to the total train movements and commercial passenger air flights Number of people killed in road accidents per 1000 persons (including host and visitor population) Percentage of young people (population under 20 years old) Percentage of non-active older population (population over 65 years old) Number of individuals per unit destination area Variation of population level Net migration rate Rate of natural increase Percentage of foreign population residing in the destination Ratio of tourists to host population Life expectancy at birth on average 	Official statistics. National statistics and Eurostat.

		<ul style="list-style-type: none"> Percentage of population at risk of poverty or social exclusion after social transfers Gini coefficient of equalised disposable income Percentage of population enrolled in non-compulsory education General demographic dependency index. Taxes on land, buildings and other structures (percentage of GDP) Percentage of women with respect to the total number of jobs in the tourism sector (hotels and restaurants) Ratio of the percentage of women employed in the tourism sector and the percentage in other activities Percentage of women employed in the tourism sector with low-wages Ratio of the percentage of women employed in the tourism sector with low-wages and the percentage in other activities 	
	Franzoni, (2015)	<ul style="list-style-type: none"> Satisfaction level by local residents No. Of complaints by local residents No. Of tours to destination with specific programme to accommodate Persons with disabilities No. (%) of residents participating in community traditional crafts, skills, customs No. Of initiatives aimed at the rediscovery of traditions No. Of hotels with rooms accessible to persons with disabilities % of firms that apply environmental management systems or environmental Certification (ISO 14001, EMAS, etc.) % of firms that publish sustainability reports Average degree of employee satisfaction Employee satisfaction per destination Employee satisfaction % of residents, with gender distinction, employed in the tourism sector Income levels (absolute and compared with other sectors) No. of workplace accidents % Of tourists attracted to the area due to its unique characteristics No. Of complaints of the tourist per destination No. Of accidents that have involved tourists % of tourists who return to the same destination % of tourists who have a positive image of the destination % of tourists who would recommend the destination to their peers % of tourists attracted to destination because of unique features % of return tourist satisfaction levels on the industry Level of satisfaction by tourist on exit Degree of perception of the tourists on the good quality/price ratio 	
	Iliopoulou-Georgudaki, Kalogeras, Konstantinopoulos & Theodoropoulos, (2016)	<ul style="list-style-type: none"> Annual no. of tourists/local people Sustainable development plan Tourism management plan Local awareness of sustainability Employment in tourist enterprises Local/foreign workers in tourism business Tourist satisfaction Local satisfaction from current tourism activities 	
	Jurigova & Lencsesova, (2015)	<ul style="list-style-type: none"> Total employment in sector as percent of total employment % of tourism jobs that are seasonal only % residents indicating that they are satisfied with local impact of tourism % residents identifying that they are directly benefiting 	

	<ul style="list-style-type: none"> from local tourism and % believing that it adds to overall quality of life % of products sold in shops produced locally % of shops and restaurant selling local products Existence of special brands, labels for local products % of business establishments open all year % of jobs occupied by local residents Local unemployment rate in season in comparison to off-season Number of incidents reported Number of attractions and facilities with special access for people with mobility concerns Changes in prices of goods, properties and housing Number of residents who have left the destination in the previous years Number of immigrants taking tourism jobs in the past year 	
Lozano-Oyola, Blancas, González & Caballero, (2012)	<ul style="list-style-type: none"> Sport facilities per inhabitant Health care equipment Number of passenger transport vehicles per inhabitant Number of financial establishments per inhabitant Number of pharmacies per inhabitant Evaluation of destination safety by tourists Number of protected designated sites Number of cultural volunteers Pressures on cultural heritage Number of expert guides in interpretation Number of festivals and customs preserved Variation of population level Percentage of young population Percentage of non-active older population Number of individuals per unit destination area Net migration rate Rate of natural increase Percentage of foreign population Ratio of tourists to locals Life expectancy Variation of available income Percentage of population enrolled in non-compulsory education General demographic dependency index Property value of real estate per inhabitant Percentage of renovated buildings Funds for building renovation Funds for the improvement of the physical urban environment 	
Tanguay, Rajaonson & Therrien, (2013)	<ul style="list-style-type: none"> Level of tourist satisfaction Level of satisfaction of the local population Number of tourists per km² Existence of a tourism plan for the community Ratio between tourists and local population at cultural events % of new real estate developments intended for tourism % of jobs in the tourism sector held by local residents % of return visits of tourists 	
Blancas, Javier, González, Lozano-Oyola & Perez, (2010)	<ul style="list-style-type: none"> Ratio of tourist to locals Ratio of peak season tourists to locals Sports facilities per inhabitant available to the community in coastal zone Health centres per inhabitant available to the community in coastal zone Public transport vehicles for travellers and merchandise per inhabitant in coastal zone Ratio of peak season tourism employment to low season tourism employment Percentage of beach area without security devices in coastal zone Number of crimes and misdemeanours made at the provincial level 	
Lin, Zhang & Geertman, (2015)	<ul style="list-style-type: none"> Residents tourism cognition Travel congestion index 	

		<ul style="list-style-type: none"> Seasonal difference Tourism innovation ability Highway mileage Investment in public services Accessibility 	
	Farinha, Jos, Silva, Lança, Pinheiro & Miguel, (2019)	<ul style="list-style-type: none"> Abstention rate % capital expenditure Broadband Internet accesses per 100 inhabitants Expenditure in research and development of institutions and enterprises Investment in research and development as % of GDP 	

Table 2. Relevant indicators from ETIS

Section	Destination Indicators: Urban/Cultural tourism
<i>Socio-economic</i>	Number of tourism-related MSMEs operating in the destination
<i>Socio-economic</i>	Number and origin of visitors to cultural sites per season (day, month, year)
<i>Socio-economic</i>	% of total tourists visiting in peak month and average for the year
<i>Socio-economic</i>	Number of tourists on peak day
<i>Socio-economic</i>	% of key sites operating all year
<i>Environmental</i>	Total number of tourists per square Km in key sites (crowding/spatial distribution)
<i>Management and optimization of key assets to destination type</i>	% of restored historic buildings
<i>Management and optimization of key assets to destination type</i>	Number of buildings and/or districts listed on endangered sites lists (i.e. World Heritage, World Monuments Fund)
<i>Management and optimization of key assets to destination type</i>	% of district under protection
<i>Management and optimization of key assets to destination type</i>	% of sites under a management and monitoring system for protection of cultural sites
<i>Management and optimization of key assets to destination type</i>	Number and % of guided tours and/or publications (promotion initiatives)
<i>Management and optimization of key assets to destination type</i>	Accessibility of tourist attractions by public transport(YES/NO)
<i>Governance</i>	Existence of up to date tourism plans and policies (YES/NO)
<i>Governance</i>	Existence of a land use or development plan(YES/NO)
<i>Governance</i>	Funding of public and private finance spent in improvement of the physical urban environment
<i>Governance</i>	Funding spent in restoration of historic buildings
<i>Governance</i>	Completed impact assessment of environmental, social and cultural aspects of tourism (in terms of evaluating a tourism plan) (YES/NO)
<i>Governance</i>	Degree of stakeholder participation in the planning process(Low/medium/high)
<i>Governance</i>	Degree of stakeholder participation in the process of implementing plans(Low/medium/high)
<i>Governance</i>	Existence of performance indicators designated for evaluating the plan developed and used(YES/NO)
<i>Governance</i>	% of plan objectives which have been met
<i>Governance</i>	Plan revision completed or scheduled(YES/NO)
<i>Governance</i>	Existence and functioning of a representative coordinating mechanism for MSP/ICZM (YES/NO)
<i>Governance</i>	Specific characteristics of islands taken into account in strategies for tourism development (YES/NO – based on interviews, questionnaires etc.)

Table 3. Relevant indicators from Guidebook: Indicators of Sustainable Development for Tourism Destination

Components of the issue	Indicators
Legislative basis for protection	<ul style="list-style-type: none"> Number and type of new legislation or amendments introduced to preserve structures at local, provincial/state/canton or national levels
Designation	<ul style="list-style-type: none"> Number and type of designation under which historic structures, monuments and districts are recognized; Percentage of eligible sites and or structures receiving designation
Funding for protection	<ul style="list-style-type: none"> %/Amount of funds allocated to the restoration, preservation and maintenance of cultural assets on a yearly basis, (differentiated according to different sources of funding, such as visitor/entrance fees, tour operator fees, donations, government funds, private foundations, international financial and development institutions, NGOs, etc.); Voluntary contributions (number and duration of programmes, number of volunteers, estimated value of contributions); Tourism contribution to preservation (amount from each source)
Profile of the issue	<ul style="list-style-type: none"> % change/number of electronic and print articles generated on historic structures, monuments and districts by local, regional, national and international media
Condition of setting and environment	<ul style="list-style-type: none"> %/change in the development of the surrounding area to a cultural asset, and environment and whether maintenance or improvements have taken place; Condition of the building or site (cost of restoration per annum)
Threats to the integrity and authenticity of the property	<ul style="list-style-type: none"> Increase/Decrease in threats and their type to the original purpose and authenticity of the property use of a site. (subjective classification)

Table 4. The final list of indicators retained for weighting

LEVEL 1 Environmental	LEVEL 2	LEVEL 3
		Code Indicator
	Landscape and biodiversity protection	
		En1 % of sites under a management and monitoring system for protection of cultural sites
		En2 Construction density per unit area
		En3 N° Green spaces for public use
		En4 Municipal expenses in environment per 1000 inhabitants
		En5 Completed impact assessment of environmental, social and cultural aspects of tourism (in terms of evaluating a tourism plan) (YES/NO)
		En6 Existence and functioning of a representative coordinating mechanism for MSP/ICZM (YES/NO)
	Energy usage	
		En7 Final energy consumption attributable to tourism
		En8 Percentage of renewable energy consumption with respect to the total attributable to tourism
	Water management	
		En9 Water consumption attributed to tourism
	Solid waste management	
		En10 Volume of waste generated
	Climate change	
		En11 CO2 emissions per inhabitant.
	Tourism development intensity	
		En12 Total tourists per unit area
		En13 Daily number of tourists per 1 km ²
		En14 Maximum population density (peak season) per km ²
		En15 Beds in secondary residences (in % of total lodging capacity)
		En16 Total number of tourists per square Km in key sites (crowding/spatial distribution)
		En17 Accessibility of tourist attractions by public transport(YES/NO)
	Reducing transport impact	
		En18 N° embarked and disembarked passengers – Airport
		En19 N° embarked and disembarked passengers of cruise ships
	Visitor perception	
		En20 Tourists' evaluation about destination cleanliness.
		En21 Tourists' evaluation about the offer of activities involved with the natural resources of the destination.
		En22 Tourists evaluation of environmental health (0–10) ii6(+)

