Sustainable tourism development including the enhancement of cultural heritage in the city of Nafpaktos - Western Greece

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Abstract - The application of a sustainable tourism management and development framework, including the enhancement of cultural heritage is presented for the city of Nafpaktos (Western Greece) and the surrounding area. Through a qualitative SWOT analysis and a quantitative Limits of Acceptable Change (LAC) - Tourism Carrying Capacity (TCC) framework, an attempt is made to establish thresholds, monitor current conditions, and upgrade tourism activities, with simultaneous development of the tourism-associated economic sectors and the cultural heritage of the city. Activity zones are identified and 18 indicators are selected to describe the environmental/cultural, economic, and social conditions of the area. Reference conditions for each indicator are established either as measured or negotiated thresholds and indicators are accordingly scored to depict the current divergence from reference. The Leopold matrix is used to compare scores and identify restrictions of development. Results reveal high potential for sustainable tourism development of the area, as 9 of 18 indicators received high scores, indicating sustainable conditions, and a variety of underdeveloped tourism endpoints were identified, including the castle of the city, which could potentially support a 90-fold increase in tourism flow. However, restricting factors of development were detected, related to the lack of a tourism management plan, the weak on-site protection of the natural and cultural heritage and the lack of awareness for sustainability among the local people. A strategic plan is finally proposed to provide managers, stakeholders, and the local communities with a guiding framework to upgrade the tourism flow in and around the city within a step-by-step sustainable process.
1. Introduction

Sustainable tourism has been defined as ‘tourism that takes full consideration of its current and future economic, social and environmental impacts, addressing the needs of visitors, the industry, the environment and host communities’ (UNEP & UNWTO 2005). According to this definition, a tourist destination can be appropriately managed to prevent uncontrolled tourism growth from deteriorating the destination’s environmental resources and the socio-cultural and economic status of host communities. However, this a priori assumption has received much opposition and practically, it has been proven very challenging to apply the principles of sustainable tourism development at an operational level (Berno & Bricker 2001; Wickens et al. 2015).

Aiming to quantify this vague sustainable-tourism concept and break it down into achievable targets, various methodologies have been proposed, such as the Tourism Carrying Capacity (TCC) (UNWTO 1999), the Limits of Acceptable Change (LAC) (Stankey et al. 1985), the Visitor Impact Management (VIM) (Farrell & Marion 2002) the Visitor Experience and Resource Protection (VERP) (National Park Service 1997; Manning 2001) and the Protected Area Visitor Impact Management (PAVIM) (Farrell and Marion 2002), while various sets of sustainability indicators have been simultaneously developed (CIDA 2012; European Commission 2013). Two of these concepts, the TCC and LAC, have been widely applied in sustainable tourism case studies (e.g. Coccossis et al. 1996; Saveriades 2000; Garrigos-Simon et al. 2004; Silva et al. 2007; Welford & Ytterhus 2009; Iliopoulou-Georgudaki et al. 2016) and despite the criticism received, they continue to be utilized as tools to evaluate the potential for sustainable development of tourist destinations.

TCC has been defined by the World Tourism Organization (1981) as ‘the maximum number of people that may visit a tourist destination at the same time, without causing destruction of the physical, economic and socio-cultural environment and an unacceptable decrease in the quality of visitors’ satisfaction’. While highly criticized as ‘almost impossible to operationalize’ (Berno & Bricker 2001), the TCC concept has evolved to include multiple carrying capacities (Salerno et al. 2013) and was recently incorporated in more flexible frameworks (Navarro-Jurado et al. 2012; Iliopoulou-Georgudaki et al. 2016), which focus on the sustainability of the developmental process itself, rather than on reaching a sustainable threshold. The LAC framework has also been used as a flexible alternative (Brown & Turner 1997; Ahn et al. 2002; Lawson et al. 2003; Roman et al. 2007; Salerno et al. 2013; Longyu et al. 2015) aiming to define ‘how much change is acceptable’ (Krumpe & McCool 1997), within a process of public participation, including negotiated, dynamic thresholds.

Over the years, the principles of sustainable tourism have been included in projects aiming to protect the world’s natural and cultural heritage. For example, for over 40 years, UNESCO has been operating ‘an international framework for cooperation and coordinated achievement across sectors in order to safeguard heritage and achieve sustainable economic development’ within the World Heritage and Sustainable Tourism Programme (http://whc.unesco.org/en/tourism), while recently, the European CHERPLAN project (http://www.cherplan.eu) applied a combination of the TCC and LAC concepts to ensure ‘compatibility and synergy between cultural heritage conservation and socio-economic growth by fostering the adoption of a modern Environmental Planning approach throughout Southeast Europe’.

