

## **Analysis of Studies on Sustainability Indicators in Tourism: an Integrative Review**

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### **Abstract**

Tourism is an important sector of the economy, generating jobs and income in the most different places. Given this context, sustainability plays an important role, especially with respect to analyzes of the touristic regions in the state of Mato Grosso do Sul, strongly known by its relation with the environment. Thus, indicators are deemed necessary tools for the measurement of these aspects, seeking to analyze and keep tourism sustainable. The objective of this study is to synthesize the knowledge produced on sustainability indicators in tourism. A survey was conducted in the databases Science Direct, Web of Science and Scopus, searching for "Sustainability indicators" in the titles of published articles and "tourism" in the text development. The study synthesis shows that several examples of sustainability indicators are thought of in terms of tourism activity; however, the main issues presented in these studies are related to the characteristics required for their composition, aspects addressed during sustainability analysis, integration between the development of tools and people who will make use of the information, and data availability for measurement.

**Keywords:** Sustainability Indicators; Tourism; Integrative review.

### **Resumo**

#### **Análise dos estudos sobre indicadores de sustentabilidade no turismo: uma revisão integrativa**

O turismo se apresenta como um importante setor da economia, gerando empregos e renda nos mais distintos lugares. Diante disso, a questão da sustentabilidade se apresenta como um importante fator a ser considerado, principalmente no que tange as análises das regiões voltadas ao turismo no estado do Mato Grosso do Sul, fortemente conhecidas pelo vínculo ambiental. Assim, os indicadores surgem como ferramentas necessárias para a mensuração de tais aspectos, visando a análise da sustentabilidade no turismo. O objetivo do trabalho é sintetizar o conhecimento produzido sobre os indicadores de sustentabilidade

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no turismo. Realizou-se um levantamento nas bases de dados *Science Direct*, *Web of Science* e *Scopus*, considerando a busca por “*Sustainability indicators*” nos títulos dos artigos publicados e “*tourism*” no desenvolvimento do texto. A síntese dos estudos mostra que diversos exemplos de indicadores de sustentabilidade são pensados no que tange a atividade turística, contudo, os principais questionamentos nos trabalhos dizem respeito às características necessárias para a composição destes, dimensões abordadas na análise da sustentabilidade, integração entre o desenvolvimento das ferramentas e as pessoas que farão uso das informações e disponibilidade de dados para mensuração.

**Palavras-chave:** Indicadores de sustentabilidade; Turismo; Revisão integrativa.

## Resumen

### **Análisis de los estudios sobre indicadores de sostenibilidad en el turismo: una revisión integrativa**

El turismo se presenta como un importante sector de la economía, generando empleos y renta en los más distintos lugares. Frente a ello, la cuestión de la sostenibilidad se presenta como un importante factor a ser considerado, principalmente en lo que se refiere a los análisis de las regiones volcadas al turismo en el estado de Mato Grosso do Sul, fuertemente conocidas por el vínculo ambiental. Así, los indicadores surgen como herramientas necesarias para la medición de tales aspectos, buscando el análisis de la sostenibilidad en el turismo. El objetivo del trabajo es sintetizar el conocimiento producido sobre los indicadores de sostenibilidad en el turismo. Se realizó un levantamiento en las bases de datos *Science Direct*, *Web of Science* y *Scopus*, considerando la búsqueda de “*Sustainability indicadores*” en los títulos de los artículos publicados y “*turismo*” en el desarrollo del texto. La síntesis de los estudios muestra que varios ejemplos de indicadores de sostenibilidad son pensados en lo que se refiere a la actividad turística, sin embargo, los principales cuestionamientos en los trabajos se refieren a las características necesarias para la composición de estos, dimensiones abordadas en el análisis de la sostenibilidad, integración entre el desarrollo de las actividades herramientas y las personas que harán uso de la información y disponibilidad de datos para la medición.

**Palabras clave:** Indicadores de sostenibilidad; Turismo; Revisión integrativa.

## INTRODUCTION

Indicators are depicted in the literature as tools that provide certain information at a given moment. More specifically, Mitchel (1996) describes indicators as something that allows the collection of information about reality. Other authors define indicators as individual data with aggregated information, and as such possessing specific characteristics, such as: clarity, statistical quantification, and efficiency (Mueller, Torres, & Morais, 1997). These characteristics are supported by Jannuzzi (2006), when considering that indicators should have social relevance; validity (ability to reflect an abstract concept); reliability; degree of adequate coverage; sensitivity; specificity; and intelligibility (transparency in methodology).