	Resident perception		
		En23	Perception of local residents about the effects in the environment and impairments of natural spaces caused by tourists.
		En24	Perceptions by the local population concerning environmental damage caused by tourism.
Economic			
		Code	Indicator
	Tourism flow (volume and value) at destination		
		Ec1	Total number of tourist arrivals
		Ec2	Average length of stay
		Ec3	Number and origin of visitors to cultural sites per season (day, month, year)
		Ec4	Average spending by tourists and excursionists
		Ec5	Beds in official tourism accommodation establishments (hotels)
		Ec6	Number of non-official tourism accommodation establishments (other)
		Ec7	Number of beds reported/number of residents
	Tourism enterprise(s) performance		
		Ec8	Tourism revenues
		Ec9	Average occupancy rate for official tourism accommodation establishments
		Ec10	Net occupancy rate of bed-places and bedrooms in hotels and similar accommodation
		Ec11	Percentage of official tourism accommodation establishments that are open all year (seasonality)
		Ec12	Ratio of low-season tourists to peak-season tourists (seasonality)
		Ec13	% of key sites operating all year
	Quantity and quality of employment		
		Ec14	Percentage of employees in the tourism sector relative to total employment
	Sustainable tourism policy and planning		
		Ec15	Existence of land use planning, including tourism
		Ec16	Varied offer of experiences (number of tourist attractions)
		Ec17	Public investment in tourism as % of budget spent on tourism
		Ec18	Existence of up to date tourism plans and policies (YES/NO)
		Ec19	Existence of performance indicators designated for evaluating the plan developed and used(YES/NO)
	Visitor perception		
		Ec20	Global satisfaction level of tourists (destination)
		Ec21	Quality of tourist offer in the destination
		Ec22	Evaluation of the price-quality relationship by tourists
		Ec23	Perception of the relation quality—price of lodging in destination (state or private).
Social			
		Code	Indicator
	Perception of visitors		
		So1	Evaluation of destination safety by tourists
	Perception of residents		
		So2	Satisfaction level by local residents
		So3	Perception of the local population regarding whether improved roads and transport infrastructure are results of tourism
		So4	Perception of the local population regarding whether improved public services are results of tourism.
		So5	Perception of the local population regarding whether the tourists have an undesirable effect in the region life style.
		So6	Perception of the local population regarding with what the tourism contributes to keep the young population in the city.
		So7	Perception of the local population regarding whether the life quality increases due the tourism.
	Tourism development intensity		
		So8	Ratio of tourists to locals
		So9	Tourist intensity
		So10	Ratio of peak season tourists to locals
		So11	% seasonal percentage of non-resident employees in total number of tourism employee
	Inclusion/accessibility		
		So12	% accessible rooms
	Community outlook		

		So13	Degree of stakeholder participation in the planning process(Low/medium/high)
		So14	Degree of stakeholder participation in the process of implementing plans(Low/medium/high)
Cultural			
		Code	Indicator
	Protecting and enhancing cultural heritage (assets)		
		Cu1	Number of cultural properties inscribed in the UNESCO World Heritage List and number of cultural practices and expressions inscribed in the UNESCO World Intangible Heritage List.
		Cu2	Evidence of active participation of communities, groups and individuals in cultural policies and the definition of administrative measures integrating heritage (both tangible and intangible) and its safeguarding (L)
		Cu3	Funding spent in restoration of historic buildings
		Cu4	Expenditure on cultural heritage of municipalities
		Cu5	Number of heritage properties with a Management Plan including a formalised framework for community participation (L)
		Cu6	Specific measures to promote the participation of minorities and/or indigenous groups in cultural life (L)
	The intensity of cultural tourism development		
		Cu7	Intensity of use of cultural sites
		Cu8	Tourist arrivals by domestic and foreign visitors / Number of entries in national lists
		Cu9	N. of visitors to cultural attractions/places (n./day)
		Cu10	Share of visitors for cultural reason in total number of visitors (%)
		Cu11	N. of visitors attending or participating in cultural events (n./year)
	Perception of visitors		
		Cu12	Tourist evaluation of the conservation of natural resources and heritage at the destination
	Perception of residents		
		Cu13	Perceptions by the local population concerning the stimulation of local crafts and culture due to tourism
		Cu14	Percentage of the population that is very satisfied with cultural facilities in a destination

Table 5. The results of the first stage of the weighting process – indicators retained

LEVEL 1		LEVEL 2		LEVEL 3		
	Weights		Weights			
Environmental	0,254712813					
				Code	Indicator	Weights
		Landscape and biodiversity protection	0,124721261			
				En5	Completed impact assessment of environmental, social and cultural aspects of tourism (in terms of evaluating a tourism plan) (YES/NO)	0,181440017
				En4	Municipal expenses in environment per 1000 inhabitants	0,176867253
				En6	Existence and functioning of a representative coordinating mechanism for MSP/ICZM (YES/NO)	0,170695249
				En2	Construction density per unit area	0,163925628
		Energy usage	0,107682141			
				En8	Percentage of renewable energy consumption with respect to the total attributable to tourism	0,529442684
		Water management	0,115241655			
				En9	Water consumption attributed to tourism	
		Solid waste management	0,115460555			
				En10	Volume of waste generated	
		Climate change	0,115197017			
				En11	CO2 emissions per inhabitant.	
		Tourism development intensity	0,110769187			
				En16	Total number of tourists per square Km in key sites (crowding/spatial distribution)	0,179807586
				En13	Daily number of tourists per 1 km2	0,17387982
				En17	Accessibility of tourist attractions by public transport(YES/NO)	0,17370033
		Reducing transport impact	0,111060279			

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				En19	Nº embarked and disembarked passengers of cruise ships	0,505801268
				En18	Nº embarked and disembarked passengers – Airport	0,494198732
		Visitor perception	0,090384426			
				En20	Tourists' evaluation about destination cleanliness.	0,326869534
		Resident perception	0,109483478			
				En24	Perceptions by the local population concerning environmental damage caused by tourism.	0,500261438
Social 0,257383085						
		Perception of residents	0,223188685			
				So7	Perception of the local population regarding whether the life quality increases due the tourism.	0,183420102
				So5	Perception of the local population regarding whether the tourists have an undesirable effect in the region life style.	0,170711648
				So4	Perception of the local population regarding whether improved public services are results of tourism.	0,161503786
		Tourism development intensity	0,189417128			
				So8	Ratio of tourists to locals	0,258503281
				So9	Tourist intensity	0,253171248
				So11	% seasonal percentage of non-resident employees in total number of tourism employee	0,244396152
		Inclusion/accessibility	0,19820101			
				So12	% accessible rooms	
		Community outlook (participation)	0,204681572			
				So13	Degree of stakeholder participation in the planning process(Low/medium/high)	0,507202881
Cultural 0,256061577						
		Protecting and enhancing cultural heritage (assets)	0,275068909			
				Cu2	Evidence of active participation of communities, groups and individuals in cultural policies and the definition of administrative measures integrating heritage (both tangible and intangible) and its safeguarding (L)	0,187155344
				Cu5	Number of heritage properties with a Management Plan including a formalised framework for community participation (L)	0,17450087
				Cu4	Expenditure on cultural heritage of municipalities	0,17079428
				Cu3	Funding spent in restoration of historic buildings	0,169777521
				Cu6	Specific measures to promote the participation of minorities and/or indigenous groups in cultural life (L)	0,167599469
		The intensity of cultural tourism development	0,247208379			
				Cu9	N. of visitors to cultural attractions/places (n./day)	0,212848845
				Cu11	N. of visitors attending or participating in cultural events (n./year)	0,202367101
				Cu10	Share of visitors for cultural reason in total number of visitors (%)	0,198700695
		Perception of residents	0,252161266			
				Cu14	Percentage of the population that is very satisfied with cultural facilities in a destination	0,504251916
				Cu13	Perceptions by the local population concerning the stimulation of local crafts and culture due to tourism	0,495748084
Economic 0,231842525						
		Tourism flow (volume and value) at destination	0,194855702			
				Ec4	Average spending by tourists and excursionists	0,156558951
				Ec2	Average length of stay	0,153554175
				Ec1	Total number of tourist arrivals	0,146685416
				Ec3	Number and origin of visitors to cultural sites per season (day, month, year)	0,140325939
		Tourism enterprise(s) performance	0,200140493			
				Ec12	Ratio of low-season tourists to peak-season tourists (seasonality)	0,174348608
				Ec9	Average occupancy rate for official tourism accommodation establishments	0,173255865
				Ec8	Tourism revenues	0,169981006
		Sustainable tourism policy and planning	0,21467562			
				Ec18	Existence of up to date tourism plans and policies (YES/NO)	0,212093336
				Ec19	Existence of performance indicators designated for evaluating the plan developed and used(YES/NO)	0,209731663
				Ec15	Existence of land use planning, including tourism	0,200740349
				Ec17	Public investment in tourism as % of budget spent on tourism	0,192643287
		Visitor perception	0,18179701			
				Ec20	Global satisfaction level of tourists (destination)	0,2605161
				Ec22	Evaluation of the price-quality relationship by tourists	0,25214217

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Travel / traveller: Travel refers to the activity of travellers. A traveller is someone who moves between different geographic locations, for any purpose and any duration (IRTS 2008, 2.4). The visitor is a particular type of traveller and consequently tourism is a subset of travel.

Visitor: A visitor is a traveller taking a trip to a main destination outside his/her usual environment, for less than a year, for any main purpose (business, leisure or other personal purpose) other than to be employed by a resident entity in the country or place visited (IRTS 2008, 2.9).

Tourist (or overnight visitor): A visitor (domestic, inbound or outbound) is classified as a tourist (or overnight visitor), if his/her trip includes an overnight stay (IRTS 2008, 2.13).

Same-day visitor (or excursionist): A visitor (domestic, inbound or outbound) is classified as a same-day visitor (or excursionist) if his/her trip doesn't include an overnight stay (IRTS 2008, 2.13).

