

# The Assessment of Carrying Capacity – A Crucial Tool for Managing Tourism Effects in Tourist Destinations

Dobrica Jovicic\*

Aleksandra Dragin\*\*

## Abstract

*It is beyond doubt that the theory of tourism lags behind tourism practice. In order to decrease such a gap, theoretical work in tourism has been intensified over the last two decades. The key problems of research include: analysis, interpretation, and management of heterogeneous effects of tourism development, permeating different aspects of human life and work – from the global to the local level. This paper discusses the role, significance, and the ways of estimation and interpretation of the concept of carrying capacity within the conceptual framework of contemporary tourism. The paper also analyses various attitudes and conflicting opinions as to this, still much debated, concept. In the end, some crucial concluding remarks are presented that could alleviate the application of the concept of carrying capacity in practice, assuming its important role in planning tourist destination development and management of various tourism impacts.*

**Keywords:** *carrying capacity, tourist destination, management*

## Introduction

Among numerous interpretations of the conceptual framework for tourism, the approach highlighting the significance of tourist needs, (movements) circulation and expenditure as constitutive factors of tourism has drawn a particular attention. Mathieson and Wall (2006) point out three key elements of the tourist phenomenon:

- dynamic element, which involves making decisions on tourist circulation and selection of a desired destination, as well as a series of social, economic and institutional factors of relevance to making such a decision;
- element of tourist destination, which includes the sojourn of a tourist in the target area as well as the interaction with economic, social and natural subsystems of the given area;

---

\* Associate Professor University of Belgrade, Geographical Faculty

\*\* Assistant Professor University of Novi Sad, Faculty for Natural Sciences and Mathematics

- consequential element, which derives from the previous two and is manifest in economic, socio-cultural and natural-ecological effects that directly or indirectly affect the quality of a tourist's experience in a given destination.

The conceptual framework outlined above is not meant to serve as a means for predicting demands or for creating the strategies for distribution of supply in the market. It appears that the purpose of this approach is to point to a complex structure of the tourist phenomenon and the complexity of the relations among its segments. It is obvious that all the elements, understood as variables within a tourism system, do not have the equal significance, that is, they do not lead to equally significant effects, so all of them cannot be quantitatively registered. However, this conceptual framework is acceptable from the standpoint of identification, comprehension and interpretation of heterogeneous effects of tourism for the following reasons (Mathieson, Wall, 2006):

- it postulates a set of different parameters, identifies their interrelations and effects, thereby providing a general perspective on the nature, quality, and scope of effects brought about by tourism;
- the effects of tourism are long-lasting, can be cumulative and mutually dependent;
- the effects of tourism result from a complex process of the interaction between tourists, local communities in receptive areas, as well as natural, economic, and socio-cultural surroundings;
- the estimation of the effects comprises all the stages in the tourism process, including making decisions on the circulation, preparation for realization, travelling to and from a destination, sojourn, and memories upon return;
- the effects of tourism are manifest in various aspects, which is why the assessment of these effects must be based on a greater number of aggregative and partial measures.

This conceptual framework also takes into account the fact that the effects of tourism are the result of change. The effects of tourism do not have the character of an individual, momentary or temporary event that is spatially and temporally linked to a specific object or manifestation. For example, although the building-up and designing of hotels, souvenir shops and ski tracks are related to a specific time interval and bear some consequences, the mentioned contents represent only part of a wider change in the manner of meeting cultural-recreational needs and tourist destination development.

The process of tourism development does not only imply inevitability and continuity, since developmental processes can be interrupted, can change direction, can be modified in character, and can produce unexpected and unpredictable consequences. The causes of changes affecting tourism development can be traced within the tourism system – these are changes, expectations, interests, knowledge and aspirations of tourists and the population of the receptive areas, as well as changes within the subjects of tourism economics (agencies, hotels). On the other hand, change can be induced or stimulated by factors outside the tourism system which are not subject to the effect and control of the key agents of tourism processes. Such factors mainly involve the political and economic situation in the emitting and reception areas, the availability of energetics, currency trends, or weather and climate changes. For example, the 2003 Iraq war, global terrorism, or threats by epidemics have led many experts and institutions to shift the focus of investigation to the consequences of the above mentioned events upon tourist demands, as well as designing a recovery strategy for threatened destinations.