Thus, when considering the ability of indicators to provide specific information to measure a studied reality, one can imagine good use for such tools for issues involving the sustainable development of various economic activities.

More specifically, sustainability indicators are those that support the processes of sustainability construction, referring to relative elements that

enable the construction of a system and make clear the objectives, concepts and target audience that will make use of the information generated (Gomes, 2011). With regard to this point, the concerns are addressed to the activities related to tourism, the object of this study.

Tourism is one of the economic activities that stands out globally in revenue generation. Several countries invest millions of dollars a year in attractions, maintenance and advertisements that attract tourists from around the world in order to generate revenue and move local economies. In the year 2014, the tourism sector moved more than 1 trillion dollars around the world, presenting a growth of more than 51 million tourists in search of trips and new places to know, despite economic difficulties. Regarding the national territory, the country currently stands out as one of the most complete tourist destinations, including business segments; beaches; ecotourism; sports; and gastronomic attractions.

According to the Ministry of Tourism, during the Brazilian National Tourism Plan 2013–2016, the share of tourism in the structure of the Brazilian Gross Domestic Product (GDP) reached 3.7%, with an increase of more than 32% between 2003 and 2009. This is further amplified by the perspective of job creation, both directly and indirectly. Estimates indicate that, in 2022, tourism will be responsible for generating over 3.63 million jobs in the country (Brazil, 2013).

When considering Brazil as a destination country, where about 20% of the visitors seek activities related to nature, ecotourism or adventure (Brazil, 2017), studies are needed on sustainability in Brazilian tourism activities, especially with respect to the availability of measurement tools.

The main idea to verify sustainability in tourism is linked to the fact that, in many destinations geared to such activities, both the environmental and social factors are very present, and some caution is required regarding the preservation of local environments and cultures. Pires (2010) discusses the changes that can occur in the fauna and flora of the tourist destinations and the consequences that such changes can generate in a given place, implying losses to the destinations that sustain their tourist activities with such resources.

As such, the question that must be asked is related to the ability of tourist activity to sustain itself over the years without preventing future generations from doing so, controlling the damage caused by frequent visits of people from different regions of the planet, while taking into account the concept of sustainable development (CMMAD 1998, p. 46).

This study sought to carry out an integrative review regarding articles dealing with the sustainability indicators used in tourism. The main objective is to summarize what has already been discussed by scholars about the use of such tools in the measurement of sustainable tourism.

## **THEORETICAL FRAMEWORK**

### **Tourism Sustainability**

According to the National Tourism Plan 2013–2016, tourism can contribute significantly to job creation and increase the GDP, since this activity requires

smaller investments to create jobs and requires intensive labor, due to the nature of the services involved in its production process (Brazil, 2013).

Tourism involves practices based on the development of the relations in a collective group, structured through mediators or instruments (Raffestin, 1993; Souza, 1995). The actions found in such activities range from the delimitation of tourist territories to the controlled movement of the hikers and visitors' perception about the society in which they find themselves (Ribeiro, Costa, & Tavares, 2013). All these interconnections within tourism show how complex and delicate the activity is, with developments in sectors that go beyond the simple local economy, which highlights the concerns that arise about its sustainability.

Although the term "sustainability" is often associated with a continuous phenomenon in which desirable characteristics replicate over time (Mitev & Venters, 2009), the most precise definition — presented by ecological science — is a closed-loop system, which can support its perpetuity without external or internal support, other than sunlight, in this specific case (Lovelock, 2000; Borland, 2009). Porritt (2007) characterizes ecological sustainability as the "capacity for continuity, throughout a long-term future, living within the constraints and limits of the physical world". The author stresses that sustainable development is difficult to measure and, although the subject involves social and economic elements in addition to environmental ones, the first two items are considered more superficial, due to the need to carry out activities that do not attack the limits of the planet.

The World Tourism Organization (UNWTO) (2002) defines sustainable development in tourism as an ongoing process that needs constant monitoring to assess the impacts of its various activities. It is expected that, with managerial actions, it will be possible to reduce the negative impacts created and, with preventive and corrective measures, to maximize the benefits.

The natural and historical-cultural aspects have come to be valued by institutions, politicians and entrepreneurs. The idea that tourism could be developed in a sustainable manner was born in accordance with environmental preservation, rescue, valorization of cultural representations and objectives, as well as providing income and employment options for the communities that receive these activities (Candiotto, 2009).

In part, this was due to what Candiotto (2009) presented as the popularization of the idea of sustainable development, which allowed the expansion of tourist destinations and their attractions across the globe. This context is reinforced by the way in which the Ministry of Tourism places sustainability as one of its basic premises, fomenting programs for its insertion and valorization in the sector since 2004 (Brazil, 2015). The following are some of these programs:

- Programa Talentos do Brasil Rural;
- Viaje Legal;
- Turismo Acessível;
- Produção Associada ao Turismo.