Source: UNWTO Glossary: <https://www.unwto.org/glossary-tourism-terms>

Table 6. The resilience indicators (a measure of change), change, and factors influencing RI performance (place, scale, time)

Reference	Type of “resilience”-resilience of what?	Factors affecting resilience/Indicators	Geographical area?	RI methodology:	Data collection method and source and time
				Equation/Explanation	
Kamran (2020)	infrastructure system / economic dimension	proximity of cultural heritage; emergency facilities (i.e., hospitals); vegetation or biophysical environment / Three-phase-evaluation; 1. contains all those attributes which are needed to be tackled before the occurrence of any adverse event; 2. evaluation involves the thorough investigation of the whole adverse scenario and make plans in such a way that mitigation losses are reduced, and basic humanitarian needs are ensured; 3. recovery measures are taken under way	Major natural disasters in Asia	N/a / FTA (fault tree analysis)	Questionnaire
Ebisudani & Tokai (2017)	disaster resilience	Natural disasters / Disaster Resilience Scores (DRS)	Focused on 29 municipalities in Osaka Prefecture, Japan	The disaster resilience score (DRS) gave the average z score of each attribute after equally weighting the variables / 17 disaster resilience indicators were selected, covering economic attributes, socio-demographic, and community connection attributes . Each variable was standardized as a z score with the mean scores given.	Population Census of Japan, e-Stat of the Statistics Bureau, and the Osaka Statistical Yearbook. Time – N/a
Graveline & Grémont (2017)	microeconomic resilience of businesses	lifetime service interruptions / Economic resilience (ER) of individual businesses	Urban Community of Central Martinique (UCCM)	$\begin{cases} ER = 1 - \frac{Ltl}{S} \\ Ltl = Stl \times t \times \sigma \\ Stl = \Delta Y + OMI + NMI \\ ER > 0 \end{cases}$ <p>-ΔY, the percentage change in business turnover during the event; -OMI, the other market impacts incurred by businesses during the event (e.g. increasing production costs, penalties dues to noncompliance with commercial contracts); - NMI, the non-market impacts incurred by businesses during the event (e.g. increasing painfulness of work, damages to reputation, stress of the workforce);- t, the recovery period, that is the length of time that separates the occurrence of the event from the return to normalcy of business activities;- σ, the equilibrium state, that is an indicator of the new level of activity reached by businesses in the long-run; - S, the sensitivity, that is the level of dependence of business activities to the lifeline service under study; - Ltl, the long-term economic</p>	Ex-ante business survey October 2015

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Reference	Type of “resilience”-resilience of what?	Factors affecting resilience/Indicators	Geographical area?	RI methodology:	Data collection method and source and time
				Equation/Explanation	
				impacts of the disaster; - StI, the immediate (short-term) economic impacts of the disaster	
Bruneckiene, Pekarskiene, Palekiene & Simanaviciene, (2019)	socio-economic system’s resilience	diversity of resources, labor force surplus, stability, ingenuity, adaptability, flexibility, cooperation, interdependence and support, autonomy, networking, and innovation / The index of a socio-economic system’s resilience to economic shocks (hereafter called the Resindicis model)	Economic shock	Equations: $R_i = p_i + a_i = \int_{t_{bs}}^{t_{es}} f_{ip}(t)dt + \int_{t_{es}}^{t_{pp}} f_{ia}(t)dt.$ $R_{mostresilient} = \min(R_i), \text{ when } i \text{ varies from } 1 \text{ to } n.$ / I _{ns} _Cap_Resilio—insight capacity index; Gov_Cap_Resilio—socio-economic system’s government capacity index; Inov_Cap_Resilio—knowledge and innovation index; Learn_Cap_Resilio—learning capacity index; Inf_Cap_Resilio—infrastructure capacity index; Str_Ins_Resilio—strategic insight sub-index; Econ_Vital_Resilio—economic vitality sub-index; Gov_Eff_Resilio—government efficiency sub-index; Fin_Opp_Resilio—financial opportunities sub-index; R_Inov_Resilio—research and innovation sub-index; Inov_Env_Resilio—innovation-friendly environment sub-index; Ed_Syst_Resilio—education system sub-index; ab_Comp_Resilio—labor market flexibility and competence sub-index; Infrast_Sistem—a modern and productive infrastructural system sub-index; Sustain_Resilio—sustainability sub-index; wi—the coefficient of weight for determinant i.	based on the availability of Lithuanian statistical information at the regional level
Amore, Prayag, & Hall (2018)	destination resilience	Diferent levels and developments of stakeholders and infrastructure in tourism system / n/a	n/a	n/a / n/a	n/a
Xie, Rose, Li & He (2018)	dynamic economic resilience	Interregional Counterpart Aid; Interregional Reconstruction Funds Transfer; Rapid Planning and Logistical Implementation; Increased Insurance Compensation; Rapidly Collecting Funds for Reconstruction; Adoption of New Technologies / N/a (they implement the CGE model)	Natural disaster (earthquake)	Sichuan provincial CGE model (Computable General eEquilibrium) / They establish the baseline scenario (“without disaster” scenario), reference recovery scenario, and dynamic resilience scenario	General statistics, i.e. secondary data for chosen time frame Period 2007-2011 (2012) Wenchuan County, Sichuan Province of China

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Reference	Type of “resilience”-resilience of what?	Factors affecting resilience/Indicators	Geographical area?	RI methodology:	Data collection method and source and time
				Equation/Explanation	
Prayag, Spector, Orchiston & Chowdhury (2019).	psychological, employee and organizational resilience	Ecological - internal and external shocks; organizational - factors such as lifestyle, human, financial and social capital affects organizational resilience; Psychological - experience stressful events; employee - operationalized in terms of workplace behaviours (Resilient individuals in the workplace thrive, rather than just survive; they are more able to bounce back and learn from adversity and uncertainty) / Psychological resilience- Brief Resilience Scale (BRS); Employee Resilience Scale (EmpRes); Organizational resilience	Christchurch, the largest city on New Zealand’s South Island	n/A / PLS-SEM, a variance-based algorithm to path analysis	A postal survey; 251 tourism organizations that were in operation in the city of Christchurch; June 2016
Giannakis & Bruggeman (2019)	economic resilience	sectoral structure / the share of regional gross value added (GVA) in agriculture, manufacturing, construction and service; population and migration, / the old-age dependency ratio, that is, population > 65 years to the population aged 15–64 years, to capture the effect of age structure in regional resilience. Population size, a proxy variable for agglomeration economies Net migration as a percentage of the total population regional development / The gross regional domestic product (GDP) per capita Accessibility and resilience of neighbouring regions / multimodal potential accessibility indicator computed by ESPON the number of resilient neighbour regions, within a 100-km radius between the centroids of the regions Eurozone membership	European regions	$\beta_{reg}^{EU} = \frac{[(E_t^R - E_{t-1}^R)/E_{t-1}^R - (E_t^{EU} - E_{t-1}^{EU})/E_{t-1}^{EU}]}{ (E_t^{EU} - E_{t-1}^{EU})/E_{t-1}^{EU} }$ $\beta_{reg}^N = \frac{[(E_t^R - E_{t-1}^R)/E_{t-1}^R - (E_t^N - E_{t-1}^N)/E_{t-1}^N]}{ (E_t^N - E_{t-1}^N)/E_{t-1}^N }$ <p>economic resilience of European regions in terms of employment growth rates:</p> <p>1. where ER is the employment at regional level (persons); EEU is the employment at the EU-27 level (persons); t – 1 is the starting year of the crisis period (2008); and t is the end year of the economic recovery period (2015).</p> <p>2.- En – stands for employment on national level</p>	
Cainelli, Ganau, & Modica (2018)	economic resilience	Technological Relatedness, Vertical Relatedness, Industrial concentration, Regional size (Population), Employment density, Labour productivity, Unemployment rate / Singular comparative indicator	Comparison to NUTS 2 regions in EU	$Resilience_r^{T,t} = \frac{\left(\frac{E_r^T - E_r^t}{E_r^t} \right) - \left(\frac{E_c^T - E_c^t}{E_c^t} \right)}{\left \frac{E_c^T - E_c^t}{E_c^t} \right }$ <p>Er denotes employment in NUTS 2 region r, Ec denotes employment in the corresponding country c, t = 2008 and T = 2009, ..., 2012 – Figure A1 in</p>	Eurostat (Structural Business Statistics (SBS) database; the European Union Labour Force Survey (EU-LFS); and the Regio database), 2008-2012

Reference	Type of “resilience”-resilience of what?	Factors affecting resilience/Indicators	Geographical area?	RI methodology:	Data collection method and source and time
				Equation/Explanation	
				Appendix A maps the spatial distribution of the resilience variable over the one year and four-year periods. According to Equation (1), a region can show one of the following three patterns with respect to its country: (i) resilience if $\text{ResilienceT}-t r > 0$; (ii) non-resilience if $\text{ResilienceT}-t r < 0$; or (iii) neutrality if $\text{ResilienceT}-t$ Is 0.	
Giacometti & Teras (2019)	economic resilience	<p><i>Covariate shocks:</i> Financial shock,-Technological shock, Commodity price shock, -Demand- driven shock, -Policy-induced and regulatory shock, -Geopolitical shock, -Environmental shock, <i>Idiosyncratic shocks</i> -Loss of income-generating activity, <i>Seasonal shocks</i> -Recurring events, e.g. annual floods <i>Stressors</i> -Unemployment, market instability, weak institutions, ageing population, mistrust among regional actors, isolation, lack of infrastructure, changing climatic conditions, etc.</p> <p>/</p> <p>N/A</p>	<p><i>Covariate shocks</i> <i>Idiosyncratic shocks</i> <i>Seasonal shocks</i> <i>Stressors</i> <i>Resilience of selected 5 Nordic regions</i></p>	<p>N/A / N/A</p>	Questionnaire (key regional actors, 2017-2018)
Tyrell & Johnson (2007)	environmental, economic and socio-cultural resiliency	<p><i>Actual (objective) environmental quality dimensions:</i> ecological-environmental quality (X_n), economic-fiscal quality (X_e), social-cultural quality(X_c), government and destination management: amount of control (G) and timing (t), size, resource base and level of infrastructure (s)</p> <p>/</p> <p>N/A</p>	General, N/A	$\dot{X}_n = h_n(X_n, X_e, X_c, G_t) - f_n(V)$ $\dot{X}_e = h_e(X_n, X_e, X_c, G_t) - f_e(V)$ $\dot{X}_c = h_c(X_n, X_e, X_c, G_t) - f_c(V)$ <p>/</p> <p><i>X- change in environmental quality</i> <i>V - influence of visitors</i> <i>h (X) - natural growth / renewal function</i></p>	General statistics and interviews, questionnaires, i.e. secondary and primary data for chosen time frame (before and after the crisis....
		<p><i>Perceived environmental quality dimensions:</i> X_n, X_e, X_c</p> <p>/</p> <p>N/A</p>		$\dot{x}_n = g_n(x_n, X_n, V, H)$ $\dot{x}_e = g_e(x_e, X_e, V, H)$ $\dot{x}_c = g_c(x_c, X_c, V, H)$ <p>/</p> <p><i>H - the amount and type of promotional campaigns, as well as unrelated positive and negative media coverage</i></p>	
		<p><i>The possibility of collapse if an uncertain threshold is reached</i></p>		$F(X_i) = \int_0^x f(Z_i) dZ_i$ <p>/</p> <p><i>Z - uncertain</i> <i>quality threshold at which collapse occurs</i></p>	
Cellini & Cuccia (2015)	economic resilience	<p>Regional surface</p> <p>/</p>	Economic crisis/Hotel industry		Istat; 2012 with respect