In Greece, sustainable tourism planning and management has been approached by case studies applying the TCC concept to define numerical thresholds of tourism development. Such thresholds are either based on a selection of specific environmental/cultural, social and economic indicators (Coccossis et al. 1996; Tselentis et al. 2006; Kyriakou et al. 2011; Tselentis et al. 2012) or include the TCC in more dynamic approaches, involving flexible limits and stakeholder participation (Iliopoulou-Georgudaki et al. 2016). This article describes an application of a combined LAC-TCC framework, within the CHERPLAN project, in the city of Nafpaktos (western Greece) and the surrounding area, to assess its potential for sustainable tourism development, including the development of the city’s cultural heritage as a possible tourism endpoint.
2. Methods

2.1 Framework overview

The methodology used, integrates two separate approaches, a qualitative SWOT analysis (Humphrey 2005) and a quantitative framework, which combines the LAC and TCC concepts, as previously described and applied by Iliopoulou-Georgudaki et al. (2016).

The SWOT analysis comprises a strategic planning method used to evaluate the Strengths, Weaknesses (or Limitations), Opportunities, and Threats involved in a project (in this case, the city of Nafpaktos and the surrounding area), requiring to specify the objective of the project and to identify factors (internal or external) that are favorable and unfavorable to achieve this objective, summarized as:

- **Strengths**: characteristics of the project, which give it an advantage over others
- **Weaknesses**: characteristics that place the project at a disadvantage relative to others
- **Opportunities**: external chances to improve performance of the project
- **Threats**: external elements that could cause trouble for the project

The combined LAC-TCC framework, which was applied to calculate the TCC whenever this was possible (or estimate the “acceptable change” from the current state when TCC could not be accurately calculated), is summarized in 6 steps:

**Step 1**: Definition of activity zones in the tourist destination and of potential interactions between the zones under investigation;

**Step 2**: Selection of indicators for each activity zone to describe the status of the economic, environmental and social conditions of the study area;

**Step 3**: Establishment of reference conditions (standards) for each indicator;

**Step 4**: Scoring of each indicator according to the degree of deviation from the reference state (standard) and comparison by utilizing the Leopold matrix;

**Step 5**: Initiation of decision-making actions and procedures by upgrading those indicators (reflecting conditions), which received the lowest scores (and as a consequence comprise restricting factors for sustainable tourism development);

**Step 6**: Monitoring of progress, adjustment of procedures and further upgrading of all indicators-conditions with low scores until all scores reach high values, reflecting the sustainable upgrading of the tourist destination.

2.2 Selection of sustainability indicators

A draft set of core indicators was initially derived from the indicator lists of CIDA (2012) and the European Commission (2013). After proper negotiations between the two teams involved in the CHERPLAN project (scientific and administrative), the initial set was enhanced to finally include 18 indicators - five environmental (ENV), six economic (EC) and seven social (SO)- to effectively represent the environmental, economic and social conditions, respectively, of the study area, which are influenced by (or associated with) tourism activities. Environmental indicators are related to the protection of cultural and natural heritage, providing information regarding the water supply capacity, the coastal/inland water quality, wastewater treatment and the ratio between natural and occupied land. Economic indicators are related to the profits from tourism business, and social indicators describe the level of satisfaction of both tourists and local people from the
current tourism activities. The data required were received mainly from the action plan of the municipality of Nafpaktia, or a field survey wherever this was possible.

2.3 The Leopold matrix

The Leopold matrix (Leopold et al. 1971) was used to visualize the information collected. As in Iliopoulou-Georgudaki et al. (2016) and similarly to Puczko and Ratz (2000), the project activities were placed in the y axis and assigned two scores (in the x axis) representing the magnitude of the impact and the importance of the activity, respectively. The ‘evaluators’ assigned the magnitude at the upper-left corner (1-lowest and 10-greatest magnitude) and the importance at the lower-right corner (1-lowest and 10-greatest importance). ‘Magnitude’ depicted the possibility of each indicator (condition) for development, evaluated as deviation (percentage) between the current state and the calculated or negotiated reference conditions. The percentages derived from these calculations were converted into a 1 to 10 scale where 1 indicates 100% deviation (condition needing attention) and 10 indicates no deviation (sustainable condition). ‘Magnitude’ was estimated by the scientific team of the CHERPLAN project, while ‘importance’ was a negotiated score assigned by both the scientific team and the administrative authorities of the Region of Western Greece involved in the project. (Obviously, involving all managers, stakeholders and the host communities of the area during such negotiations in an extended application could provide more accuracy to the process).

2.4 Study area

Located in western Greece, Nafpaktos is the capital city of the Municipality of Nafpaktia, which covers an area of 876 km² and has a population of 31,594 inhabitants. The city of Nafpaktos has 13,415 inhabitants and its economy depends primarily on the tertiary sector, with 58% of the population being involved in the tourism business, 20% in processing activities and 9% in farming and stock-breeding.

