Sustainability of Tourism in the Alps: The Role of Hotels

Dina Rizio and Geremia Gios

ABSTRACT

Sustainable tourism development in the Alps is crucial in several respects. For many local communities, tourism is the first, and sometimes the only, source of income. However, tourism activities are perceived as responsible not only for increases in GHG emissions and energy consumption, but also for the overconsumption of natural resources and a steady degradation of the environment. These factors, in conjunction with increasing tourist flows, determine the need for a sustainable approach to Alpine tourism development. The Alps have historically been characterized by tourism activities which involve the consumption of both natural resources – the alpine landscape: its pastures, forests, and mountains – and built resources such as ski infrastructures and hotels. Hotels are important in alpine destinations; in some areas they are one of the main historical enterprises. Hotel services account for a large part of tourist expenditure, however they are also heavy consumers of energy, water, and natural resources and generate considerable quantities of waste. Given their key role in tourism activities, their relevance to Alpine destinations and their economic and environmental impact, hotels have been selected as the unit of analysis. This research is in its initial stages. It aims to analyze two Alpine hotels, using an emergy analysis to measure their environmental performance. The selection of the hotels, based on a principal component analysis, will be made in order to allow the study of two alternative strategies and approaches to energy consumption and energy management. The evaluation of hotel sustainability aims to both sensitize hotel management and inform local policies in defining sustainable destination strategies.

INTRODUCTION

Tourism and the Need for Sustainability

Given the growth of the tourism industry, it is perceived as an attractive option for developing countries (Sinclair, 1998) and has strongly performance in developed countries (Milne & Ateljevic, 2001). However, tourism activities have economic, social and environmental effects that may be either positive or negative (Milne & Ateljevic, 2001). In order to take advantage of the positive effects and mitigate the negative effects tourism must be sustainable. Although the contribution of tourism to development is widely recognized, it is difficult to provide a theoretical framework for sustainable development. Sharpley suggests a framework which can be applied to tourism if three main characteristics are included (Sharpley, 2000). First, a holistic approach to development and environmental issues, involving an evaluation of the natural resources needed and affected by tourism activities. Second, this evaluation must investigate the long term capacity of the ecosystem to not only provide inputs (i.e. natural resources) for tourism activities, but also to mitigate its negative outputs (i.e.
emissions and wastes). Third, access to these natural resources must be guaranteed for both an inter-and-intra generational group of stakeholders.

In the long term, ecosystem capacity and resource availability are critical to sustainable tourism development. Tourism activities, requiring a large amount of both natural resources in the form of access to the territory and its natural assets – energy, food, and water – and ecosystem services in the form of supporting and regulating functions – absorption of emissions, pollution, congestion, and waste – generate potential negative effects such as an increase in both GHG emissions (Scott et al., 2008) and the consumption of natural resources and energy. These effects are exacerbated by the growth of the industry, which needs to reduce its impact and shift to more efficient patterns of usage (Law et al., 2012; World Economic Forum (WEF), 2009). Both quantitative reductions and improvements in the efficiency of natural resource and energy consumption in tourism activities are key to the sustainability of tourism development. An increased awareness of the scarcity of these natural resources and the impossibility of replacing them in the short term indicates the necessity to both assess the sustainability of natural resource usage and maintain the natural critical capital.

Identifying and measuring both the considerable strain put on the natural environment by tourism, and its large demand for resources and energy, are crucial to ensuring sustainable tourism development. Although it is difficult to establish environmental accounting measures, both the importance of this assessment to sustainable tourism development (Lei, Zhou, Hu, Guo, & Cao, 2011) and the need for further studies on this topic (Buckley, 2012) have been widely noted.

However, sustainable tourism development is fostered not only at a macro level of analysis but also at a micro level. Although the environmental pressures arising from tourism activities have so far been understood as external and macro forces driving actions to further the sustainable development of the tourism sector, there are also internal and micro forces which promote sustainable tourism development. At the firm level, the natural-resource-based-view provides a first approach to recognizing the biophysical natural constraints that could be imposed on firms in the performance of their activities. It suggests a conceptual framework based on three main strategies to be implemented by firms: pollution prevention, product stewardship, and sustainable development (Hart & Dowell, 2011; Hart, 1995). There have been several applications of this conceptual framework to tourism and hotels (Leonidou, Leonidou, Fotiadis, & Zeriti, 2013) since the tourism industry faces market pressures to increase its sustainability.

On the demand side, customers require more environmental friendly products and stakeholders are pressing for the introduction of eco-innovations in all fields of the tourism sector. On the supply side, tourism firms are not only constrained by the scarcity of natural resources and the increase in energy prices, but are also required to meet environmental regulations, to produce higher quality products, and to introduce greener practices and eco-innovations voluntarily.

**The Alps and Tourism**

Tourism development in the Alps began in the XVIII century – the early tourists were climbers and walkers, scientific researchers and aristocrats – this history has contributed in various ways to the development of the Alps as a tourist destination (Buttilani, 2001; Bätzing, 2005).