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Reference	Type of “resilience”-resilience of what?	Factors affecting resilience/Indicators	Geographical area?	RI methodology:	Data collection method and source and time
				Equation/Explanation	
		Territorial surface of region; Km of coasts Regional Economic (Tourism) Dimension / Number of accommodation structures; Number of hotels; Share of hotels in accommodation structures; Share of 4–5-star hotels in hotels; Share of 1–2-star hotels in hotels; Share of stays in historical cities; Share of stays in seaside destinations Infrastructure endowment / Km of electrified railroads; Km of roads; Km of highways; Number of ports; Number of airports; Rail per Km squared; Road per Km squared; Highway per Km squared; Number of airports per Km squared Culture endowment / Number of theatres; Number of cinemas; Theatres per inhabitants; Cinema per inhabitants; Number of sites in UNESCO World Heritage List; Public expenditure for tourism in current account; Public expenditure for tourism in current account divided by surface; Public capital for tourism; Public capital for tourism divided by surface Social Capital / Putnam index for social capital; Theft index	revenue/Italy/hotels 4, 3, 2* and urban, cultural and mountain destinations	$r = (1 + g_{rec}) / (1 + g_{imp})$ / g_{imp} is the variation rate (of the variable under scrutiny) in the period when the negative shock occurs (so that, g_{imp} is negative), g_{rec} is the variation rate in the recovering phase.	to 2008
Bellini , Grillo, Lazzeri & Pasquinelli. (2017)	Regional engineering, ecological and evolutionary resilience	Tourism modernisation / <i>inclusion in development strategies’ targets for innovation and smart specialisation; level of policy vision concerning tourism;</i> Tourism for innovation Tourism-generating innovation Tourism-pulled innovation Tourism moderation / <i>not defined qualitatively but/or seen in the policy makers role: inclusion in development strategies’ targets for innovation and smart specialisation; level of policy vision concerning tourism emerged from the smart specialization documents</i>	Any kind of endogenous (social, economic variables) or exogenous shock (crisis, disasters)/EU regions/EU/between different regions	N/A	N/A

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Reference	Type of “resilience”-resilience of what?	Factors affecting resilience/Indicators	Geographical area?	RI methodology:	Data collection method and source and time
				Equation/Explanation	
Strickland-Munro (2017)	Socio-ecological resilience	<p>Sociocultural links between the local community and cultural amenities/activities/tourism tours, etc.</p> <p>/</p> <p>Opportunity for community involvement in Park activities: Number of opportunities for community members to provide culturally specific training and information to destinations’ managers, tour operators or tourists; Maintenance of traditional customs and practices e.g. Percentage of youth representation on on-country trips with elders; Local community benefit from Park tourism</p> <p>Local community benefits from Park tourism</p> <p>/</p> <p>Training and skills development; Number of training programmes for Park staff per level of employment; Social responsibility of Park authorities; Percentage of goods and services obtained from local businesses; Local businesses associated with Park tourism; Percentage of tourism ventures registered to operate in the Park with local community management and/or level of ownership</p> <p>Local community involvement in Park governance</p> <p>/</p> <p>Number of formal meetings held; effectiveness: Presence of an agreed approach, in writing, for solving problems and dispute resolution; Diversity of groups involved; Number of formal links between the Advisory Committee and other decision-making bodies; Support from higher levels of authority; Number of Advisory Committee decisions adopted as Park policy</p>	Tourism arrivals (carrying capacity, etc.)/local community/in tourism system of protected areas/?	<p>N/A</p> <p>/</p> <p>Monitoring the change in community adaptive capacity (local skills or education, i.e. slow drivers of change impacted by tourism arrivals).</p>	Official statistics, questionnaires, stakeholders’ opinions
Bec, McLennan & Moyle (2016) ²	Community resilience	<p>Beliefs/values; Place attachment Personality (including perception of risk/vulnerability); Exposure/frequency/ severity of change; Demographics; Lifestyle</p> <p>/</p> <p>N/A</p>	tourism decline and rejuvenation/ community/different periods of time	N/A	N/A
Cheng & Zhang (2020)	Resilience of the industrial-economic system	<p>Level of economic development</p> <p>/</p> <p>GDP; GDP Growth index; Per capita GDP</p> <p>Economic benefit of tertiary industry</p> <p>/</p> <p>Value of tertiary industry</p> <p>The development rate of tertiary industry</p> <p>/</p> <p>Growth index of the value of the tertiary industry (%)</p> <p>Investing scale of fixed assets</p> <p>/</p>	disaster/counties/of a country differing in tourism specialization	$ERI = \frac{D_i^-}{D_i^+ + D_i^-} i = 1, 2, 3, \dots, m$ <p>The ERI was calculated with the TOPSIS model based on the index system framework (8 subsequent steps and formulas/calculations...</p>	Official statistics, 2008-2019.

Reference	Type of “resilience”-resilience of what?	Factors affecting resilience/Indicators	Geographical area?	RI methodology:	Data collection method and source and time
				Equation/Explanation	
		Total investment in fixed assets			
		Total revenue of government / Financial revenue			
		The disposable revenue / Financial expenditures			
		Level of openness / Ratio of import and export total to GDP (%)			
		Economic benefit of tourism / Total tourism income			
		Position of tourism in total economy / Percentage of tourism income to GDP (%)			
		Revenue of accommodation and catering / Accommodation and catering sales			
		Deposits of financial institution / Deposit balance of financial institutions			
	Resilience of the socio-economic system	Development of consumer market / Total retail sales of consumer goods			
		Popularity of communication facilities / Number of telephone and mobile phone users			
		Level of employee resilience / Number of employees			
		Level of employee resilience in tertiary industry / Number of employees in tertiary industry (people)			
		Industrial structure / Proportion of employees in tertiary to total employees			
		Living standard of urban residents / Disposable income of urban residents			

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Reference	Type of “resilience”-resilience of what?	Factors affecting resilience/Indicators	Geographical area?	RI methodology:	Data collection method and source and time
				Equation/Explanation	
		Living standard of rural residents / Disposable income of rural residents			
		Total unemployment level / Unemployment rate (%)			
		Convenience of transportation system / Length of Highways (Kilometres)			
		Scale of travel demand Number of total tourist arrivals (people)			
1)	Strickland-Munro (2017) developed conceptual framework for assessing interactions within protected area tourism systems (i.e. applicable to other tourism systems, i.e. cultural destinations, urban/rural destinations, etc.)				
2)	From this review, it is clear that the dimensions of community resilience can be broadly categorized as space, time, institutions and structure (i.e. the economy, society and environment).				

Table 7. Reflection on retained research papers on the TALC

Reference	Region/area	Type of research/method employed	Framework/Results
Dealbuquerque & Mcelroy (1992)	Caribbean islands	Qualitative research	In this paper the "destination life-cycle model" is presented to explain the link between tourism intensity and ecological vulnerability. It suggests that islands pass through three primary stages of tourist development: low-density exploration, rapid growth and consolidation, and high-density maturation involving the substitution of man-made for natural attractions. The three basic stages or tourism styles are identified and broad strategies consistent with the systems' framework for a sustainable tourism with moderate densities are briefly explored.
Getz (1992)	Niagara falls	Qualitative research	In this paper the potential relevance of the concept of a destination life cycle to tourism planning is examined. Historical analysis of the development of Niagara Falls reveals specific problems in differentiating the hypothetical life-cycle stages of the model. A survey of experts reveals considerable variance of opinion on the question of the current state of the industry. The findings suggest that this resort has evolved into a permanent state of maturity in which aspects of consolidation, stagnation, decline, and rejuvenation are interwoven and constant. "Capacity," in this context, is a management concept, not an absolute limit, and "rejuvenation" is a planning initiative.
Di Benedetto & Bojanic (1993)	Cypress Gardens	A step-logarithmic function	This paper investigates the effects of both strategic and environmental factors on the tourist area life cycle for Cypress Gardens. It is hypothesized that both types of factors can have a revitalization effect on the tourist area life cycle. Strategic and environmental factors are both found to have a significant effect on the life cycle and the step-logarithmic function demonstrates a very good model fit for the life cycle.
Johnson & Snepenger (1993)	Greater Yellowstone region	Qualitative research	This papers researches tourism life cycle of the Greater Yellowstone region. The stages include exploration, involvement, development, consolidation, stagnation, and then a series of choices ranging from rejuvenating to decline. Few empirical assessments of the tourism life cycle concept exist for federally managed resources. Four dimensions provided data for monitoring the tourism life cycle, being: visitation trends, growth of the service economy in the region, host residents' perceptions of current tourism development, and current biological indicators of the ecosystem. These four sources of information indicate that tourism development in the Greater Yellowstone region is more complex than the life cycle concept would suggest.
Agarwal (1994)	UK generally (the resort cycle revisited)	Conceptual research	This chapter provides a theoretical overview of the resort model and assesses its significance in relation to the future of seaside resorts, in the context of the South Coast of England. The discussion centres on the resort cycle and the advantages and limitations of using the model to study the evolution of tourism destination areas. The second part of the chapter looks at the resort cycle, accepted as a broad research framework, and an attempt is made to develop the model by ascertaining the theoretical applicability of the final-post stagnation phase to the present state of coastal tourism in the UK.
Agarwal (1997)	Torbay resort, UK	Qualitative research	This paper seeks to contribute to the debate surrounding the applicability of the resort cycle by testing the model in the context of seaside resort tourism along the south coast of Britain. A brief review of the resort cycle is followed by discussion which focuses on the main methodological problems and limitations. In the second part of this paper, using the resort cycle as the broad research framework, an attempt is made to validate the model empirically, drawing upon the experience of a particular resort, Torbay, one of the most well-established seaside resorts in the UK. The results presented reinforce the importance of 'unit of analysis' and highlight the difficulty of operationalizing the model. In addition, the study findings reveal the critical role of regeneration in continued resort evolution.
Harrison (1995)	Swaziland	Qualitative research	In this paper divergence from Butler's ideal type is analysed in some detail, but is attributed primarily to external factors beyond