Tourism is dependant on a subject's time, expenditure and use of his discretion income. Any change in these factors results in serious repercussions for tourism economics. Given that participants in tourism trends exhibit their needs and expectations in various manners, the tourism market is fragmented such that the effects individual destinations are exposed to are characterised by a growing diversity. However, the diversity of tourism influences has to be identified, comprehended and anticipated in such a way as to enable valid inferences that will serve as the basis for making adequate management decisions and strategies for sustainable development. Starting from the mentioned conceptual framework, we turn to the significance and role of the tourist destination, as well as the estimation of its carrying capacity.

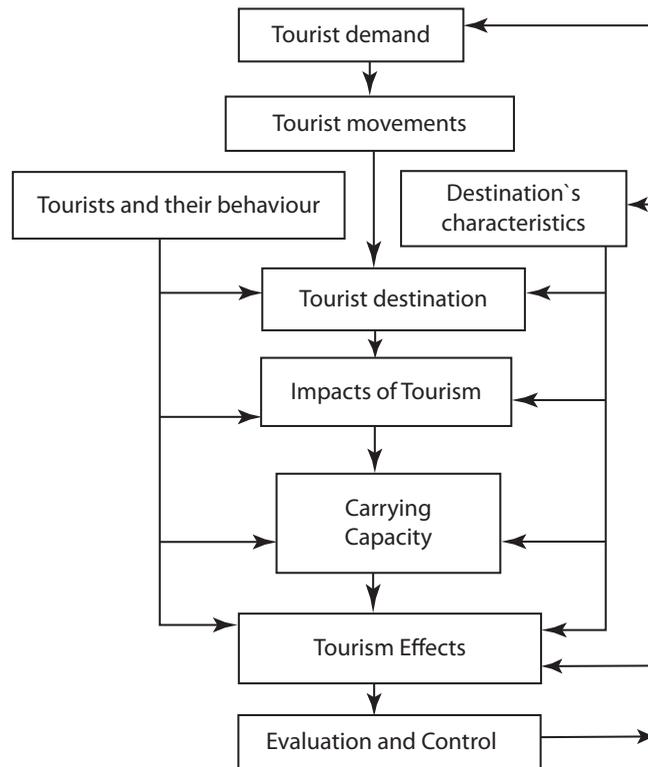
### **The carrying capacity – notion, relevance, possibility of practical application**

The assessment of carrying capacity is used as a sign of tourism impact on space and the environment. It represents an important component of planning spatial development in tourism, and is one of the mechanisms for establishing standards for sustainable tourism. Carrying capacity can be defined as a maximum number of tourists that sojourn in a specific area and use its contents in a way that does not induce unacceptable and irreversible change in the environmental, social, cultural and economic structure of the destination nor does it decrease the quality of tourist experience. An insight into available literature shows that numerous authors and institutions have so far dealt with problems and attempts at defining carrying capacity of tourist destinations, in particular, tourist-recreational areas.

According to the Federation of National Parks of Europe (FNNPE, 1992), carrying capacity is an ability of the ecosystem to self-sustain and trigger development of human activities in an unlimited scope, with no negative feedback effects. The World Tourism Organisation defines three levels that are necessary for the estimation of carrying capacity: ecological, socio-cultural, and psychological (WTO, 1997). Mitchell (1979) and O'Reilly (1986) offer a similar definition of carrying capacity.

Although majority of work in the issue of carrying capacity has been done in the area of theoretical approach to the concept, the practical application of proposed definitions faces numerous difficulties. It is beyond doubt that the concept of carrying capacity is by itself highly attractive and useful, but the so far experience has shown that in everyday practice it has been frequently abandoned and substituted with other concepts such as a limit of acceptable change in the destination, system of tourist management, etc. In addition, the practical application of the concept of carrying capacity should involve both natural surroundings and that altered/built up by human factors. In the so far examinations, however, the dominant relation is given to that between the carrying capacity and the natural surroundings.