Currently, Alpine development is connected with European economic and political dynamics. The main economic sectors in the Alps, in terms of their contribution to GNP, are: service, political and public services, and new, old, and traditional economies (Ruffini, Hoffmann, Streifeneder, Zanolla, & Cetara, 2007). The service sector is the biggest, and tourism is one of the main economic activities.

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1 The service sector or urban sector consists of business activities, hotels, restaurants, real estate, transport, financial services; the political sector includes services such as public administration, education, and healthcare; the new economy is based on IT services and telecommunication; the old economy is based on chemical and mechanical industries, the traditional economy is based on food, textiles, metal-work, and construction (Ruffini, Hoffmann, Streifeneder, Zanolla, & Cetara, 2007).
With more than 30 million visitors, 115 million overnight stays (ASTAT, 2013)\(^2\), the Alpine region is the main tourist destination in central Europe. In certain areas, tourism is the main economic sector and the economies of 10 percent of alpine municipalities are based on tourism (Schönthaler & Andrian-Werburg, 2007). Both summer and winter tourism are important, but the largest expenditure is registered by winter tourists (Bartaletti, 1998).

The Alpine tourism market is extremely complex and very differently organized to other economic sectors. On the one hand, tourism demand, is subjected to changing trends, requires more composite and refined products (Grissemann, Pikkemaat, & Weger, 2013) and is mainly composed of self-organized tourists (Franch & Martini, 2002). On the other hand, tourism supply is highly fragmented since it consists of a large number of SMEs which are closely connected to their local territories and communities but poorly oriented to co-operation and networking with other SMEs. Since the final tourist product is a mix of different products and services, these heterogeneous and non-cooperative SMEs need to work hard to produce integrated and high-quality tourist products (Franch & Martini, 2002). Moreover, integration is crucial to the creation of added value for tourists. Hotels are both the historical and the most dominant SMEs, in the tourist sector, in several Alpine destinations (Battilani, 2001).

**Sustainability Issues in Hotel Management: Economic and Environmental Performance**

The hotel sector is a key component of tourist supply since accommodation is one of the main services bought by tourists. The direct costs of hotel services and the indirect and induced effects generated by their production represent the largest part of overall tourist expenditure.

However, hotels consume large amounts of resources and energy to produce the services they provide, these account for most of the total costs borne by the hotel (Bohdanowicz & Martinac, 2007; Bohdanowicz, 2005; United Nations Environment Programme (UNEP), 2011).

Thus, the management of environmental issues of hotel structures can affect firms’ economic performance. For example, pollution prevention can lower a firm’s inputs (such as natural resources) and energy consumption, thus allowing them not only to reduce costs and raise revenues but also to mitigate the environmental effects of their activities (Porter & Van der Linde, 1995). As underlined other authors (Álvarez Gil, Burgos Jiménez, & Céspedes Lorente, 2001), the increased economic importance of tourism and hotel activities has combined with environmental concerns to prompt more research into businesses’ environmental management practices.

According to (Cramer, 1998), environmental management systems involve two areas of activity: technical and organizational. Technical activities entail physical modifications of products or machinery while organizational activities refer mainly to planning and control measures.

A different classification, based on management related criteria, distinguishes between internal and external drivers of motivation for the implementation of environmental management systems. The former may be either the ethical values of the owners and/or concerns about costs, while the latter are generated by pressure from customers and stakeholders (Bonilla-Priego, Najera, & Font, 2011)\(^3\).

Due to their importance in the tourism sector; their economic impact; their energy consumption and their environmental impact, both at a macro and micro level, hotels have been selected as the unit of analysis for this study.

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\(^2\) The European nations included in this statistics are: Austria, Germany, Italy, and Switzerland.

\(^3\) In this respect, a further classification distinguishes between operational-centered or customer-centered activities. Operations-centered activities refer to utility costs and maintenance expenses while customer behavior-centered activities refer to laundry, linen, supplies, food, and beverages (Zhang, Joglekar, & Verma, 2012).
METHODOLOGICAL APPROACH

Case Study and Data Collection

The Province of Trento is an Italian autonomous province located in the North-eastern Alps. Tourism is important to the provincial economy: in 2010, tourist expenditure was estimated to be about € 2,830,000,000. Tourism generated 15% of the province’s GDP: 68.6% direct effects, 5.8% indirect effects, and 25.6% induced effects, while the national average is about 6% (PAT, Servizio Statistica, 2012). Most tourist expenditure goes on accommodation services, and hotels attract the majority of this (PAT, Servizio Statistica, 2006). The Province of Trento finances industrial sectors and enterprises through the APIAE⁴. In the recent announcement for subsidies, funds were assigned to several economic sectors, including tourism⁵.