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			Swazi control. Initial tourism developments occurred while the country was a British colony and, as in Lesotho and Botswana, with which Swaziland is compared, further expansion was conditioned by the country's position as a periphery of the Republic of South Africa.
Tooman (1997)	3 regions in the Greater Smoky Mountains	Qualitative research	The destination life-cycle model was applied to the Smoky Mountain region in order to better understand the economic effects of the tourism industry over time. This model fits the region sufficiently well to be useful in analysis of the evolution of second- and third-order economic impacts. Although the involvement stage provides greater benefit for the local population, what seems to be of critical importance for social welfare is not the stage of development but the degree of diversity in the area where development occurs.
Prideaux (2000)	Not applicable	Conceptual research	This paper argues that a new approach to the issue of resort development is required and proposes a new model, the Resort Development Spectrum. The model is based on the operation of the market specifically focusing on the operation of the supply side. Tourism development in resort areas is found to occur in four phases commencing with local tourism and concluding with a fourth phase where the resort develops a strong international profile. A possible fifth phase of decline, stagnation or rejuvenation is also postulated. The model does not find that growth is automatic or even sequential through the phases.
Upchurch & Teivane (2000)	Latvia	Descriptive statistics	The thrust of this study was to (a) determine the stage of development of tourism in Latvia and (b) to evaluate the positive and negative impacts of tourism development in Riga, Latvia. In terms of Butler's tourist life cycle theory, residents indicated that tourist development is in the early stages of development. This is reflected in their bifurcate, and somewhat ambivalent, responses regarding positive and negative impacts associated with the influx of tourists in their community.
Lundtorp & Wanhill (2001)	The Isle of Man (Britain); the Danish island of Bornholm	Conceptual research; tested on the case studies	The paper examines the time path of tourist growth patterns that could give rise to such a cycle and in doing so, permits the exact demarcation of the five stages of the lifecycle, though in practice, the transition from one stage to another has not shown to be so clearly observed. The model is tested on the Danish island of Bornholm case by Shaw and Williams (1992), and on the Isle of Man case by Cooper and Jackson (1989), using long run time series, from 1884 to 1912 and from 1912 to 1967 (without world war II), respectively. It showed that even under the assumption of a uniform market that ignores the shifting patterns of tourist arrivals, the lifecycle curve can only be a truly representative aggregation if all are repeat tourists. Once non-repeaters are included in the market, the lifecycle model is only a statistical approximation or caricature of the real world and becomes increasingly distorted as their proportion rises, to a point where the model collapses.
Johnston (2001)	Not applicable	Conceptual research	This paper attempts to shore up the model's theoretical foundations by specifying and elaborating upon ontological and epistemological elements. Giddens' structuration theory and Glaser's concept of 'basic social process' are utilized for ontological aspects. Comparative examination of four types of process (human life cycle, product life cycle, port development and eco succession) indicated that seven features were of epistemological concern: the unit-entity; its characteristics; its users; stages as conceptual units; change mechanisms; macro-structural conditions; and typical stage sequence. These are discussed in relation to the existing destination area literature. A synthesis presents a modified form of the model and a suggested method for how to incorporate the ontological and epistemological elements into case research.
Papatheodorou (2004)	Not applicable	Conceptual research	This paper examines evolutionary patterns in tourism from an economic geography perspective. It proposes a new theoretical model where endogenous changes to the tourism circuit lead to a dualism in market and spatial structures: powerful conglomerates share the markets with a competitive fringe and core resorts share tourism spaces with peripheral destinations. The model illustrates graphically the interaction of market and spatial forces and studies implications for resort development. The short run analysis examines the relationship among origin regions, core and peripheral resorts; smooth and abrupt long-term patterns are subsequently explored. The paper also gives directions to operationalize the model and suggests themes for future research.
Lafferty & Fossen (2005)	Queensland and Hawaii	Qualitative research	Paper investigates a perennial issue in tourism policy, planning and research: how mature destinations can deal with the

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			problem of stagnation and potential decline. It first examines the tourist area life cycle model, indicating some of its strengths and limitations. Then it discusses Michael Porter's concept of clusters, in order to assess how it might assist tourism policy-makers and planners to prevent tourism decline. Finally, it compares the formation of tourism clusters in the two most important 'sun and surf' destinations in the Oceanic tourism market - Queensland and Hawaii.
Moore & Whitehall (2006)	Barbados	Markov-switching autoregressive (MS-AR) model	This study uses Markov-switching models, and quarterly data on stay-over visitor arrivals for Barbados over the period 1957 to 2002, to test the tourism area life cycle concept. Markovian models allow the stochastic process of the growth in tourist arrivals to switch between the regimes outlined in the life cycle concept. The key finding of the paper is that the life cycle framework adequately represents the growth in arrivals from individual tourist markets. However, there does not exist a common life cycle relationship, which is applicable to all tourism source markets, and by extension, to total tourist arrivals.
Karplus & Krakover (2005)	Dead Sea resort area, Israel	Interactive regression model	The objective of the study is to examine the validity of the model's tourism life cycles curve while using a stochastic regression expression that should not necessarily yield to the logistic curve suggested by Butler. The regression model is a compound of endogenous and exogenous variables incorporated in an interactive manner with the temporal development process. Monthly bed-night data for the years 1974-2000 are used as a measure of demand. Besides time, accumulated investment in terms of hotel rooms is applied as an endogenous variable and a security indicator is applied as an exogenous variable. The suggested interactive regression was found to perform better ($R^2 = 0.92$) than the temporal expression ($R^2 = 0.70$). Despite the selection of a stochastic flexible model, the Dead Sea development pattern was found to conform to Butler's tourist area cycle of evolution model.
Russell (2006)	Not applicable	Conceptual research	While not disagreeing with the original Tourism Area Life Cycle (TALC) model, this chapter provides additional theoretical concepts that will enhance the power of the model to provide a greater understanding of the evolution of tourist destinations. The principles of chaos theory and complexity have been meshed with the TALC to bring to the forefront the underlying forces of change and the importance of triggers at critical times in the evolution of a destination.
Faulkner & Tideswell (2005)	Gold Coast Australia	Qualitative research	This paper looks at the specific case of Australia's Gold Coast as an example of a maturing and potentially stagnating destination to illustrate the methods being developed in that context to avert stagnation.
Johnston (2006)	Not applicable	Conceptual research	In this paper, a 'boundary analysis' which tackles the problems 'what is the region?' and 'what type of region' is done to eliminate or at least minimise issues of spatial fetishism and multisite development. The second issue concerns the stage sequence. It is stressed that second analysis should involve obtaining a complete understanding of the institutional development of tourism at the destination. This can be called a 'pathway analysis' and incorporates the remaining elements (internal characteristics, resort morphology, users, macrostructural conditions) so as to bring out aspects of facilitation, tolerance or inhibition (or some different pathway type) that have occurred. This paper has also intended to show that relying solely on a graphical model is no longer adequate to study a pervasive process; the focus is on ontological and epistemological underpinnings.
Hovinen (2006)	Lancaster County	Qualitative research	This chapter first summarizes the results of the previous applications of the TALC model. As the model emphasizes the potential for tourism destinations to experience significant decline if appropriate planning efforts are not undertaken, the author discusses the prospects for avoiding such a decline in Lancaster County. The case study has shown that a tourism cycle has been progressing in Lancaster County, although not always in the ways Butler hypothesized in his 1980 TALC model. The research showed that in the diversified and essentially culturally based tourism destination of Lancaster County, different sectors of tourism have combined to create what is now a mature industry where growth, stagnation, decline, and revitalization through reinvestment or new investment coexist.
Butler (2006)	Not applicable	Conceptual research	The paper gives additional information regarding the antecedent and contemporary literature and concepts related to the TALC model. It also gives explanation of the mathematical modelling logic behind the TALC model and explains some of the pro et contra arguments on the model.

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Malcom-Davies (2006)	Not applicable	Conceptual research	The paper discusses the policy measures in the rejuvenation phase at heritage sites. Heritage attractions, whatever their original functions, found themselves thrust into a highly competitive marketplace during the 1980s. There are myriad activities that offer alternative leisure experiences. The test for success for cultural institutions can no longer be a purely aesthetic one. They must justify themselves in quantitative terms, such as the number of visitors or income generated consequently leading to the saturation threshold and decline.
Haywood (2006)	Not applicable	Conceptual research	This chapter reviews some of the conditions and concerns necessary to make TALC studies and research more useful to those who are opting for directing tourism development for destinations in specific areas, for crafting and implementing industry policies and strategies, leading the development processes and managing destination management organisations or other types of tourism and hospitality organisations. Hence it is contemplating the issues of the TALC stages' predictors, configurations and site of a tourism area, unit and mode of change and unit of measurement.
Petrosillo Zurlini, Grato & Zaccarelli (2006)	10 socio-ecological systems in the Salento region, southern Italy	Holling's conceptual sustainability model	The number of official tourists visits generally underestimates the true number of visits, but the discrepancy varies among sub-regions. In order to estimate underhand (uncounted) tourist visits, a separate procedure relating "number of people" to "solid urban waste production" is developed, and then it is used to correct the official estimates. The results suggest that relative risk of sub-regions from tourism pressure may not be adequately represented by official counted visits. The set of developed indicators allow identifying two specific sub-regions as the highest risk areas, and these are discussed in terms of Holling's sustainability model.
Russo (2006)	Venice	Qualitative research	This chapter has presented an original interpretation of the relations between space and market which supports the assumption of a cyclical development pattern in urban heritage destinations, for which relatively little evidence has been produced in the literature. The application of this model, however, can be extended to a variety of contexts, and in particular to those in which the local capacity is negligible with respect to the global dimension of tourism. The vicious circle model should not be confused with the destination cycle; rather, it should be seen as an 'appendix' to it, providing a spatial/ economic explanation for the decline stage of the TALC. It is argued that the reasons for decline have to be looked for in the inability of tourism to generate the resources that are needed to 'keep up' the quality of the destination, both for what is the market for tourist goods, and the heritage itself.
Inbakaran & Jackson (2006)	Five touristic regions in Victoria, Australia: Goldfields, the Grampians, the Murray, Gippsland Natural Discovery and Goulburn Murray Waters	Multiple discriminant function analysis	This research study used a cluster analysis to segment the host community into four cluster groups. Demographic variables constituted the cluster base. These four cluster groups differed from each other on gender ratio, age, life cycle stage, education, migration status, occupation and current involvement with tourism. A further analysis demonstrated that these cluster groups significantly differed from each other in terms of both attitude towards current tourist numbers and future tourism development. The results of this study are discussed in terms of exploring the underlying causes of both positive and negative attitudes of hosts toward tourism.
Lagiewski (2006)	Not applicable	Conceptual research	This chapter categorizes and documents a selection of major works relevant to Butler's 1980 article on the TALC. The goal is to present a simple, yet informative chapter that helps scholars find and select appropriate works and commentary pertaining to the TALC model. It is important to note that this chapter is not meant to be a literature 'review' of the original 1980 article, but rather a literature 'survey' that documents the works of others who have solidified this work as an academic classic in the field of tourism. The author has made every attempt to include a bibliography for this chapter that contains all works pertaining to the 'application' of Butler's concept of a tourism area life cycle. These works were generated between the year 1980 and 2002.
Manente & Pechlaner (2006)	Not applicable	Conceptual research	This chapter summarizes the results of a study carried out for the European Commission aimed at analysing the decline of tourist destinations with regard to the definition of an early warning system based on appropriate indicators that would allow the identification of tendencies of decline. The authors propose a set of indicators in order to monitor the evolution of the destination according to the TALC phases, and redefine a declining destination as a 'destination with a certain tradition in