Carrying capacity has thus acquired the features of an elusive concept that is still to be debated on. While considering the problem of sustainable development it has been noted that tourism generates various negative effects that may jeopardize long-term developmental perspectives, with the carrying capacity being marked as a useful framework for identification, comprehension and solution of registered problems (O'Reilly, 1986). As opposed to this view, other authors suggest the use of an alternative and more flexible framework. In this vein, Butler (1999) denies the mutual dependence between the definition of sustainability of tourism development and the concept of carrying capacity. According to this author, if sustainable development implies respect for the needs of the current generation while at the same not endangering the needs of future generations then, rather than on carrying capacity, the focus should be



*Figure 1. Conceptual frame of tourism (Mathieson and Wall, 2006)*

placed on a definition of the limits for the use of tourism space before a significant decline in the quality of tourism resourceful foundation or in tourists' experience have occurred.

The long-lasting discourse about the concept of carrying capacity has shifted to the need for clear and precise definition of tourism goals and the estimation of the extent to which these goals are achieved. Essentially, a recreational area or a tourist place does not have a single, eternally defined carrying capacity. Capacity is a reflection of goals set for a specific place or locality. It follows then that what needs to be specified is the nature of tourists' experience that can be realized, as well as an acceptable level of modification of the environment. Setting up and achieving the goals are apparently dependent on the factors such as available material resources, managerial skills, and the like.

### **Measuring and estimating carrying capacity**

Carrying capacity can be measured either at the level of a tourist destination as a whole with all its associated contents or at the level of individual, specific services and facilities. In both cases, capacity is characterized by economic, physical, and social attributes that can be measured. Each type of capacity may significantly vary from one destination to another, depending on the natural-ecological characteristics of a given area, the manner of its use, and developmental goals to be achieved. Each capacity type is characterized by a tolerance limit for a destination as a whole or for individual objects and facilities. Such a limit marks a threshold of

change which, if overrun, leads to mainly negative effects in tourism. If tolerance limits are not overrun, then the effects of tourism can in principle be said to be positive.

Numerous investigations have been published, in particular in the USA, that specify the procedure for calculating carrying capacity and generating specific formulae that would be valid for a specific destination type. Despite this, there is still no reliable and scientifically validated method for the calculation of carrying capacity. This is mainly the result of different approaches to the standard of mean area allocated to area users (including tourists, their activities and built-up facilities), by means of which carrying capacity is calculated. Numerous authors use different standards which they come to on the basis of empirical evidence. Therefore, experiences are different and so are the applied standards.

### **Measuring and estimating carrying capacity**

Carrying capacity can be measured either at the level of a tourist destination as a whole with all its associated contents or at the level of individual, specific services and facilities. In both cases, capacity is characterized by economic, physical, and social attributes that can be measured. Each type of capacity may significantly vary from one destination to another, depending on the natural-ecological characteristics of a given area, the manner of its use, and developmental goals to be achieved. Each capacity type is characterized by a tolerance limit for a destination as a whole or for individual objects and facilities. Such a limit marks a threshold of change which, if overrun, leads to mainly negative effects in tourism. If tolerance limits are not overrun, then the effects of tourism can in principle be said to be positive.

There is a capacity for each of the economic, physical, and social subsystems within a system of tourist destination. To allocate space for souvenir shops, restaurants, hotels or parking lots can sometimes imply occupying a place that is already taken up by enterprises and economic subjects whose activities are primarily aimed at satisfying the needs of the domicile population, that is, the local market. In this respect, a good illustration is a historic city in Great Britain whose Mayor once expressed dissatisfaction about the fact that three department stores in the area are selling only sweets but not a single one is selling shoes (Webster, 1999). This is a good example of how necessary is to adequately estimate the economic capacity that will reflect the possibilities of absorbing tourism functions, while at the same time not suppressing the required local activities nor dramatically increasing production costs and services aimed at the domicile population. Dilapidation of historical objects or contamination of beaches due to inadequate treatment of waste waters illustrate another situation, i.e., when tourism manages to overrun the upper limit of the physical or ecological capacity. In addition, it is well known that the tolerance threshold that the domicile population has for tourists' behaviour can sometimes be overrun, manifesting itself as lack of politeness towards visitors. In this case we are dealing with overrunning the social carrying capacity.

Some authors point out that "carrying capacity by itself is not a goal but a means by which the goal may be achieved" (Howie, 2003): In other words, carrying capacity should not be understood as a single, spatially and temporally for ever given parameter, but as an important instrument by which the development of tourist destination is steered. Changes that destinations face in their development are inevitable. The application of the concept of carrying capacity makes it possible an effective and efficient estimation of the acceptable level and direction of change brought about by tourism. In other words, carrying capacity is mainly the issue of managerial judgement such that both the regularity and validity of such a judgement consider-

ably vary depending on the position, interest, and expectations of different interested partners (stakeholders) participating in tourism processes. It is beyond doubt that making valid management decisions in tourism must be based on and supported by an adequate scientific investigation and establishment of efficient monitoring systems as key prerequisites for modification of once made decisions.

## Key factors of impact on carrying capacity

The capacity of a tourist destination to absorb the requirements of tourists on one side and the requirements of subjects of tourism economics on the other side depends on the relations between numerous and complex factors, in particular, the specificities of tourists, destinations, and the local population. For example, the extent to which the local population gets irritated by tourists' sojourn can be increased in cases of higher concentration of tourist traffic, including longer stay arrangements, continual demonstration of visitors' financial superiority and selection of activities implying closer contacts with the local population. Dissatisfaction and resentment that on such occasions may be born on the part of the domicile population is to be primarily expected in destinations with a highly developed tourist traffic or a limited participation of the local community in tourism development.

Given what has been so far observed, it can be said that capacity levels and the consequent tolerance threshold mainly depend on two groups of factors: characteristics of tourists and characteristics of a tourist destination and its population (Weaver, 2006). The characteristics of tourists that bear implications for carrying capacity involve:

- *Socio-economic and psychological characteristics.* These include sex, age, income, purchasing power, motivation, attitudes and expectations, perception of the quality of tourist attractions, racial and ethnic structure, mode of tourist behaviour, etc. Overall, the mentioned characteristics significantly contribute to and determine the communication between the local population and tourists;
- *Level of usage.* The number of visitors and their distribution across space and time are key parameters for the estimation of the level of usage of a tourism place;
- *Length of stay and tourist traffic by season;*
- *Type of tourist activities;*
- *Level of tourist satisfaction.*

Each of the above characteristics has its own relevance, thereby significantly affecting the scope, frequency and type of interaction with the physical attributes of a destination and its local population. It is important to note that the levels of usage are not only the issue of the number of tourists, for if they are one might form the wrong picture about tourism development. Frequently, the type of tourist activities and possible conflicts between tourists with different needs, interests and expectations can be more relevant indicators of the usage level of a tourist area, the fact that decision-makers must seriously take into account.

The characteristics of a destination which can affect carrying capacity include: First, natural-geographic characteristics and processes: topographic, geomorphological, hydrographic, petrographic, climatic, biogeographic, etc. Second, economic structure and development. These include the level of economic development, diversity and mutual dependence of the elements of economic base, spatial characteristics of development, forms of investment, import-export ratio, costs of preparation and delivery of tourism services. Third, social structure and

organization. These include: demographic profile of the local population, strength and perseverance of the local culture, availability and quality of public services and facilities, forms of social organization, the role of women, religious attitudes, ethics, level of medical and public safety, attitudes to tourists, language, tradition and gastronomical specificities. Forth, political structure and organization. Political structure of the reception country and its tourist destinations is of great importance. Factors such as forms and principles of socio-political organization, regulations on planning and parcelling, stimulating measures for tourism development, the role and competence of the national, regional, and local tourist organizations significantly shape the effects brought about by tourism. Finally, level and type of tourism development. These include the level of involvement of the local community in tourism development, stages and dynamics of tourism development, characteristics and types of tourist attractions, forms and quality of accommodation facilities and public transport, the role of agencies and local companies in creating and delivering tourism services (Font and Tribe, 2001).