Another important action fomented by the Ministry of Tourism was called "Passaporte Verde", a campaign on sustainable attitudes that would provide

tourists with *tips* about sustainable destinations they could visit. It was developed in partnership with the United Nations Environment Programme (UNEP) (Brazil, 2015).

The Tourism Regionalization Program (Brazil, 2007) establishes, the aspects that define tourism sustainability in its document on tourism and sustainability:

- Environmental aspect: it is the basis of natural and cultural resources, and any socioeconomic activity, in such a way that tourism would depend on the quality and protection of the environment in the long term;
- Economic aspect: economic sustainability is associated with economic efficiency, profitability and competitiveness;
- Socio-cultural aspect: humanized society is the starting point of the concept of socio-cultural sustainability, which enables the person to lead a decent life in the process of elaborating a productive and sustainable society;
- Political-institutional aspects: from the moment a tourism institution writes and approves its policy, the document becomes a parameter for the future political decisions of the institution.

According to the aforementioned about the constant need to monitor tourism activities for the development of sustainable tourism, sustainability indicators allows the measurement and evaluation of processes, taking into account a more objective perception of the aspects that define this concept.

## **SUSTAINABILITY INDICATORS**

Indicators are conceptualized as tools formed by one or more variables that, through associations made in the most diverse ways, allow the understanding of broader meanings about the phenomena to which they refer (IBGE, 2002). Quiroga (2001) adds to that, stating that indicators are not only statistics but also the representation of a variable that assumes a value in a specific period. This allows information to be obtained about a reality and as such it must effectively communicate the state of the observed phenomena, coherent logic, and simplicity in statistical comprehension and quantification (Mitchell 1996, Muelle et al., 1997).

Sustainability indicators are quantitative representations of a given parameter that conveys information about a phenomenon that has some importance for sustainable development (Bryn van Druinen, 1999 apud Mathis, 2001 p. 11).

Among the various tools used to monitor and evaluate sustainable development — that which meets current needs without compromising the possibility of future generations being able to meet their needs (CMMAD, 1998) — sustainability indicators stand out due to their dynamics and ability to contemplate the various dimensions of sustainability: social, environmental, economic and institutional. This allows for the contextualization and aggregation

of analyses, besides the presentation of a scenario delimited by an information set (IBGE, 2008).

In a way more directed towards tourist activity, the UNWTO affirms that the indicators of sustainable tourism:

Assess information on the impacts of tourism in an area to demonstrate whether positive impacts are occurring as expected and negative impacts are being avoided. In case the positive impacts are not meeting expectations, the indicators will demonstrate this fact. If negative impacts are emerging, the indicators will identify them before they get worse. Environmental indicators can be used by decision-makers to take action where necessary in order to reinforce positive impacts and avoid or mitigate negative ones.

In order to enable a more comprehensive survey of the current situation of sustainability indicators in tourism, an integrative review was carried out.

## **METHODOLOGY**

### **Integrative review**

An integrative review is characterized as a research methodology that allows inferences about the studies carried out on a given topic. Being characterized as a qualitative research, Broome (2006) more objectively defines an integrative review as a scientific method that summarizes the past of an empirical or theoretical literature, enabling a more comprehensive understanding of a given phenomenon.

This technique allows for the summarization of several published studies, allowing the emergence of new knowledge based on results acquired by previous research (Polit and Beck, 2006). It is widely used in the health sciences such as in the areas of Medicine and Nursing, serving to review several concepts and ideas into a single study.

Botelho, Cunha and Macedo (2011) describe the steps to carry out an integrative review, dividing the steps into six topics:

- 1) Identification of the subject and selection of the research question.
- 2) Determination of inclusion and exclusion criteria.
- 3) Identification of pre-selected and selected studies.
- 4) Categorization of selected studies.
- 5) Analysis and interpretation of the results.
- 6) Presentation of the knowledge review/synthesis.

This mechanism is determined as a unique tool for health studies, precisely due to directing practices, grounding efforts in scientific knowledge and encompassing concepts, methodological problems, revision of theories and evidence in particular subjects, thus allowing the creation of consistent frameworks that explain problems of high complexity (Whittemore & Knafl, 2005).



According to Souza, Silva and Carvalho (2010), despite the difficulties in combining the design of several studies, this method — when developed based on rigorous systematic inclusion approaches — allows for the reduction of bias and errors.