The municipality attracts all types of tourism due to the landscape variety, which includes sandy beaches, mountainous areas surrounded by thick natural forest, spring waters, artificial lakes and cultural heritage sites. Sixty villages of the municipality are built in altitudes between 700 and 1000 m attracting visitors, which seek alternative forms of tourism, such as hiking, canoeing and rafting. The harbor of the city of Nafpaktos is one of the most scenic in the wider area. The historic centre of the city represents an interesting traditional urban complex, surrounded by a fortified wall and dating back to the prehistoric times. Nafpaktos has been denominated worldwide as a place of historic value and of particular natural beauty.

The study area was partitioned in three activity zones for the application of the process (Figure 1):

1. The coastal zone, including a coastline of 42.5 km, with many beaches, most of them weakly organized, such as Kryoneri, Kato Vasiliki, Antirrio and the beaches Psani and Gribovo, which are closely connected to the urban zone. In a rough estimation, the accessible coastline could be set at 22 km due to the places with rough relief (rocky shores and steep shorelines).
2. The urban zone including the city of Nafpaktos along with its historical monuments such as the castle city.
3. The rural zone consisting of settlements at an extended area around the city centre, natural places such as the Evinos river and the relevant artificial lake, the Mornos river and mount Varasova, which is listed in the NATURA 2000 network, while, located in a distance of 40 km are the most developed ecotourism areas, mainly the villages Elatou and Ano Chora.
2.5 Tourism Carrying Capacity of the castle of Nafpaktos

A separate analysis was applied to derive a TCC threshold for the castle of Nafpaktos. TCC was derived by comparing the tourism flow in the castle with the one of the castle of Edinburgh (Scotland) as it is considered one of the most visited castles in the world and it is managed appropriately to ensure a long-term, sustainable tourism flow. TCC was calculated as the daily number of visitors per m².

3. Results

3.1 SWOT analysis

Five thematic sectors have been introduced to describe the environmental, economic and social conditions of the city of Nafpaktos and the surrounding area: (i) environment, (ii) tangible heritage, (iii) buildings and infrastructure, (iv) society, legislation and culture, (v) tourism and economy. The Strengths, Weaknesses, Opportunities and Threats of the city of Nafpaktos according to the SWOT analysis are summarized in table 2.

3.2 LAC-TCC framework application

**Step 1** - Definition of activity zones: Three activity zones were identified, the coastal, urban and rural zone (Figure 1 - see the ‘Methods’ section for details).

**Step 2** - Selection of indicators: Eighteen environmental, social and economic indicators were selected to represent the environmental, economic and social conditions of the municipality (Table 2).

**Steps 3 & 4** - Establishment of reference conditions, scoring of indicators and comparison: For each indicator, reference conditions and the relevant scoring are described below:

**ENV1** - Protection of natural/cultural heritage: The castle of Nafpaktos, the fortified wall around the city, the harbor and the traditional town centre are the main sites of cultural interest, attracting tourist flow from the coastal zone. The mountain Varasova, a NATURA 2000 area located 20 km west of the city, hosts a rich flora and fauna (see the SWOT analysis for details) and in combination with the beautiful landscape, it attracts alternative types of tourism. All historical monuments, including the castle, are legally protected and
supervised by the 22nd Ephorate of Byzantine Antiquities of the Hellenic Ministry of Culture and Sports, while the mountain Varasova is protected by the Ministry of Environment and Energy. However, as mentioned in the SWOT analysis, in practice, the protection of cultural and natural heritage is weak. Specifically for mountain Varasova, there is no sufficient personnel to keep watch over the area for forest fires or other possible violations. Therefore a score of 3/10 is assigned for all areas to reflect this situation.

ENV2 - Water supply capacity: Each town in the municipality has at least one water tank, from which is supplied by drinking water, derived from nearby springs and groundwater pumping. There is no relevant quantitative information, however it is widely accepted among managers, stakeholders and local communities that the water resources of the municipality and the wider area are sufficient to cover a possible increase in tourism activities. Lack of drinking water has been rarely reported and only during specific summer seasons. A score of 8/10 is assigned for all zones to indicate the sustainable level of this condition.

ENV3 - Coastal/inland water quality: The beach of Psani has been awarded a blue flag for the year 2015, indicative of the high bathing water quality and the facilities to support tourism activities. All other beaches except for Gribovo present excellent bathing water quality according to the relevant EU Directive 2006/7/EC. Swimming however was not allowed in Gribovo during 2014 as it was found inappropriate, since municipal wastewater is released in the area. Yet, in 2015 the water quality was upgraded. The inland water quality of Evinos and Mornos rivers and the relevant lakes has been reported to fulfill the requirements of the Water Framework Directive 2000/60/EC, with only minor exceptions. Considering the above, a score of 6/10 is assigned for the coastal and urban zones and 9/10 for the rural zone to reflect the abovementioned data.