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			providing tourism, but characterized by one or more negative trends. These negative trends can be anticipated by a number of different signals before the destination reaches a decrease in demand.
Berry (2006)	Cairns region, Australia	Qualitative research	In this chapter, data from the Cairns region, Australia, are analysed to demonstrate to what degree the TALC model can be used to identify indicators of stage development and how these can be used to suggest future trends. It also addresses that if correctly used, the model can provide a timely warning of possible deterioration in a region's tourism industry as well as suggest corrective strategies. The model does not suggest a predetermined cycle for all tourism-based economies such that 'stagnation' and 'decline' are unavoidable. However, it does suggest that without appropriate intervention from responsible policy makers, it is highly likely that some tourism regions will behave as the model suggests.
Haywood (2006)	Not applicable	Conceptual research	This chapter discussed tourism as a "living industry" and the implications of this concept. Many organisations it is composed of create their own processes that are changed based on the people's willingness. However, life cycles represent only one model for learning about the complexities of these changes. Other (evolutionary) theories (theories of change) are explored here and put in relationship with the life cycle theory.
Lundtorp & Wanhill (2006)	The Isle of Man (Britain); the Danish island of Bornholm	Conceptual research; tested on the case studies	Because many of the case studies in the literature have been dealing with mature destinations, the stagnation period, with the implication of a growth ceiling, has been given most attention. In practice such a ceiling has been difficult to identify as the available evidence indicates that public and private initiatives for mature resorts may put off any stagnation phase before it occurs, so making it unobservable in the data. The chapter seeks to give a demand-generated explanation of the life cycle model by introducing an equation that follows the pattern of a logistic curve and when the function is graphed it shows a curve replicating the life cycle path. It deals with a relative number of tourists, and mathematical break points occur when the curve reaches 9%, 21%, 79% and 91% of the expected long run value or ceiling, which in turn can be identified with Butler's five stages.
Prats, Guia & Molina (2008)	Costa Brava Centre (Mid-Costa-Brava)	Conceptual research	This paper uses the notions of system of innovation and social network analysis, and apply them to the tourism industry, to introduce the Tourism Local Innovation System (TLIS) model. This model can be used to assess the innovation capacity of tourism destinations and, also, to design relational network structures that favour innovation. Finally, by using social network analysis methods to draw a destination's relational network map, the case Costa Brava Centre (Mid-Costa-Brava) - the most visited destination in Catalonia, is presented, as an actual example of TLIS.
Zhong, Deng & Xiang (2008)	Zhangjiajie National forest Park in China	Descriptive statistics	Results indicate that the park has experienced the first four stages as described in Butler's 1980 seminal paper. Currently, the park is in the consolidation stage. Both governments and the private sector are major players as catalysts for the park's tourism development from one stage to the next. While the local or even regional economy has become increasingly dependent on tourism, the park has also been experiencing noticeable transformation and loss of traditional cultures since its inception in 1982.
Oreja Rodríguez, Parra-López & Yanes-Estévez (2008)	Tenerife	Qualitative research	An explanatory model of change of a destination is proposed and the theoretical basis of this model described. Teleological model with its focus on strategy, have been considered in this study. Both perspectives are synthesised and represent a strategic integration of key aspects of tourist management in island destinations.
Lozano, Gomez & Rey-Maqueira (2008)	Not applicable	Dynamic general equilibrium model	An analysis of the evolution of tourism destinations is made from the point of view of the economic growth theory. Specifically, the environmental growth model of Gomez et al. (2008) is extended to give some insights into the dynamics of the number of tourists, tourism revenues, environmental quality, congestion of public goods and welfare.
Cole (2009)	Not applicable	Logistic modelling	This paper explores suggestions in the literature that the tourism industry is "chaotic" by transforming a previously developed resort model into discrete logistic equation (DLE), a widely researched chaos model. Given parameters characteristic of the industry, the logistic tourism model (LTM) explains, for example, the hesitant take-off of tourism, the role of agglomeration

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			during the rapid growth phase, and why even in maturity, with slower average growth, a resort maintains its high growth potential and propensity for chaos. These and other findings suggest that globalizing industries, such as tourism, may exhibit quite different dynamics from those captured by traditional growth models or localized supply-demand elasticity models.
Butler (2009a)	Not applicable	Conceptual research	The Tourism Area Life Cycle (TALC) has had a relatively long life and has been applied in many situations but also has been criticized for not being capable of explaining the reasons behind the process of development. One form of analysis which has particular relevance to the TALC in this context is Force Field Analysis (FFA), an approach, like the original Product Life Cycle model, adopted from the business literature. The paper begins with a brief discussion of the TALC model and its continued relevance, and then examines the potential application of FFA. It is argued in the conclusion that the combination of the two models may provide researchers with a better means of explaining the development process of destinations in a non-statistical manner and aiding a movement towards sustainability.
Butler (2009b)	Not applicable	Conceptual research	Attention is paid to the life cycle model which has been used for a quarter of a century to describe the process of development of tourist destinations, whether such a model can be used to predict future patterns, and whether cycles, waves or wheels are suitable analogies for the pattern of tourism growth. The paper argues for a blending of both evolutionary and revolutionary predictions in the case of tourism destinations, an approach which allows for the incorporation of ideas such as chaos theory and chance into the equation of growth, in order to reflect both the inertia and dynamism that are inherent in tourism.
Diedrich & García-Buades (2009)	Five coastal communities in Belize	Descriptive statistics	The data are used to predict the position of the study communities in the TALC which, based on the proposed model, range from the late exploration to late development stage. The results show that the data collected in Belize reflect the proposed relationship, suggesting that local perceptions of tourism impacts may be used as indicators of destination decline.
Butler (2010)	Not applicable	Conceptual research	Two concepts have featured heavily in academic writing on tourist destinations over the past three decades, one relating to the tourism area life cycle (TALC) and the other relating to sustainable development (SD). It is argued here that these concepts have many features in common, and that the idea of stability in the development process of a destination is dependent on that destination living within its limits, i.e. not exceeding its tourist carrying capacity. In the TALC this desired state equates to the stage of "stagnation" and for sustainable development, it represents a state of sustainability. The paper reviews the issue of implementation in the context of these concepts using two examples to illustrate how a more sustainable form of tourism might be achieved when effective control over the development and operation of tourism is implemented effectively.
Cochrane (2010)	Asia, World Heritage Sites	Conceptual research	Resilience is related to vulnerability approaches, popular amongst development practitioners, and has roots in complexity science. Applied to tourism systems, resilience explains the deeper forces underlying Butler's 'Tourism Area Life-Cycle', proposed in 1980 when tourism destination development was thought to progress in a linear fashion. Later versions of the model proposed a 'rejuvenation' stage, but the resilience concept goes further in explaining the cyclical and complex nature of systems, based on recovery from perturbation and the accumulation of various forms of capital which allow faster renewal and stronger structures.
Golebski, Nawrot & Olszewski & Zmyślony (2010)	Rural destination in Poland, Kraina Pogrzebka" ("Bay Bolete Land", Lubuskie Province	Multicriterial analysis	The aim of the paper is to develop the investor appeal index that would enable public and private entities to identify the general locations for tourism investments within destinations nearing to an end of their involvement stage or entering the development stage of their life cycle. The central part of the process, which is structured on a multidimensional comparative analysis, is the construction and computation of the composite index describing the investor appeal of an emerging tourist destination.
Pratt (2011)	Hawaii	Input-output modeling and computable general equilibrium modeling	The results show that the size of tourism's economic contribution is dependent on the import propensity of tourists as well as the import propensities of tourism-oriented sectors and their backward and forward linkages while the CGE model highlights the fact that welfare is maximised at the zenith of tourism growth.