## **STUDY DEVELOPMENT**

This study is a qualitative analysis (Redeker, 2000). The methods of the integrative review adopted were based on Botelho et al. (2011), taking into account the survey of three different research databases: Web of Science, Scopus and Science Direct. The choice of databases was due to their high number of subjects and studies found, enabling a greater survey of articles on the subject.

The survey focused on articles published in each study base found by the words “Sustainability indicators” and “tourism”. As a guide to the search, the term “Sustainability indicators” was used for the titles of the studies in order to focus the research on articles that had such discussion in their analyses. The term “tourism” was introduced in the search of subjects referred in the content of each study, seeking to identify discussions relating the tools of sustainability measurement to tourist activity. Although the original intent was to conduct a direct search with the words “Sustainability indicators in tourism” in the title of the studies, the lack of results due to the specificity of the subject lead to this division of terms in order to increase the number of possible results. Through this search, we found seventy different studies evaluated using predefined criteria, resulting in a reduction in the number of studies analyzed. These inclusion and exclusion criteria were categorized as follows.

### Inclusion criteria:

- To exemplify the dimensions addressed in tourism sustainability.
- To discuss the development of tourism sustainability.
- To exemplify sustainability indicators.

### Exclusion criteria:

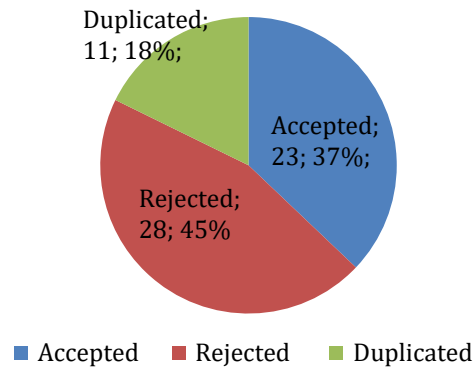
- Lack of relationship between the indicators presented and tourism.
- Lack of relationship between the indicators presented and sustainability.
- Duplicity.

Despite the reduction in the scope of research given the need for a link with tourism, we decided to work with this specificity because of the composition of sustainability dimensions in the tourism environment, which transcends the initial idea of Triple Bottom Line, concept where sustainability raises the use of natural resources, as well as social and economic issues (Holliday apud Rossi et al., 2000).

A total of 72 articles were published in the three databases (Graph 01). Eleven (18%) were excluded for being duplicates, 28 (45%) were excluded because they did not meet the prerequisites defined; a total of 23 (37%) papers were

accepted for study analysis. Among the accepted papers, 12 were considered highly relevant for presenting examples of indicators used in the construction of a sustainable tourism measurement system.

**Graph 1** – Situation of articles collected in the databases



Source – Research data

Data analysis was performed using the *application software Start*, provided by the Federal University of São Carlos (UFSCAR); access to Portal de Periódicos Capes allowed to verify the selected databases.

## DATA ANALYSIS

### Science Direct Database

The analysis began with the studies extracted from the Science Direct database, surveying 19 papers for the keywords previously mentioned in the title and in the course of the study. In these surveys, 11 papers were rejected and eight papers were accepted. Among the accepted papers, only three were classified as having a high reading priority, with topics related to the subject of sustainability indicators in tourism. That is, studies that deal with sustainability indicators within the tourism context, focusing on sustainability actions within the development of this economic activity. All other selected articles (or other five articles accepted) were classified as low priority, since they presented tourism in a simplified way in the study, representing such activity as supplementary to the treatment of the use of sustainability indicators. Although this does not place the study as a high priority in the evaluation of the content development, they have still made relevant contributions to the understanding of sustainability indicators.

Considering the years of the publications found on this database, it is noted that the majority of studies was published between 2014 and 2015. The concentration of publications is between 2010 and 2015, with emphasis on 2014 (21% of the studies from the database and 16% of the studies found in Science Direct, respectively).

One of the main problems presented at the beginning of the analysis was the lack of orientation of the studies in the context presented as a subject for the development of the integrative review. Although a significant amount of studies appears in the search conducted for sustainability indicators, in the



various databases — as this search is concentrated in tourism activity and in the sustainability of the sector — few publications appear, making it difficult to study the formulation of the theory and to enable further understanding of the situation.

This led to rejection of part of the studies, following the criteria previously stipulated in the integrative review, ending with a total of 19 articles, 11 were rejected, and eight were accepted for the analyses.

Initially, part of the studies extracted dealt with the subject of sustainability indicators; however, they used as grounds for analysis the Triple Bottom Line model, limiting the studied dimensions to social, environmental and economic. Because of this, tourist activity stood out only as a single element of economic activities, not having the relevance that was sought for conducting this review.

This classification was performed considering the way in which the studies dealt with the subject of sustainability indicators in the context of tourism, presenting the indicators and describing them as a system constituted by tools that were directly related to tourism activities. Table 1 presents the titles of the studies, their classification and respective priority.

**Chart 1 – Articles from Science Direct**

Article title	Year	Situation	Priority
Meta-performance evaluation of sustainability indicators	2010	Rejected	Low
Towards integrated social ecological sustainability indicators: Exploring the contribution and gaps in existing global data	2015	Rejected	Low
Sustainability indicators for run of the river (RoR) hydropower projects in hydro rich regions of India	2014	Rejected	Low
Review of urban sustainability indicators assessment: Case study between Asian countries	2014	Rejected	Low
Evaluating impacts of development and conservation projects using sustainability indicators: Opportunities and challenges	2014	Rejected	Low
Assessing the use and influence of sustainability indicators at the European periphery	2013	Rejected	Low
The sustainability indicators of power production systems	2010	Rejected	Low
Development of regional sustainability indicators and the role of academia in this process: the Portuguese practice	2009	Rejected	Low
The application of urban sustainability indicators: A comparison between various practices	2011	Rejected	Low
Incorporating resilience into sustainability indicators: An example for the urban water sector	2008	Rejected	Low
Resource-based sustainability indicators: Chase County, Kansas, as example	2002	Rejected	Low
How to use sustainability indicators for tourism planning: The case of rural tourism in Andalusia (Spain)	2011	Accepted	High
Sustainability indicators for managing community tourism	2006	Accepted	High

(continues...)

**Chart 1** – Continuation

Article title	Year	Situation	Priority
Developing Key Sustainability Indicators for Assessing Green Infrastructure Performance	2017	Accepted	Low
Using dynamic sustainability indicators to assess environmental policy measures in Biosphere Reserves	2016	Accepted	Low
Dynamic integration of sustainability indicators in insular socio-ecological systems	2015	Accepted	High
Selection of sustainability indicators for planning: combining stakeholders' participation and data reduction techniques	2015	Accepted	Low
Exploring the self-assessment of sustainability indicators by different stakeholders	2014	Accepted	Low
Adaptive-participative sustainability indicators in marine protected areas: Design and communication	2013	Accepted	Low

Source – Research data

Among the studies accepted for analysis (eight in total), only three were considered high priority (published in 2006, 2011 and 2015), while the others were classified as low priority.

## Scopus database

The Scopus article database (Table 2) was the one that allowed the survey of a greater number of studies within the specifications previously described in the search for articles. A total of 43 published studies were found that had the term “Sustainability indicators” in the title and the word “tourism” in the context of the study.

After a primary analysis of the selection of articles and after verifying the importance of the subject “Tourism” at work and the way in which the authors dealt with the issues of sustainability indicators in this field, 25 papers were rejected (58.14% of the total found in the base) due to the lack of similarity with the initial proposal of the survey. The need to discard some articles due to their lack of availability in the databases and other platforms is limited, as it is only possible to analyze the abstract, which was not considered sufficient for this review.

**Chart 2** – Articles accepted in Scopus

Title	Year	Situation	Priority
International ecotourism and economic development in Central America and the Caribbean	2017	Accepted	Low
Tourism sustainability in Tibet - Forward planning using a systems approach	2015	Accepted	High
Socio-cultural sustainability and “buen vivir” (good living) at heritage sites: Assessment of the agua blanca case, Ecuador	2015	Accepted	High

(continues...)

**Chart 2 – Continuation**

Title	Year	Situation	Priority
Analysis of the social, cultural, economic and environmental impacts of indigenous tourism: A multi-case study of indigenous communities in the Brazilian Amazon	2014	Accepted	Low
Environmental impacts on the Galapagos Islands: Identification of interactions, perceptions and steps ahead	2014	Accepted	High
Resident satisfaction with sustainable tourism: The case of Frankenwald Nature Park, Germany	2013	Accepted	High
Community involvement in the assessment of the importance of sustainable rural tourism indicators for protected areas: The case of the Nevado de Toluca National Park in Mexico	2013	Accepted	Low
Sustainability diagnosis based on indicators for a coastal corridor of the southern Gulf of Mexico	2013	Accepted	Low
Sustainable performance index for tourism policy development	2010	Accepted	Low
Sustainability indicators for tourism destinations: A complex adaptive systems approach using systemic indicator systems	2008	Accepted	Low
Sustainability indicators for small tourism enterprises - An exploratory perspective	2008	Accepted	High
Development of a tourism sustainability assessment procedure: A conceptual approach	2005	Accepted	High
Sustainable performance of the tourist industry in the state of Baja California Sur, Mexico	2003	Accepted	High
Measuring sustainability in a mass tourist destination: Pressures, perceptions and policy responses in Torrevieja, Spain	2003	Accepted	High

Source – Research data

There were also four papers considered as duplicates, since they were present in other databases (Table 3).

**Chart 3 – Duplicate Articles in the Scopus database**

Article title	Year	Situation
Dynamic integration of sustainability indicators in insular socio-ecological systems	2015	Duplicated
How to use sustainability indicators for tourism planning: The case of rural tourism in Andalusia (Spain)	2011	Duplicated
Meta-performance evaluation of sustainability indicators	2010	Duplicated
Sustainability indicators for managing community tourism	2006	Duplicated

Source – Research data

As per Chart 2, a total of 14 published articles (32.56% of the total found in Scopus) were accepted for data analysis, where it is also worth noting that from these 14 papers, eight (57.14%) were classified as having a high analysis priority,

as they presented both examples of sustainability indicators used in tourist activity and discussions on the dimensions pertaining to sustainable tourism that were to be measured.

### Web of Science database

Search in the Web of Science database (Table 4) rendered 10 articles after the subject “sustainability indicators” was searched in the title, and “tourism” in the text development. In this search, seven papers were considered duplicates.

In addition to this, two other papers had to be rejected for analysis (according to what was previously stipulated as an evaluation criterion) since although discussing sustainability indicators they treated tourism merely as an example or analysis, failing to analyze further the study about indicators in the context of tourism itself.

**Chart 4 – Articles from the Web of Science**

Article title	Year	Situation	Priority
Sustainability indicators regarding tourism development and coral reef conservation: A case study of Akumal, in the Mexican Caribbean	1999	Accepted	High
Sustainability Indicators Integrating Consumption Patterns in Strategic Environmental Assessment for Urban Planning	2013	Rejected	Low
Sustainable development at local level and “anthropic resilience”: sustainability indicators from the SPIn-ECO project	2004	Rejected	Low
Sustainability indicators of rural tourism from the perspective of the residents	2015	Duplicated	Low
Dynamic integration of sustainability indicators in insular socio-ecological systems	2015	Duplicated	Low
How to use sustainability indicators for tourism planning: The case of rural tourism in Andalusia (Spain)	2011	Duplicated	Low
Meta-performance evaluation of sustainability indicators	2010	Duplicated	Low
Sustainability Indicators for Small Tourism Enterprises - An Exploratory Perspective	2008	Duplicated	Low
Sustainability Indicators for Tourism Destinations: A Complex Adaptive Systems Approach Using Systemic Indicator Systems	2008	Duplicated	Low
Sustainability indicators for managing community tourism	2006	Duplicated	Low

**Source** – Research data

Only one study resulting from our database search (Sustainability indicators regarding tourism development and coral reef conservation: A case study of Akumal, in the Mexican Caribbean) was accepted for analysis, as its objective was the evaluation of sustainability indicators in the development of local tourism conducted in order to protect coral reefs from the region. However, the difficulty found in evaluating the written text is due to the lack of availability of the complete study document, since the Web of Science database only provides the abstract of the text.

## Theory developed by the articles

The first perception was the lack of published studies on tools for measuring tourism sustainability. Concerning “environmental indicators”, discussions have been gaining spacing in a considerable amount of studies (with regard to the databases used for data collection). However, this volume of discussion is drastically reduced by contemplating tourism as the main background for research on sustainability indicators.

The discussions conducted by the studies analyzed occasionally mention the (Environmental Sustainability Index – ESI), an important tool for measuring sustainability that must be used in several regions around the world. However, they highlight the more complex problem that occurs after the moment that a more specific focus is sought on tourism and activities that involve sustainability. Concerning this issue, Gunter, Ceddia and Tröster (2015) discuss the work developed by Tanguay, Rajaonson and Therrien (2013) on the indicators that were chosen by these authors, explaining the usefulness of such items for the understanding of sustainability. The authors also strongly emphasize the definition presented by Honey (2008) on ecotourism, which is defined as an activity concerned with the reduction of impacts on the environment while also encompassing social and cultural issues. This concept exemplifies the ramification of the dimensions discussed with regard to sustainable tourism, as new concerns arise in this context.

Brandão, Barbieri and Reyes Junior (2014) focus greatly on the concept of tourism sustainability indicators, defined as a set of formally selected information that is to be used as a regular basis for measuring important changes in the development and management of tourism.