## Concluding remarks

Taking into account a series of factors influencing the carrying capacity of a destination, it is difficult, if not impossible, to calculate its exact value, in spite of the fact that the practice has revealed several attempts at a mathematical optimization of carrying capacity. Nevertheless, the concept of carrying capacity has a high importance as it shows that tourism exerts serious effects on all subsystems of a tourist destination that are either of natural or of anthropological origin. Consequently, this concept has a significant role in planning a destination development and managing tourist activities. Specific subsystems have a low-tolerance threshold to the impacts of tourist activities, whereas in other subsystems this threshold is set higher. The identification, knowledge and interpretation of the effects of overrunning the tolerance threshold constitute vital factors for designing a policy and strategy for destination development with a focus on introduction of control mechanisms. A destination has its own limits as to the intensity of tourism development it can absorb, while the exceeding this limit can yield serious and sometimes even permanent negative consequences.

It can be concluded that the following prerequisites are of a particular importance for the proper understanding and use of the concept of carrying capacity in an attempt to create sustainable tourism:

- Carrying capacities change over time along with changes in goals and technological processes affecting tourism, while the type and scope of tourist traffic have a critical influence on the variability of carrying capacity;
- It is necessary that an agreement on desired/acceptable ecological, social, and economic conditions and effects of tourism development be reached, including indicators for their monitoring and evaluation;
- In order for the concept of carrying capacity to be used as a valid means of destination management, it is necessary to accurately identify the relation between the scope and type of tourist traffic in a given area, as well as the effect arising from them;
- It is necessary to postulate a political, legislative, and financial framework within which the managerial bodies and planning sectors can set the limits of tourist usage of space.

No doubt, carrying capacity will be exceeded if a specific destination cannot absorb tourist demand. In such circumstances, the motivational values and the overall resource founda-

tion of tourism prediction may be seriously, even irreversibly, afflicted. The greatest controversies and disputes following carrying capacity are related to the question of whether it is a constant that serves as the indicator of a maximally permitted level of usage of a given tourist area. The prevailing opinion is that the concept of carrying capacity is more complex than that. It is vital that an attitude be adopted that takes into account the necessity of embracing a particular strategy of tourism development along with the fact that tourism exerts different natural, ecological, and socio-cultural impacts upon a destination and its subsystems, which must be managed in an optimal way (as much as it is objectively possible). It is only in this way that a many-year old debate on the concept of carrying capacity can bring forth favourable repercussions for the estimation and management of the effects of tourism development.

## References

- Butler, W. (1999): "The concept of carrying capacity for tourist destinations" *Tourism Development*, John Wiley & Sons, Toronto.
- Howie, F. (2003): *Managing the Tourist Destination*, Cengage Learning, London.
- Font, X., Tribe, J. (2001): Promoting green tourism: The future of environmental awards, *International Journal of Tourism Research* 2 (5), pp. 1–13.
- Federation of Nature and National Parks of Europe (1993): *Loving Them to Death? Sustainable Tourism in Europe's Nature and National Parks*, FNNPE, Grafenau.
- Jovicic, D. (2006): *Tourism and Space*, Ton PLUS, Belgrade.
- Jovicic, D. (2008): *Introduction to Tourisimology and Tourist Geography*, Ton PLUS, New Belgrade.
- Laws, E. (1995): *Tourist Destination Management*, Routledge, London.
- Mitchell, B. (1979): *Geography and Resource Analysis*, Longman, London.
- Mathieson, A, Wall, G. (2006): *Tourism – Change, Impacts, Opportunities*, Pearson, Essex.
- O'Reilly, M. (1986): "Tourism carrying capacity", *Tourism Management*, 254-8.
- WTO (1997): *What Tourism Managers Need to Know*, Madrid.
- Weaver, D. (2006): *Sustainable Tourism: Theory and Practice*, Elsevier Butterworth-Heinemann, Oxford.
- Webster, K. (1999): *Environmental Management in the Hospitality Industry: A Guide for Students and Managers*, Cengage Learning Business Press, London