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Pritchard & Lee (2011)	Luang Prabang, Laos	Qualitative research	The study revealed the country to be in the development stage of tourism, although Luang Prabang Province shows some of the characteristics of an international destination. The audit identified planned developments that could lead to the portfolio becoming unaligned with the nation's tourism strategy. The process also revealed the existence and the potential for subgroups of attractions, termed associated attractions, which, in this case, emerge from natural and cultural attractions, but that are unlikely to exist without them.
Filimonau, Dickinson, Robbins & Reddy (2011)	Weekend holiday trip from London to Poole (Dorset, UK)	Qualitative research	A key feature of the Life Cycle Assessment calculation is that for short-haul trips the proportional impact of accommodation-related emissions is shown to be larger than in earlier calculations, while transport impacts are reduced. The comparison demonstrates markedly different results. The reasons for the discrepancy along with the potential of LCA to estimate the indirect carbon contribution of the holiday trip's components are discussed.
Garay & Canoves (2011)	Catalonia, Spain	Qualitative research	Research shows the value of the Tourism Area Life Cycle combined with Regulation theory when analyzing the long-term historical development of tourism. In this article, we present the case of Catalonia, one of the main tourist destinations in Europe. The paper shows how the combination of these theories can be especially practical for constructing a global model that groups tourism development by phases with its paradigmatic changes.
Coelho & Butler (2012)	Not applicable	Conceptual research	A Tourism Development Index (TDI) is proposed to identify the stage of the life cycle and, at the same time to show the level of development of a tourism destination in a competitive context. Through a random simulation, based on specific assumptions, it is confirmed that it is possible to quantify the different stages of the life cycle, and thus make it possible to identify at which stage a destination is in an international competitive context.
Weaver (2012)	Not applicable	Conceptual research	This paper positions sustainable mass tourism (SMT) as the desired and impending outcome for most destinations. Natural resource scarcity, development of green technology, climate change awareness, the global financial crisis, institutionalized environmentalism and Internet technology all facilitate the emergence of sustainability as a societal norm that is combining with the longer established norm of growth desirability. SMT convergence is occurring along three distinctive paths in an evolutionary manner that reflects environmental pragmatism. The market-driven 'organic' path describes the conventional tourism area life cycle model of Butler, whilst the regulation-driven 'incremental' path entails deliberate alternative tourism (DAT) in which carrying capacities are gradually increased to accommodate higher visitation levels. The hybrid 'induced' path describes planned mega-resorts conceived as growth poles. Each model is invested with its own specific planning and management implications.
Hazmi Omar & Mohamed (2012)	Langkawi Island, Malaysia	Qualitative research	This paper aims to examine the applicability of the tourism area life-cycle model by Butler (1980) to Langkawi's lodging development. Results indicate that the island has experienced the first four stages; exploration, involvement, development and consolidation. Both government and private sector are the major players for the island's lodging development.
Cole (2012)	Cross-section of Caribbean and other island destinations	Conceptual research based on extension of the Verhulst equation originally devised in 1838.	Discussion of agglomeration and clustering in the tourist area life cycle (TALC) literature has not led to a corresponding change of the principal equation used to formalize the model. This paper proposes a modification that accounts for the synergies between the accommodation, entertainment, and other components of a tourist destination. Estimations based on visitor expenditures and experts' evaluations of destination authenticity are compared. The results illustrate how parameters representing synergy and congestion vary across tourism styles and time.
Butler & Weidenfeld (2012)	Not applicable	Conceptual research	Drawing on the knowledge of working relationships between tourism firms, this paper suggests an underlying conceptual framework for the study of the dynamic nature of the cooperation, competition, and spatial proximity between tourism firms and the interrelationships between these aspects throughout the TALC.

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Kozak & Martin (2012)	Turkey	Qualitative research	Tourist destinations tend to follow similar development patterns. Eventually, all destinations enter the market maturity stage leading to a decline in visitors. To prevent visitor decline, tourism managers and policy makers try to reposition their destinations appealing to more tourist segments. A multi-segment strategy is expensive and may create a fuzzy destination image, further accelerating the decline. An alternative strategy extends Zeithaml, Rust, and Lemon's (2001) customer pyramid theory. This paper applies customer pyramid theory to Turkey's tourism industry.
McLennan, Ruhanen, Ritchie & Pham (2012)	Not applicable	Conceptual research	This article aimed to undertake a comprehensive review and analysis of the literature relevant to transformation. Originating from systems' theory, transformation theory explains the dynamic interaction between institutions and structure. Transformation theory has gained some prominence in the tourism destination evolutionary literature for its holistic and flexible approach to strategic destination management.
Ivars Baidal, Rodríguez, Sánchez & Rebollo (2013)	Benidorm (Spain)	Qualitative research	Theories and models cannot entirely explain the complexity of local tourism systems and their interaction with the market. The difficulty increases when analyzing the unique destinations, which presents internal factors derived from the local context which play a key role in understanding its urban and tourism model. The influence of the economic cycle on tourism demand must be distinguished from the effects of structural changes in the tourism market because adapting to structural changes is essential to maintain competitiveness despite temporary fluctuations.
Ma & Hassink (2013)	Gold Coast, Australia	Conceptual research	Two interlinked concepts derived from evolutionary economic geography, namely path dependence and coevolution are argued to bring the debate around the literature of tourism area life cycle substantially forward. The case of the Gold Coast, Australia is examined with the explanation of two theoretical frameworks in the empirical context. The paper concludes by arguing for a combination of both a path dependence and coevolution perspective to analyze tourism area development.
Romao, Guerreiro & Rodrigues (2013)	Regions of Southwest Europe (Italy, France, Spain and Portugal)	Panel data analysis	In this article, a simplified version of the tourism area life cycle model is developed in order to identify different stages of tourism evolution among the regions of Southwest Europe (Italy, France, Spain and Portugal). This information has been included as a dummy variable in a panel data model which aims to explain regional tourism attractiveness, between 2003 and 2008, including other variables related to sustainability (regional natural and cultural resources), regional innovative efforts and other elements related to tourism infrastructures and economic conditions that influence regional tourism performance. The results obtained show that 50% of the inland regions and 56% of the west coast regions are in the exploration stage while 52% of the south coast regions are in stagnation.
Lee & Weaver (2014)	Kim Yujeong, Korea	Descriptive statistics	It yields a basic pattern of conformity, although the staggered and overlapping sequencing of indicators suggests the presence of successive exploration, involvement, and development tendencies rather than stages. Apparent contradictions between very high guest-to-host ratios and contact and relatively low levels of resident dissatisfaction and attraction change reflect the topophilia of both residents and visitors and, more speculatively, the influence of a homogeneous cultural context.
Sanz-Ibanez & Anton Clavé (2014)	Not applicable	Conceptual research	Considering concepts such as human agency, contextuality and path dependence, the paper conceptualizes local tourism destinations evolution as a complex, path- and place-dependent process that is determined by the action and interaction of stakeholders and their ability to adapt or create new paths, as well as to survive in response to local and global changes. Hence, it discusses the bidirectional effects between stakeholder practices and local tourism destinations evolutionary performance. Furthermore, it attempts to increase the understanding of how and why.

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Yang, Ryan & Zangh (2014)	Kanas, Xinjiang, China	Descriptive statistics	This paper finds that TALC is a useful analytical framework in China, despite its command economy, and governments' multiple roles in tourism development. The position of cultural heritage and the characteristics of the Tuva and Kazakh ethnic minority peoples in tourism in Kanas are critically examined, as is China's concept of social harmony and progress.
Lundberg (2015)	West Sweden	Qualitative research	Findings show that it is not possible, as argued in previous research, to use perceived tourism impacts as an indication of destination decline. Instead findings indicate that negative impacts of tourism development are perceived by a larger share of the population at destinations with lower levels of tourism development. The life cycle of destination is suggested to be more complex, chaotic and dependent on the specific context of the destination. cluster analysis is applied to divide local residents into groups with differing perceptions. Three destinations in West Sweden are empirically studied. A four-cluster solution is used, dividing residents into development supporters, prudent developers, ambivalent/cautious and skeptics.
Garcia Sastre, Alemany Hormaeche, & Trias (2015)	Balearic Islands	Qualitative research	Based on the analysis of successive marketing plans of the Autonomous Region of the Balearic Islands, and using the Gini index to measure seasonality, this study explores the link between the two and demonstrates that regional political policies adopted over the last 20 years have not reduced seasonal variation in tourism. The demand remains at the same levels of seasonality as in the 1990s, suggesting the ineffectiveness of the policies implemented.
Albaladejo & Martinez-Garcia (2015)	Not applicable	Mathematical modelling; Endogenous growth model	According to the tourism area life cycle (TALC) model of Butler (1980), the evolution of a touristic destination follows an S-shaped curve which is upper-bounded by its carrying capacity, usually assumed to be a fixed constant. This forecast prevents a tourism-based economy from maintaining positive growth rates in the long run. Along a balanced growth path, the income from tourism grows at the same rate as the innovation, and the carrying capacity will grow as the rate of innovation surpasses the foreign economic growth rate. The long-term growth of the economy depends on the real exchange rate.
Kimmel, Perlstein, Mortimer, Dequn & Robertson (2015)	Ping'an Village, China	Qualitative research	Drawing upon observations from site visits and interviews with local stakeholders in one village in the Scenic Area (SA), this case study identifies the various social, economic, and environmental variables that will shape tourism's future contribution to the area's economic and community development and landscape and cultural heritage preservation (with regard to tourism area life cycle stages).
Omar, Othman & Badaruddin (2015)	Tioman Island, Malaysia	Qualitative research	This paper describes the life cycle of coastal resorts in Tioman Island by providing the evidences of historical and fieldwork data from the start of the 1890s up to the present. The findings demonstrate that tourism has resulted in substantial changes in the island's coastal resorts. The resorts in the island have passed through subsequently four stages of development as suggested in Butler's model and are currently in the consolidation stage.
Kristjansdottir (2016)	Norway, Iceland and other OECD countries	Regression modeling	The study indicates that the S-shape of the Butler's tourist area cycle of evolution can be captured with a polynomial function for a range of OECD countries, as well as for Norway and Iceland combined and for Iceland solely. The main implication of this study to managers and tourism policy planners is the potential to apply the TALC model to estimate development and potential peaks in the tourism industry in advance, years before the tourist level reaches maturity at the top.
Liu, Vogt, Lupi, He Ouyang & Liu (2016)	Wolong Nature Reserve, China	Descriptive statistics	The authors use mixed method approach to identify the stages of TALC, i.e. in-depth interviews and surveys with various local stakeholders, questionnaire surveys of tourists, field surveys and secondary data sources (government documents).
Canovas & Castineira. (2016)	Costa Blanca, Alicante (Spain)	Descriptive statistics	This research makes a brief review of the main scientific contribution from the field of the Geography of Tourism followed by an analysis of the wide thematic diversity of the Costa Blanca cultural heritage in Alicante (Spain), a tourism area characterized by the signs of consolidation described by the evolution models of the Tourism Product Life Cycle and the theories of productive restructuring. The analysis of tourism potential allows identifying the relevant heritage elements that could justify the creation

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			of cultural tourism products as strategy of tourism diversification.
Albaladejo, Gonzalez-Martinez & Martinez-Garcia (2016)	Spanish regions	Panel data modelling	Following the ideas of the Tourism Area Life Cycle (TALC) theory, a dynamic econometric model for tourism demand is proposed where the reputation effect (the effect of the lagged demand on the current tourism demand) is not constant, but dependent on congestion. The model is tested using panel data from Spanish regions during the period 2000-2013. Two estimations are performed depending on whether the tourists' origin is domestic or international.
Petrevska & Collins-Kreiner (2017)	Macedonia	Qualitative research	The study explores the political context and the government's role in policy-making and implementation at each TALC stage. It also attempts to assess key arenas of governmental influence on tourism, such as privatization, legislation, tourism promotion, and fiscal policy. To this end, an analysis was conducted of secondary data sources with the aim of assessing the current stage of tourism development.
Yun & Zhan (2016)	Zhangjiajie city, China	Descriptive statistics	The study's results show that residents' positive perceptions of the impacts of tourism in Zhangjiajie influence their attitudes about conservation of cultural resources in the consolidation stage, such as attitudes about cultural conservation, cognition of cultural knowledge, behaviour related to cultural conservation, and residents' attitudes about tourism development. All results reflect the importance for cultural conservation of residents' positive perceptions of the impacts of tourism.
Peroff, Deason & Seekamp (2017)	Multiple countries (e.g., Australia, Canada, Kenya, Peru, United Kingdom, United States)	Qualitative research; multiple case studies	This case study of the demonstrates the advantage of integrating multiple evaluative lenses and highlights the challenges of partnerships with limited structure and narrow vision. Furthermore, it documents the difficulties rural areas face when competing with nearby established destinations.
Albaladejo & Martinez Garcia (2017)	Bornholm	Multilogistic growth model	Considering the data of passenger flows to Bornholm from 1912 to 2001, collected by Lundtorp and Wanhill, the authors find that the superposition of several logistic growth models fits better with these data. Then they propose a multilogistic growth model, where investment or innovation in the tourism sector boosts the addition of new logistic curves which superpose the old ones. The continuous birth and superposition of these new life cycles is not free; it requires the purposive effort of entrepreneurs and governments seeking new markets and the improvement of infrastructures.
Kubickova & Li (2017)	Costa Rica, Guatemala and Honduras	Multivariate Panel Cointegration Model	The objective is to investigate the role government plays in tourism competitiveness and understand the relationship based on the Tourism Area Life Cycle model. Countries characterized as tourism-dependent will demonstrate higher levels of government engagement than those less dependent on tourism. Case study was employed, utilizing time-series analysis. The results indicate that the role government plays in tourism competitiveness may depend not only on the level of freedom provided (proxy for government) but also on the stage of destination development.
Ferreira & Hunter (2017)	Stellenbosch Franschhoek-Paarl, South Africa	Descriptive statistics	A geographical analysis of the development and current state of wine tourism in the region can assist in the country's efforts to develop a new strategy to enhance and preserve wine tourism in the future. Strong evidence of hierarchical differentiation between the wineries of the more established wine tourism regions has emerged. The impact of the wine tourism resorts on the smaller wineries has yet to be determined in the context of the resilience of the whole region. The development of wine tourism is also responsible for the transformation of rural landscapes and especially in the regions that have the most developed wine routes.
Hee, Jeong & Xuan (2017)	Southern Anhui, China	Descriptive statistics	The period 1979 to 1990 comprised the formation stage of spatial agglomerates; tourism spatial structure began to show the characteristics of agglomeration development, and Gini indexes of the number of tourists and tourism revenue increased significantly from 0.26 to 0.29, and from 0.33 to 0.35, respectively. From 1991 to 2008, the system experienced a growth stage; from 2009 to the present day, the system has remained in a blowout-development stage, during which non-linear interactions among agents are strengthened; various emerging development factors generate cultural tourism, vacation tourism, rural tourism and other new tourism products jointly with traditional development factors.

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Holmes & Ali-Knight (2017)	Case studies from Australia, United Arab Emirates and the UK	Qualitative research	Findings facilitate an extension of Butler's model to include additional trajectories and accompanying underpinning critical factors that better explain and predict the nature of events and festivals.
Holladay (2018)	Not applicable	Conceptual research	Measuring the resilience of a dynamic system is a difficult undertaking. This article is an effort to present intersecting theories between destination resilience and sustainable tourism. Traditional tourism management relies on a narrow focus based in scientific approaches that are often linear in concept. This type of thinking may lead to some limitations in planning and a full understanding of how the tourism industry operates on various scales. Resilience describes the capacity of a system to absorb change and continue to persist. Sustainability is the intersection of social, economic, institutional, and ecological variables. In this article, a heuristic model is presented that combines and adapts Butler's Tourism Area Life Cycle and Holling's Adaptive Cycle. This heuristic model is intended to stimulate theories on destination resilience within the context of sustainable tourism.
Baez-Garcia, Flores-Munoz & Gutierrez-Barroso (2018)	Tenerife, Canary Islands	Nonlinear competing regression analysis (logistic, Gaussian and logarithmic)	Paper analyses mature destinations, using quantitative data and alternative functional forms. The results suggest that the diagnosis of maturity was at least premature in the first place, poorly based on data analysis and fast in promoting specific policies whose effectiveness is under discussion even after decades.
Kruczek, Kruczek & Szromek (2018)	Antarctic Region	Multiple regression analysis	An important problem for the development of tourism in the polar regions is the determination of the limit of tourist traffic that these regions can accept, without risking the degradation of the environment. This article describes the environmental conditions of Antarctica that decide its attractiveness for tourists, as well as its political and legal status. Reference is made to climate change affecting the area, and on the basis of the Butler cycle, the hypothetical limits of the further development of tourism are described.
Romao (2018)	Japan and Europe	Conceptual research	A specific discussion on the contribution of tourism for economic growth (tourism-led growth hypothesis) and its limitations in the long run is framed within the consideration of the historical dimension of tourism development, through the analysis of the evolutionary aspects of the life cycle of tourism destinations, including potential negative long-term consequences of specialization in tourism.
Marsiglio (2018)	Not applicable	Two-sector endogenous growth model à-la Uzawa-Luca	The relationship between tourism specialization and structural change in an endogenous growth model is elaborated, analysing its implications for both economic growth and tourist flows. A two-sector economic growth model is considered where the development of tourism activities generates a production externality and a structural change, which modifies the resources-use intensity, ultimately affecting tourist flows. It was shown that structural change might explain why tourism economies may experience fast economic growth as suggested by empirical evidence, and why phases of rejuvenation, decline, or stagnation consistent with the predictions of the TALC hypothesis might occur. By combining different results, it is shown that an eventual phase of decline generated by structural change does not necessarily have to be interpreted as a poor economic outcome since there might exist a bell-shaped relationship between residents' income and number of visitors.
Szromek (2019)	Island of Bornholm	Logistic function (SFw)	This paper presents the basis of the tourism area life cycle (TALC) concept and its extension in the context of the implementation of sustainable development practices in the tourist business model. The author uses the logistic function to determine the level of tourist absorption and capacity. The empirical basis of the methods used was statistics on the development of the tourist industry on Bornholm (data from the period 1912–2009). The objective of the paper is to determine the stage of development of the tourist area of Bornholm and the consequences of this stage for business models of tourist enterprises functioning there.
Zhang & Cheng (2019)	36 Wenchuan counties, China	Fixed-effects panel threshold regression	The empirical results show that tourism significantly contributes to economic growth, supporting the validity of the tourism-led growth hypothesis (TLGH) for the disaster-affected destinations. Specifically, the estimated coefficients of tourism on economic growth decrease with the levels of tourism specialization and industrial structure exceeding the threshold value. Based on the Tourism Area Life Cycle theory (TALC), 36 disaster-stricken counties are divided into six types based on the evolution of tourism specialization.

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Yang, Yin, Xu & Lin (2019)	Southern Anhui, China	Conceptual research (applied on the case)	According to the complex adaptive systems theory, tourist destinations may be regarded as complex adaptive systems formed by multiple adaptive agent interactions and composed of an agent system, tourist attraction subsystem, tourist service facility subsystem, and external environment system. This paper explores the spatial evolutionary progress of the Southern Anhui tourist area, from 1979 to 2016, during which period the area experienced growth, from the formation stage up to blowout-development stage, measured by the Gini indexes of the number of tourists and tourism revenue. In this last stage, from 2009 to 2016, the non-linear interactions among agents are strengthened; various emerging development factors generate cultural tourism, vacation tourism, rural tourism and other new tourism products jointly with traditional development factors. New tourism products form a large number of new spatial agglomerates that are interconnected, accelerating the spatial flow of tourists and tourism revenue and reducing the differences in tourism development levels within the region; Gini indexes of the number of tourists and tourism revenue declined steadily from 0.17 and 0.23 in 2009 to 0.12 and 0.15 in 2016.
Lee & Jan (2019)	Taiwan	Descriptive statistics, confirmatory factor analysis, multivariate analysis of variance	In this paper, the research gaps in sustainable tourism development were addressed by examining residents' perceptions of the sustainability of community-based tourism based on tourism area life cycle theory. The survey questionnaire was distributed to the residents of six Taiwanese communities, and it was designed to determine the residents' perceptions of the economic, socio-cultural, environmental, and life satisfaction sustainability of tourism. In total, 849 usable questionnaires were collected. The four dimensions of sustainability were evaluated according to the pre- and post-development perceptions of tourism sustainability, and significantly different results were obtained. The study concludes that the residents' perceptions differed across the developmental stages; thus, managers should consider the development opportunities and adopt appropriate strategies across different development stages.
Albaladejo & Gonzalez-Martinez (2019)	The most visited Spanish municipalities	Panel data analysis	A dynamic econometric model for tourism demand which considers the implications of the Tourism Area Life Cycle (TALC) theory on tourism demand is proposed. Unlike other dynamic models, in this specification the effect of the lagged demand on the current tourism demand is not constant, but dependent on congestion. The model using disaggregated data from the most visited Spanish municipalities for the period 2006-2015 is used. Two panel data estimations are carried out: one with the coastal tourist resorts and the other one with the inland municipalities. The results showed that tourism congestion reduces the positive previous tourist effect on current arrivals, suggesting that increasing congestion could worsen the attraction of a tourist destination. Congestion is more negatively perceived in inland destinations than coastal ones. Finally, a strong persistence in tourism demand for coastal destinations is shown.
Cruz-Milan (2019)	Participants in survey from the USA	Partial least squares structural equation modelling (PLS-SEM)	This research studies destination choice based on Plog's venturesome concept, incorporating the effects of four consumption needs from the theory of market choice behaviour. An empirical test in the context of destinations in two stages of Butler's tourism area life cycle (TALC) showed that venturesome does not predict behavioural intentions as postulated by Plog. However, results demonstrated that epistemic and emotional (functional and social) needs are predictors of preference for novel (mature) destinations, supporting the original conceptualization of Plog's psychographic framework.
Fan, Liu, Qiu & Richard (2019)	Not applicable	Conceptual: utility maximization model	Host attitudes toward tourists are critical to the sustainable development of the tourism industry. By following the social exchange theory and applying a utility maximization model, the current study not only explains Doxey's Irridex model from an economic perspective but also complements the findings of the tourism area life cycle model proposed by Butler. Results show that the public resources at the destination, along with the ability of local community in channelling (foreign) tourism income into productivity advancement, influence the optimal level of tourism development in a destination.