Some of the key features of measuring indicators are addressed in an analysis of tourism sustainability in Tibet (Zhang & Zhang, 2015). The discussion shows an important point related to the use of these tools — although mostly initially — about the need for them to be understandable, easy to measure and evaluate, dynamic, and possible to be used independently. Schianetz and Kavanagh (2008) further complement the guiding principles for defining the system of indicators, stating that, in addition to its effectiveness, freedom of action, safety, adaptability, coexistence and psychological needs, this system must have the capability of existing in a normal environment.

Another important aspect highlighted in the discussions on sustainability in tourism and, consequently, on the need to measure it, concerns the use of public policies, especially with regard to the development of special programs aimed at maintaining and protecting specific areas of environmental fragility. The practices that have been adopted in tourism concerning the territory used and societal integration (directly influenced by public policies) in the development of this subject are discussed by Ribeiro et al. (2013). In this context, Endere and Zulaica (2015) discuss “The National Plan for Good Living” (2013-2017), which was developed in Ecuador with the purpose of following sociocultural matters based on the sustainability paradigm. The authors discuss criteria that determined the choice of sustainability indicators. These criteria can be compared with the dimensions presented by other studies, being divided into: characteristics and states, management, perceptions of values, transmission of

knowledge and experiences, economic support, and environmental protection. This survey, once again, indicates the importance of socio-cultural issues when it comes to the analysis of sustainable tourism.

Another important issue raised by Benitez-Capistros, Hugé and Koedan (2013) concerns the use of the Delphi technique to select indicators and items to be studied when seeking to understand sustainability for various activities, as well as the impacts generated in the environmental dimension. Hugé, Hai, Hai and Kuilman (2010) define the Delphi technique as a method structured by a group communication process that allows for the treatment of complex problems. This method uses research with *experts*, transforming notions into more collective thoughts with a feedback process.

Regarding the concept of sustainable development and indicators created for the measurement of tourism activity, several organizations have suggested examples of tools; however, the issue is global rather than local, and the focus was directed towards the environment, leaving institutional, social and economic issues aside. This approach is in line with the one presented by Porritt (2007), regarding the definition of the concept of sustainability by ecology. The author points out that although there are other dimensions to be considered with regard to the application of sustainability, the main point is related to environmental issues. Nunes, Lafon, Alderete and Barreto (2013) present the economic, social and environmental dimensions in the study carried out on the Gulf of Mexico; however, Cottrell, Vaske and Roemer (2013) present the concept of sustainability prisms, which takes into account the satisfaction with activities developed through tourism, as well as economic, social and institutional dimensions (besides the environmental dimension traditionally used), which structures the creation of indicators that allow to fully understanding of sustainable development.

In addition to the selection of different dimensions for detailing the information collected, some authors, such as Guerrero, Pérez and Ibarra (2013), discuss the need for local population participation in the use of indicators, since these tools should be relevant to the people who will use them, besides being understandable to the general public. Apart from this, there is the matter of the social involvement of each region with tourism itself, since populations will not only receive the benefits generated by economic activities, but also the costs raised in such processes, which underscores the need for understanding the pros and cons on the part of the public.

In the case of European studies on sustainable tourism, in addition to basing their work on the social, cultural, environmental and economic dimensions, they also carry out analyses of the strengths and weaknesses for that particular territory. In addition, *stakeholder* consultation and planning of the entire process for the development of tourism sustainability form a new concept of selection of indicators, as shown in an analysis of sustainability performance indices for the creation of tourism policies (Castellani & Sala, 2009).

On the other hand, Ko (2003) presents a reflection on the dimensions of tourism sustainability in a broader way, dividing them, first, into two basic systems: the human system and the ecosystem itself. In the first one there are political, economic, socio-cultural and production structure dimensions. In the



second system there are the dimensions of general environmental impacts; ecosystem quality; biodiversity; and management of environmental policies.

In a more integrated manner, by establishing dialogue between the different types of possible indicators for measurement and the response policies in Spain, Rebollo and Baidal (2003) present surveys of land use indicators for tourism, pressure indicators (such as tourist satisfaction) and response indicators (urban planning), emphasizing the need to analyze the site itself in order to understand the integration of sustainability in the development of tourism management. This integration is still highlighted by the different types of existing policies, and their separate focus on cultural; social; environmental; and tourism promotion policies.

During the construction of the system of sustainability indicators for analyzing the situation in the sea and coast of Portugal, the authors Marques, Ramos, Caeiro and Costa (2013) deal with participatory adaptation, considering the strategic public for the selection of the most important subjects with regard to the consideration of tools, leading to the creation of 26 different indicators.

The number of indicators described in the literature varies considerably, depending on the problem handled and the form of measurement that is intended to be performed. In the case of tourism planning in Andalusia, Spain, indicator systems created based on social, environmental and economic dimensions add up to 55 different items, ranging from life expectancy, amount of health equipment, and number of accommodations for tourists in that region (Blancas, Lozano-Oyola, González, Guerrero & Caballero, 2011). Another important point to be raised in this study is the quantitative treatment given to indicators, given the need to standardize the results for comparing values (Banos-González, Martínez-Fernández & Esteve-Selma, 2015; Banos-González et al., 2016; Pazkad, Osmond & Corkery 2017), and even the creation of an index with the possibility of more complex measurements.

This relation to the perception of stakeholders (Mascarenhas, Nunes & Ramos 2014; Mascarenhas et al., 2015) for the construction and survey of indicators that effectively express information about the development of sustainable tourism is also present in the study conducted by Choi and Sirakaya (2005) and community-based tourism. The application of the Delphi technique is again described by the authors as a way of developing such tools, which, in this context, are divided into six dimensions: economic, social, cultural, ecological, political and technological. The total of developed indicators after the use of the technique was 125.

The discussion on sustainability in tourism activity, with various perspectives, pointed out a diversity of indicators used in the measurement of sustainable development, considering a range of treated dimensions, which vary depending on the approach. However, some points are raised in the conclusions of the papers that present some convergence in the development of the scientific use of indicators aimed at sustainability.

The need for a large amount of information for their optimal use is presented due to the approach adopted when using indicators in the development of policies that imply management changes. Another issue to be observed is the need to integrate information with stakeholders and the population that will make use of such results created by the proposed systems, taking into

account the social and cultural dimensions and the need for applicability and understanding of these tools.

With respect to understanding, standardization stands out as a key point for the development of a system that allows to evaluate the development of tourism sustainability, since value comparisons are an important part of the developmental analysis of a given aspect. Additionally to this is the Delphi Technique, which is notable for allowing scholars, in addition to defining variables through their use, to generate different weights for each variable and each dimension analyzed, emphasizing the different looks on the problem for each situation.

## **FINAL CONSIDERATIONS**

This study sought to conduct an integrative review of studies whose main subject is sustainability indicators in tourism, seeking to identify the level of development of these measurement tools.

This survey allowed a broader perception of the context of these studies, pointing out, firstly, that the subject has been initially approached during the 90s in academic studies carried out in several regions of the world, such as Spain, the Caribbean, Mexico and Brazil. However, further advancements are yet to come, since much of the discussion diverges with respect to the indicators used in the analyses, even in cases where the dimensions converge into a standard (economic, environmental, sociocultural and institutional in some cases).

In addition, there is still the matter of the lack of a mathematical approach in these studies, since few studies have quantitatively presented the development of a system of indicators that allows the measurement of sustainability.

Another important aspect highlighted in the study evaluations was the characteristics required by the indicators to meet their ultimate goal. Concerns about the understanding of the tool, the disaggregation of the indicators and the integration with the concepts of sustainability have been present in most studies, reaffirming the complexity and delicacy of the structuring of tools that may, in fact, influence the development of regional and local policies.

The studies analyzed show a strong need for a clear definition of sustainable development and tourism sustainability. As the use of indicators is highly focused, several studies depict the characteristics required for such tools to have an adequate and efficient use, such as disaggregation, ease of understanding, and integration with the local community and the public of interest.

The search for reliable information that allows scholars to use indicators to measure sustainability in tourism is shown to be a problem in terms of process accuracy. As such, the presentation of examples of indicators of sustainability measurement is diverse, especially considering the economic, environmental and socio-cultural dimensions. Some studies still present more dimensions (aside from the three aforementioned) in the construction of indicator systems, considering the technological and institutional dimensions. However, the definition of these often converges on the impacts caused by the large variation in resource demands and services in periods of high season.

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## CONTRIBUTIONS

**Arthur Caldeira Sanches:** Stipulation of the research question and objective, development of the theoretical proposition, bibliographical review and theoretical framework, choice of methodological procedures, data collection, data analysis, design of tables, graphs and figures, calculations and projections, critical review of the manuscript, manuscript draft, adequacy of the manuscript to RTA norms.

**Leandro Sauer:** Development of the theoretical proposition, critical review of the manuscript.

**Erlaine Binotto:** Stipulation of the research question and objectives, choice of methodological procedures, critical review of the manuscript.