The database contains the hotels that were eligible for, and received, funding at this recent announcement. The data already available refer to:

a) the enterprise with respect to ownership, size, and number of employees;
b) the types of investments planned, funding percentages, and amounts of funding received.

Starting from this information, the database will be enriched in two phases: desk research and a questionnaire.

Research Design

The desk research will provide an exhaustive review of the characteristics of the hotels’ environmental performance.

The questionnaire will consist of open, dichotomous, and multiple choice questions. The survey will have three aims: to collect further data to profile hotels according to their commitment to the environment and their willingness to implement eco-innovations; to find the main components of the environmental performance of these SMEs, and to ask whether they would be willing to participate in a subsequent phase of the study. Regarding this last point, respondents will receive additional, general, information on the data needed for, and the estimated burden of, this further phase of the study. Hotel profiles will be obtained by correspondence analysis (CA) while the main environmental performance components will be obtained by principal component analysis (PCA). The CA is a powerful tool, one of the multivariate techniques that aims to reduce data complexity without a priori assumptions about models or particular structures, while still allowing for the testing of hypotheses. It is an appropriate technique for profiling hotels because it allows us to obtain both descriptive and graphical representations of qualitative data⁶. The PCA is also a multivariate technique. Given a dataset of interrelated variables, the PCA enables researchers to reduce data dimensions while ensuring the maintenance of as much data variability as possible. This technique reveals the most relevant components to the environmental performance of the hotels in the sample⁷.

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⁴ APIAE is the acronym for the local agency which manages public subsidies to enterprises in the Autonomous Province of Trento.
⁵ This last campaign is the 2/2012 which is based on the Operative Plan FERS 2007-2013 and the provincial law n. 6/1999.
⁶ Briefly, the CA has a geometrical approach to problems which applies to contingency tables by codifying rows and columns of these tables in geometric points. The CA generates orthogonal components and assigns them a score according to an optimal principle that is as representative as possible of the original data (Greenacre, 1984, 1993).
⁷ This technique allows a reduction in data dimensionality by obtaining new variables which are uncorrelated. These variables are called principal components. The principal components are ordered according to the variation (deriving from the original data) they are able to capture. From a mathematical point of view, these components represent the solution of an eigenvalue-eigenvector problem applied to a positive-semidefinite symmetric matrix (Jolliffe, 2002).
According to the results of the PCA, two hotels will be selected for the emergy analysis: one resulting in the best environmental performance and one in the worst. This means that although only two hotels are selected for the emergy analysis, this selection is based on the previous analysis and the hotels are at the two extremes of the range of environmental performances shown by the hotel’s sample.

The evaluation of the environmental performance of these two hotels by assessing their energy consumption will use the emergy analysis (Odum, 1983, 1996). The emergy analysis applied to these two hotels is particularly effective at obtaining sustainability indicators for the renewable and nonrenewable sources of energy used by the structures. The advantages of using Odum’s emergy analysis to evaluate the environmental performance of hotels derive from the method’s holistic approach.

It allows the identification of all the natural and economic components of the systems, the assessment of the quality of energy and resources in use, and the evaluation of the services provided by the environment (Lei et al., 2011).

Despite these advantages, the multidisciplinary approach and the large amount of data required for this methodology have meant that it is still rarely applied to tourism studies.8

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8 To date the applications of emergy analysis to measure the sustainability of tourism systems are limited. These applications are related to: ecotourism in the Caribbean (Abel, 2000, 2003); resorts in Mexico and Papua New Guinea (Brown & Ulgiati, 2001); tourism industry of Macao (Lei & Wang, 2008); life cycle model to investigate the emergy flow of tourists and residents for an Italian coastal resort region (Vassallo, Paoli, Tilley, & Fabiano, 2009).
The aim of this emergy analysis is to obtain emergy indicators (EYR, ELR, ESI) that allow an analysis of a hotel’s environmental performance through a systemic approach which identifies all the hotel’s inputs and outputs (in energy terms). The indicators obtained can be integrated with a calculation of the price of energy consumption to measure the potential competitive advantage obtained by these two hotels.

A preliminary system diagram illustrates the main components, interactions, and energy flows of a hotel-based system.

CONCLUSIONS

This preliminary paper aims to highlight not only the important role played by hotel operations at a macro and micro level in a context of sustainable tourism development, but also the strong connection between economic and environmental performance for these SMEs. Given their importance within the tourism industry and their economic and environmental impacts, hotel activities are an interesting topic of study in tourism literature.

The energy analysis is a powerful method for providing information on the sustainability performance of hotels and their pattern of natural resource and energy consumption – essential elements both when planning destination management strategies and to inform policy makers’ decisions around the fostering of local sustainable development.

This research is at an initial stage and all inputs are welcome to enable the proper application of the energy methodological framework, particularly given how few applications of this analysis there have been to tourism.

REFERENCES


PAT, Servizio Statistica. (2006). L’impatto della spesa turistica nell’economia provinciale (Studi Monografici). Retrieved from:


