A mathematical model for tourism potential assessment

Libo Yan [a], Bo Wendy Gao [b, *], Meng Zhang [a]

[a] Faculty of Hospitality and Tourism Management, Macau University of Science and Technology, Macau, SAR China
[b] Faculty of International Tourism and Management, City University of Macau, Macau, SAR China

HIGHLIGHTS

- Resource values and development state determine a site's tourism potential.
- A model for assessing the tourism potential of heritage sites is developed.
- The weights of indicators and sub-indicators are computed.
- The model generates a hierarchy of heritage sites based on their tourism potential.

ARTICLE INFO

ABSTRACT

An audit of the potential for tourism development at heritage sites is a critical step in the planning process. An examination of the current literature on the evaluation of tourism potential reveals two main approaches: descriptive and qualitative. These approaches are not so effective for comparing the tourism potential of heritage sites in a region. Thus, this study aims to develop an operable, quantitative approach to measuring the potential of heritage sites. The mathematics model proposed in this study is characterized by different weights allocated to different indicators for tourism potential, based on resource values and development state. Applying the proposed model allows the assessment results of heritage sites to be compared, as the tourism potential of each site is represented by a value (0-1). A case study of two heritage sites in China demonstrates the effectiveness of the model.

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1. Introduction

Put simply, tourism potential refers to the ability of a site to attract and receive tourists with concerns about accessibility, resource quality, interpretation of resources, and so on (Anderson, 2007). Tourism potential can be defined as "the totality of natural, cultural, historical and socio-economic background for the organization of tourist activity in the particular area" (Kuskov & Dzhaladyn, 2006, as cited in Shohan, Toleuuly, & Assadova, 2012, p. 34). Bassey (2015) further explained tourism potential as the pool of resources possessed by a community or a place that could be transformed and developed into tourist attractions or finished products. However, tourism potential should not be understood exclusively from a resource-based perspective; operational factors are important additions to the concerns about tourism potential.

This is in line with Bassey's (2015) emphasis on the needs of tourist sites in terms of facilities, services, and infrastructure to make attractions visitor-ready.

Destination attractiveness is a term related to the tourism potential of heritage sites, considering that "[d]estinations could be on any scale, from a whole country… to a village" (UNWTO., 2007, p. 1). At the smallest scale, a destination can be a heritage site such as a historic village. The attractiveness of a destination can be examined from the supply or demand side. Formica (2000) noted the difference between the two perspectives: "The supply perspective is based on the number and quality of available attractions at destination. The demand perspective depends upon the perceptions and interests of travelers in the area." (p. 1) Buhalis (2001) further differentiated the two perspectives by identifying the supply-side factors as competitiveness and the demand-side factors as attractiveness. Vengesayi (2003) echoed this view of destinations from the two sides, which were closely related to each other, as "the overall tourist attractiveness of a destination is dependent upon the relationship between existing resources (natural, cultural, historical, etc.) and the perceived value of such resources" (Formica, 2000,

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* Corresponding author. Address: Avenida Padre Tomás Pereira Taipa, Macau, SAR China.
E-mail addresses: lbyan@must.edu.mo (L. Yan), bowendygao@yahoo.com.au (B.W. Gao), mzhang@must.edu.mo (M. Zhang).

p. 1). The present study uses the term "potential" rather than "attractiveness"; the former refers to an initial assessment at the very beginning of tourism development, and the latter refers to the evaluation of destinations on any scale and at any stage of development.

Before marketing a tourism place or site, it is necessary to know the potential of the locale or relevant resources. Doing so is helpful for making informed decisions on many related issues, such as planning, publicity, investment, and management. Accordingly, many studies have been conducted to evaluate the tourism potential of various sites or resources. These studies have been dominated by the model of du Cros (2001), which integrates concerns about the physical robustness of heritage into the assessment of potential, in parallel to the market appeal of heritage assets. In the model, robusticity and cultural significance constitute one dimension, and market appeal and product design constitute another. The assessment results are visually presented in a matrix, with heritage sites placed in nine areas according to their market appeal and ability to cope with increasing visitation.

The two-dimension model of du Cros (2001) has an internal flaw. Due to the mutually exclusive nature of the two dimensions, in the figural presentation of assessment results, heritage assets tend to be clustered together without forming a hierarchy (McKercher & Ho, 2006). The failure to generate such outcomes as a rank of resources or assets leads to doubts about the effectiveness of the model. By disaggregating the du Cros model, McKercher and Ho (2006) managed to rebuild a four-dimension framework (hereafter referred to as the McKercher framework) that relates to the cultural, physical, product, and experiential values of assets. Despite attempts to use an ordinal scale to mark sub-indicators of the fourfold values, the qualitative nature of assessment remains unchanged, as does the neglect of differentiating indicators in terms of their importance in the assessment system (McKercher & Ho, 2006; Sánchez Rivero, Sánchez Martín, & Rengifo Gallego, 2016). In other words, the framework of the four types of values inherited some weaknesses of the du Cros model.

This study aims to develop a new model for auditing the tourism potential of tourism sites. Applying the model to heritage site evaluation generates a hierarchy of sites, which would be helpful for comparing sites in terms of their potential for tourism development. A quantitative method is required to obtain a hierarchy of heritage sites based on levels of potential. Quantitative methods have been widely used for site evaluations for various developments, such as environmental conservation (Matin et al., 2016) and tidal energy development (Kolios, Read, & Ioannou, 2016). In addition to conducting site evaluations, studies have assessed sites for different forms of tourism development, such as casino construction (Ishizaka, Nemery, & Lidouh, 2013). Quantitative methods have been used to evaluate heritage sites (e.g., Al Mamun & Mitra, 2012; Malik & Bhat, 2015), and the quantified results are helpful for comparing the tourism potential of sites in a given area.

2. Literature review

The evaluation of tourism potential is an important aspect of destination development. A major reason for assessing tourism resources is the financial consideration. The municipal budget may be limited and thus the potential of regional tourism resources must be evaluated to help the local government make decisions on allocating resources for sustainable tourism development (Kuo & Wu, 2013). Apart from the financial factor, resources or attractions in a destination are not equally important; instead, there is a hierarchy of attractions (McKercher, 1996). The aim of such assessment is to determine the value of resources; thus, it is helpful

for decision making in terms of allocating economic resources for the purpose of tourism development. In this sense, the evaluation of tourism potential is critical for tourism planning (du Cros, 2001). A clear understanding of the tourism potential of resources benefits destination development and marketing (Ptáček, Roubínek, & Jan 2015; Sheng & Lo, 2010).

Various resources enter the domain of assessment in terms of tourism potential. At the macro level, the object of assessment could be categorized into two types: cultural and natural. The cultural resources assessed cover a wide range of heritage sites, from the cultural to the industrial and agricultural (Landorf, 2016; Metsaots, Printsmann, & Sepp, 2015; Ptáček et al., 2015; Sun, Jansen-Verbeke, Min, & Cheng, 2011); from the world to regional level (Io, 2011; Teo & Yeoh, 1997); from large as a city or towns to small as a street or square (Bucurescu, 2013; Neupane, Anup, & Pant, 2013; Pawlusiński & Kubal, 2015; Southwell, 2002); from urban to rural (Fisher, 2006; Kuo & Wu, 2013); and from area to route (Božić & Tomić, 2016; Sánchez Rivero et al., 2016). Although cultural heritage has received the most scholarly attention, natural resources have not been neglected, as exemplified by the evaluation of nature-based tourism sites in Chiang Mai province of Thailand (Emphadhu & Ruschano, 2007, pp. 739–746), as well as the potential assessment of bird habitats in Serbia (Bjeljac, Ćurčić, & Brankov, 2012).

2.1. The du Cros model and the McKercher framework

Several methods for evaluating the tourism potential of resources or destinations have been adopted in other studies. The prevalent approach is du Cros's (2001) model, which consists of two dimensions of heritage: conservation of cultural value and commodification of market appeal (or heritage management and tourism development). The concept of robusticity has been used to represent the former dimension. Robusticity and market appeal form a three-level matrix, within which assessed heritage sites can be plotted at different positions. Based on the positions in the matrix, heritage sites can be classified into four types: high market appeal and relatively high robusticity; relatively high market appeal but low robusticity; moderate market appeal and relatively high robusticity; and low market appeal regardless of robusticity. The merit of the du Cros matrix lies mainly in the synthesis of the two major aspects associated with heritage: conservation and commodification. As Bucurescu (2013) explained, for sustainability considerations, evaluations of the tourism potential of heritage sites should not be bound to market appeal, but should be conducted while considering the factor of robusticity, namely, the ability to accommodate negative impacts derived from increased levels of visitation.

The du Cros model has been widely used in studies of tourism potential assessment. Stamenković and Jakšić (2013) applied the du Cros model straightforwardly to evaluate an old town center and made no modification. Li and Lo (2004) adopted the model to evaluate the tourism potential of single-surname villages in the New Territories, Hong Kong. While confirming the effectiveness of the model, the study criticized the matrix for the vague concept of "product design needs" in the market appeal dimension and the lack of community concerns in the robusticity dimension. Although many studies have adopted the du Cros model to assess cultural heritage, a few have attempted to apply the model to natural heritage with modified sub-indicators (Bjeljac et al., 2012).

A significant development of the du Cros model lies in the McKercher framework, which consists of four dimensions: cultural, physical, product, and experiential value. These dimensions were formed by disaggregating the factors in the du Cros model, including physical significance, robusticity, development needs,