ENV4 - Wastewater treatment: A wastewater treatment plant is operating, receiving wastewaters from the city of Nafpaktos and having a capacity to serve 25,000 citizens. The plant is not connected to all settlements of the municipality and since the municipality has a population of 31,594 inhabitants, it would be insufficient. Wastewater from the villages around the city is gathered in cesspools at each house. These cesspools are not watertight, allowing water to leach out to the ground. Considering that an increase in tourism activities will generate more wastewater and until all settlements are connected to the treatment plant, a score of 6/10 is assigned for the coastal zone, 6/10 for the urban zone and 7/10 for the rural zone (which is less crowded, therefore less impacted).

ENV5 - Natural land/occupied land: According to GIS derived information, the coastal zone maintains its natural environment in most cases except for specific organized beaches. The city of Nafpaktos has replaced the natural land in the urban zone, whereas the rural zone remains almost natural (11% of the area covered by settlements and agricultural land). As a result, a score of 8/10 is assigned for the coastal zone, 2/10 for the urban zone and 9/10 for the rural zone.
### Table 1. SWOT analysis for the city of Nafpaktos

<table>
<thead>
<tr>
<th>Sectors</th>
<th>Strengths</th>
<th>Weaknesses</th>
<th>Opportunities</th>
<th>Threats</th>
</tr>
</thead>
</table>
| 1. Environment | **(1)** Beautiful landscape, coastline with two main beaches, farm fields, mountainous areas, water resources, oak, pine and fir tree forests, canyons.  
(2) Very rich fauna (birds, wild bears, deer, wildcats, squirrels, foxes, and other mammals, amphibians, serpents) and flora.  
(3) Protected areas (Varasova mountain – GR2310005).  
(4) Mild Mediterranean climate.  
(5) Geographic location, 15 min from Patras and 2½ hours from Athens, in the middle of the historical square Delphi – Dodoni – Olympia – Epidaurus.  
(6) Solid waste disposal site and recycling program. | **(1)** Earthquake activity in the area.  
(2) Risk of forest fires. | | | |
| 2. Tangible heritage | **(1)** Traces of Neolithic settlements and Mycenaean towns.  
(2) Medieval constructions (fort and castle).  
(3) Churches, monasteries, traditional town center (large number of traditional buildings, statues).  
(4) Two museums. | **(1)** No sufficient promotion of the castle.  
(2) Weak protection of archaeological sites and traditional buildings. | **(1)** Recognition of Nafpaktos in relation to the famous sea battle. | | |
| 3. Buildings & infrastructure | **(1)** Very short distance to the bridge connecting Achaea and Euboia, and to other major road corridors.  
(2) Vicinity to two major ports (Patras, Argos).  
(3) Technological Educational Institute of Western Greece. | **(1)** Lack of sufficient and safe road infrastructure to/ from the internal areas.  
(2) Recognized tourist destination attracting high-quality tourism.  
(3) The landscape supports the development of agricultural, stock farming, and fishing activities. | **(1)** Construction of new road corridors (Nafpaktos ring road, Ionian road).  
(2) Vicinity to the bridge of Rio – Antirrio (and the relevant museum).  
(3) Vicinity to a high number of research and educational institutes. | | |
| 4. Society, legislation, & culture | **(1)** Various social programs addressing the elderly and disabled people and infants.  
(2) The city has been built according to urban planning, and is currently elaborating its new master plan.  
(3) Technological Educational Institute of Western Greece. | **(1)** Aging of local population.  
(2) Low educational level of population.  
(3) High unemployment rate.  
(4) Too strict regulatory framework that prevents any new constructions.  
(5) Lack of structures/initiatives for promotion of entrepreneurship.  
(6) Insufficient protection of natural and cultural heritage, due to dispersion of population among many small communities.  
(7) Need for vocational training of municipal staff. | **(1)** Tendency for people to migrate to smaller settlements.  
**(2)** Inter-municipal relations in major issues (artificial lakes, ecotourism). | | |

**Legend:**
- **SWOT:** Strengths, Weaknesses, Opportunities, Threats

**Notes:**
- The Morios river dam, as well as the Evinos river dam are deteriorating the underground water resources, withholding huge quantities of water, which otherwise would enrich the underground reserves, e.g., salination of underground waters has been reported.
- Climatic change and exacerbated risk of forest fires.
- Earthquakes in the area.
- Intense soil exploitation, pollution of marine ecosystems and habitats (from stock farming and industrial plants), degrading of ecosystems (from excessive lumberjack activities), illegal fishing, and non-rational management of water resources.
Table 1. SWOT table

<table>
<thead>
<tr>
<th>Sectors</th>
<th>Strengths</th>
<th>Weaknesses</th>
<th>Opportunities</th>
<th>Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Tourism &amp; economy</td>
<td>(1) Recognized tourist destination attracting high-quality tourism.</td>
<td>(1) Heavy traffic, lack of parking space, and insufficient mass transportation.</td>
<td>(1) Increasing demand for eco-tourism, agro-tourism, special and alternative forms of tourism.</td>
<td>(1) The financial crisis hinders economic development.</td>
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<tr>
<td></td>
<td>(2) The landscape supports the development of agricultural, stock farming, and fishing activities.</td>
<td>(2) No sufficient infrastructure for alternative forms of tourism, particularly sports tourism.</td>
<td>(2) Increasing demand for organic farming products.</td>
<td>(2) Growing competition and pressure from the nearby city of Patras.</td>
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<td>(3) Lack of sufficient enterprises, particularly in the sector of agricultural products processing and trade.</td>
<td></td>
<td>(3) Heavy traffic, lack of parking space, and insufficient mass transportation prevent further tourist development.</td>
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<td></td>
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<td>(4) Lack of certification for denomination of origin for local agricultural products.</td>
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<td>(5) Pressure from the neighboring areas, mainly from the large city of Patras.</td>
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<td>(6) No sufficient promotion of the castle.</td>
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<td></td>
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<td>(7) Protection of the lake Evnos waters and surrounding area from pollution and infections, due to its transfer to the city of Athens to enhance drinking water supplies, constitutes an obstacle to entrepreneurial development in the area.</td>
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Table 2. Selection of sustainability indicators reflecting the environmental, economic, and social conditions of the city of Nafpaktos

<table>
<thead>
<tr>
<th>Conditions (ENV)</th>
<th>Indicators</th>
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<tbody>
<tr>
<td>Environmental</td>
<td>1. Protection of natural/cultural heritage</td>
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<td></td>
<td>2. Water supply capacity</td>
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<td></td>
<td>3. Coastal/Inland water quality</td>
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<td></td>
<td>4. Wastewater treatment</td>
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<tr>
<td></td>
<td>5. Natural land/occupied land</td>
</tr>
<tr>
<td>Economic (EC)</td>
<td>1. Number of tourists per year</td>
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<td></td>
<td>2. Annual number of tourists/km coastline</td>
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<tr>
<td></td>
<td>3. Access – road network</td>
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<tr>
<td></td>
<td>4. Local enterprises/foreign enterprises</td>
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<tr>
<td></td>
<td>5. Occupancy rate of accommodation facilities</td>
</tr>
<tr>
<td></td>
<td>6. Contribution of tourism to local economy</td>
</tr>
<tr>
<td>Social (SO)</td>
<td>1. Annual number of tourists/local people</td>
</tr>
<tr>
<td></td>
<td>2. Sustainable development plan</td>
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<tr>
<td></td>
<td>3. Tourism management plan</td>
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<tr>
<td></td>
<td>4. Local awareness of sustainability</td>
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<tr>
<td></td>
<td>5. Local/foreign employees in tourism business</td>
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<td></td>
<td>6. Tourist satisfaction</td>
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<td></td>
<td>7. Local satisfaction from current tourism activities</td>
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</tbody>
</table>
EC1 & EC2 - Number of tourists per year and Annual no. of tourists/km coastline: To derive the TCC for this set of indicators, the city of Nafpaktos was compared with the Greek territory and with the Municipality of Skiathos Island (central Greece), which is considered to have reached its TCC. Greece reached 20,000,000 tourists during 2014 with 15,000 km of coastline, reflecting 1333 tourists per km of coastline. The island of Skiathos reached 119,069 tourists during 2013 with 44 km of coastline, corresponding to 2706 tourists per km of coastline. The city of Nafpaktos with an annual average of 15,000 tourists and 22 km of coastline is far beyond the TCC of 2706 tourists/km and even lower than the Greek average (Figure 2). This reveals a high potential for tourism development, therefore a score of 8/10 is assigned for the coastal zone and the adjacent urban zone, derived as:

\[ EC2 = \left(1 - \frac{681}{TCC}\right) \times 10, \]

where,
EC2: Score of indicator EC2
TCC: Tourism Carrying Capacity

![Figure 2. Annual number of tourists per km of coastline for the city of Nafpaktos. The TCC is set at 2706 tourists/km derived from the island of Skiathos.](image)

EC3 - Access/road network: After the construction of the bridge between Rio - Antirrio in 2004, as well as the Ionian road, together with the ring road of Nafpaktos, the road network provides quick access to a large number of tourist destinations almost at all zones. However, the urban zone is characterized by narrow roads, which usually results in heavy traffic, preventing also the access to the coastal zone. The rural zone is more isolated due to the mountainous narrow road network. Therefore, a score of 6/10 is assigned to the coastal zone, 5/10 for the urban zone and 5/10 for the rural zone.

EC4 - Local enterprises/foreign enterprises: The ratio is higher in the coastal and rural zones due to the presence of foreign super markets in the urban zone. Nevertheless, almost 60% of the local people are employed in tourist business and other services. All hotels of the coastal, urban and rural zones belong to local citizens. As a result, a score of 9/10 is assigned to all activity zones.

EC5 - Occupancy rate of accommodation facilities: The rate of occupancy is highly seasonal. For the coastal zone, occupancy varies between 80% and 100% during summer, being much reduced at the other
seasons. Similarly for the urban zone it varies between 75% and 85%, while hotels in the rural zone are highly occupied (95%) during winter and spring. A score of 6 is assigned for the coastal zone, 7 for the urban zone and 7 for the rural zone.

EC6 - Contribution of tourism to local economy: Data from the master plan of the municipality reveal the critical economic contribution of tourism to the local economy, as 9.7% of the local people are farmers, 20% are employed in processing activities, while more than 60% are involved in tourism-associated business. In the rural zone however, a rise in farming activities is observed, except for specific villages, such as Elatou and Ano Chora, which highly depend on tourism. Scores of 8, 7 and 6 are assigned for the coastal, urban and rural zones respectively.

SO1 - Annual no. of tourists per local people: For Greece this number is 20,000,000 tourists per 10,900,000 people, which corresponds to 1.84 tourists/local people, while in the island of Skiathos \( \frac{119,069}{6,160} = 19.3 \) tourists/local people. In the city of Nafpaktos it is \( \frac{15,000}{13,415} = 1.12 \) tourists/local people (Figure 3). Setting the TCC at 19.3 (or even lower after possible negotiations between stakeholders and managers), the city of Nafpaktos is much below the TCC. However, it is close to the Greek limit of 1.84. While the score of the indicator for the coastal and urban zones could be 9/10 (calculated similarly to EC2), a score of 6 is assigned to include the Greek average. A score of 8 is assigned for the less crowded rural zone.

\[ \text{Figure 3. Annual number of tourists per local people. The TCC is set at 19.3 tourists/local people derived from the island of Skiathos.} \]

SO2 - Sustainable development plan: The action plan for the Municipality of Nafpaktia describes in the most comprehensive way the current economic and social conditions and the strengths and weaknesses of the municipality. However, a sustainable development plan of the city and the surrounding area is not available. A score of 7/10 is assigned for all activity zones.

SO3 - Tourism management plan: Apart from the description of the current conditions through the Nafpaktia action plan, no specific plan for tourism management is available or ongoing. A score of 4/10 is assigned for all zones.

SO4 - Local awareness of sustainability: Young people are aware of the concept of sustainability but the larger portion of the population needs much education to adapt. Although theoretically, they accept and welcome any kind of development which will upgrade the local economy, they may stand against possible restrictions to non-sustainable practices. A score of 4 is assigned for all zones to reflect this situation.
SO5 - Local/foreign employees in tourism business: All employees are local people, indicating a good start for development of the local economy in a possible upgrade of tourism activities. A score of 10 is assigned.

SO6 - Tourist satisfaction: All hotels in the coastal, urban and rural zones score above 7.5 in tourism sites. This indicates a general satisfaction of tourists from the current situation in the area. A score of 9 is assigned for all zones.

SO7 - Local satisfaction from current tourism activities: Since the largest proportion of the local people are employed in the tourism business, they get very satisfied when tourist flow increases, resulting in higher profits for them. However, people in the urban zone anticipate a rise of tourism flow from the coastal to the urban zone, while those in the rural zone would like to see elevated tourism activities during all seasons. Scores of 9, 7 and 8 are assigned to the coastal, urban and rural zones respectively.

The integration of indicators into the Leopold’s matrix and the classification in five status classes according to their scores is presented in Table 3. Six indicators (ENV1, ENV4, EC5, SO2, SO3 and SO4) scored lower than sustainable in all activity zones. Five indicators (ENV3, ENV5, EC3, EC6 and SO1) presented varying scores between the activity zones and seven indicators presented sustainable status. Regarding the coastal zone, the low awareness of sustainability among the local community, the lack of a tourism management and a sustainable development plan, the water quality and the insufficient wastewater treatment were the main restricting factors of sustainable tourism development. In the urban zone, the weak protection of cultural heritage is an additional restriction, while in the rural zone, the weak protection of natural heritage and the narrow road network also inhibit the sustainable tourism development of the area.

Table 3. Comparison of indicators through the Leopold matrix for the coastal, urban, and rural zone. Restricting factors for development are expressed as low-scored indicators (magnitude-upper left corner / importance-bottom right corner).
3.3. Tourism Carrying Capacity of the castle of Nafpaktos

For the castle of Edinburgh, the monthly number of visitors reached 200,000 during July 2011. This results in an average daily number of 6600 visitors. Considering that the accessible area of the castle is 35,737 m$^2$, the TCC can be defined at 0.18 tourists/m$^2$/day. For the castle of Nafpaktos the no. of tourists per day per m$^2$ is similarly calculated at 0,002 (41 tourists per day; accessible area 18,342 m$^2$), revealing that tourism development in and around the castle is potentially effective (Figure 4).

![Figure 4. Comparison between the castle of Nafpaktos and the castle of Edinburgh. TCC is calculated as the daily number of tourists per m$^2$ at 0.18.](image)

4. Discussion

4.1. Sustainable tourism development in the city of Nafpaktos

The city of Nafpaktos and its surrounding area has a high potential for sustainable tourism development as suggested by both the SWOT and the LAC-TCC application. According to the SWOT analysis, specific characteristics of the area could be accounted as opportunities to enable sustainable tourism activities, such as: (i) the increasing tendency of urban populations to migrate to rural areas, (ii) the ongoing development of alternative types of tourism, (iii) the increasing demand for ecological products, (iv) the upgraded national road network and the presence of the bridge, which connects the city with the Peloponnese region. In contrast, threats for the area were also detected and related to (i) the financial crisis, (ii) the deterioration of natural resources and tangible cultural heritage, (iii) the disturbance provoked to ecosystems, (iv) the uncontrolled residential development in tourist areas and (v) the risks from climate change, forest fires and earthquakes.

According to the LAC-TCC application, ‘sustainable’ scores (far below the defined threshold) were assigned to nine indicators at all activity zones, six indicators were assigned moderate scores and three presented low scores, reflecting both opportunities and restrictions of development. In general, the weak protection of the city’s cultural and natural heritage, in combination with the lack of local awareness of sustainability and the lack of a tourism management plan are restricting factors of sustainable tourism development in the area. Within a sustainable scheme, attention should be given to specific factors at each activity zone:
(i) Coastal zone: Indicators ENV3, ENV4, EC3, EC5 and SO1 reflect the restrictions of a possible tourism development. The coastal zone could support higher tourist flow, as the annual number of tourists per km of coastline (EC2) is much lower than the defined TCC. This however would require better organization of the available beaches and the development of new hotel rooms to support the increased tourism activities (EC5). Simultaneously, the wastewater treatment capacity should be upgraded (ENV4) to avoid further deterioration of the coastal water quality (ENV3). Possible overcrowding between tourists and local people should be also monitored (SO1).

(ii) Urban zone: Indicators ENV4, EC3 and SO1 reflect the restrictions of a possible tourism development. The capability of the urban zone to support increased tourist numbers is reflected by EC1 and this can be achieved by promoting the cultural heritage of the zone, especially the castle, which was showed that it could support 90 times as many tourists as currently estimated. Similarly to the coastal zone however, the wastewater treatment capacity should be upgraded instantly. New parking areas should be created to avoid traffic in the city centre (EC3), while possible overcrowding should also be monitored (SO1).

(iii) Rural zone: Indicators EC3, EC5 and EC6 reflect the restrictions of a possible tourism development. To support higher number of tourists, the rural zone would initially require to upgrade the narrow, mountainous road network (EC3). Increased tourist flow would afterwards require an upgraded wastewater treatment capacity and continuous monitoring of the inland water quality, which may be degraded, as new hotel rooms will be soon required (EC6).

It was also revealed by the analysis that currently there is lack of tourist flow (interaction) between the activity zones, with the main volume of tourists being concentrated in the coastal area. By promoting the castle city, a large number of tourists could flow from the coastal to the urban zone, leading to further development of the last and revitalizing the urban zone’s economy. This zone-interaction could be achieved by developing promotional activities in the coastal zone, such as leaflets and informational signs, which will prompt the incoming ‘coastal’ tourists to also visit the castle city and the historical city centre. To avoid provoking traffic around the city centre, which is characterized by a narrow road network, this castle visit could be undertaken by a 50-seat bus, which could deliver tourists from the coastal zone to the castle every 30 minutes, thus increasing the number of castle visitors to almost 1000 per day.

4.2. Lessons learned and future priorities

From the application of the case study, it was evident that an implementation of a sustainable tourism management and development plan should include two basic components to be successful at an operational level: (i) flexibility of thresholds and (ii) public participation.

Flexibility of thresholds: Consistent with previous findings (Navarro-Jurado et al. 2012; Salerno et al. 2013; Iliopoulou-Georgudaki et al. 2016), a sustainable tourism plan, once initiated, should be perceived as a long-term process of continuous monitoring and adjustment. TCC cannot and should not be viewed as a static number. Except for the environmental limits, which can be more accurately quantified, thresholds may be used throughout the process, but should be considered flexible and may increase or decrease according to the new conditions formed by the step-by-step upgrading of each indicator-condition, after appropriate monitoring and feedback.

Public participation: The previously described flexibility, inevitably requires the participation of managers, stakeholders and the local communities to derive those thresholds, which cannot be accurately quantified. As indicated by Castellani and Sala (2012), tourist destinations may have multiple carrying capacities, including not only the physical characteristics of an area but also the stakeholders’ perceptions.
This indicates the necessity of public participation during the implementation. A negotiated TCC could stand for a threshold, until monitoring informs about possible changes in other conditions, which may influence this threshold in a continuously evolving process towards sustainability.

Despite the variety of sustainable tourism case studies in Greece, currently there is a lack of a national strategic framework for sustainable tourism management and development. Although the basic TCC principles are generally applied at each case study and despite the efforts to integrate multiple indicators in models for evaluating an ‘overall’ carrying capacity (Prokopiou et al., 2014), different sets of sustainability indicators are applied, expressing the TCC either as a ‘beach impact factor’ (Tselentis et al., 2012), as people per m of beach (Tselentis et al., 2006), as no. of tourists per inhabitant or no. of beds per 100 inhabitants etc. (Kyriakou et al., 2011), while the SWOT analysis is scarcely used (Kyriakou et al., 2011; Iliopoulou-Georgudaki et al., 2016). This variety of applications, although useful to derive conclusions at a local level, inhibits the integration of the results in a national level, and the possibility of best practices application elsewhere. Considering that Greece is among the top tourist destinations worldwide, a holistic approach, applying a commonly accepted set of indicators and methods should be implemented to enable compatibility and comparability between the various case studies. This effort will facilitate the consensus between managers, stakeholders and local communities regarding thresholds and upgrading actions within a common concept.

5. Conclusion

Within a strategic tourism planning and management framework, a tourist destination can be appropriately managed to sustainably upgrade tourism activities, without deteriorating its environmental resources and the socio-cultural and economic status of the local communities. The city of Nafpaktos and its surrounding area have the potential for sustainable tourism development as the tourist flow is much less than the defined TCC, for both the coastal (beach TCC) and the urban zones (TCC of the castle). However, the weak protection of the cultural and natural heritage, in combination with the lack of local awareness of sustainability and the lack of a tourism management plan are restricting factors for sustainable tourism development of the area. Thus, prior to any actions to increase tourist flow, specific conditions should be updated:

a. Indicators scored ‘3’ and ‘4’ - A tourism management plan needs to be imminently implemented. The natural and cultural heritage of the area should be protected from violations in a local level (on-site protection) and sensitization actions to increase the local awareness of sustainability should be applied.

b. Indicators scored ‘5’ and ‘6’ - The road network of the rural zone needs to be upgraded afterwards and new parking areas should be constructed in the urban zone to avoid traffic in the city centre. After upgrading and receiving feedback, actions to promote the cultural tourist attractions of the city (including the castle) and the surrounding area should be implemented. As tourist flow will be increased, the wastewater treatment capacity should be upgraded and monitoring to avoid overcrowding should be applied. New infrastructures (hotel rooms) may be required to support the elevated tourism activities.

c. As tourism flow reaches higher levels, specific indicators, mainly environmental and social (e.g. coastal/inland water quality) will start receiving lower scores, which will then indicate unsustainable conditions and will require new measures to be received. In a situation where most indicators start receiving low scores, the physical limits of the area, usually referred to as “total carrying capacity” are being reached and any kind of development should be restricted in the specific level.

D. The interconnection between activity zones is a critical factor toward the increase of the tourist flow in the area. Tourists from the coastal -and the rural- zone could be prompted to visit the
castle in the urban zone, within specific promotional activities, raising the visitor numbers and the economic benefits for the local people.

In a process of continuous monitoring and adjustment, characterized by flexibility of thresholds and public participation, sustainable tourism development is achieved when the scores of all indicators are kept at ‘7’ or higher (or even lower if properly negotiated), suggesting that all conditions are not close to the TCC and could be further upgraded, without deteriorating the destinations environmental, social-cultural and economic resources. Using this concept as a springboard, cultural tourism could serve as a key contributor towards expanding tourism, by attracting not only the enthusiasts of natural environment but also those seeking educational/cultural destinations.

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