



# The interactive effects of online reviews on the determinants of Swiss hotel performance: A neural network analysis



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## HIGHLIGHTS

- We examine the determinants of Swiss hotel performance.
- We use an artificial neural network model to build on prior eWOM studies.
- Regional room star rating has a positive impact on RevPar.
- Room quality, regional review, hotel regional reputation negatively affect RevPar.
- Findings imply boundaries to reputational benefits for Swiss hotels.

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## ABSTRACT

From a strategy perspective, the growth of social media accelerates the need for tourism organisations to constantly re-appraise their competitive strategies. This study contributes theoretically to the tourism performance literature by validating a new approach to examining the determinants of hotel performance. Drawing from and extending prior hotel determinants studies, this study uses artificial neural network model with ten input variables to investigate the relationships among user generated online reviews, hotel characteristics, and Revpar. The sample includes 235 Swiss hotels for the period 2008–2010, with 59,688 positive reviews from 69 online sources.

The empirical findings reveal four hidden nodes that have a significant impact on RevPar. Three of these have negative impacts: room quality, positive regional review, hotel regional reputation, and regional room star rating has a positive impact. Further, the findings imply that there may be boundaries to reputational benefits for Swiss hotels.

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## 1. Introduction

Successful tourism organisations tend to focus attention on those factors that enhance performance, so that they can maintain sustainable long-term success. The deployment of assets, resources, processes, capabilities and competencies that collectively provide the tourism organisation its unique advantage remain the key components of a successful strategy. Although the strategy literature advocates a variety of universal rules and concepts to enhance

performance (Phillips, Davies, & Moutinho, 2002), to date there has been a paucity of fresh approaches investigating the determinants of tourism performance.

The identification of new determinants of tourism performance remains one of the most critical activities for those concerned with the planning and management of tourism organisations. Today's tourism performance measurement approaches have to comprise financial and non-financial performance measures linked to business strategy (Vila, Costa, & Rovira, 2010). Moreover, technological turbulence in the external environment, market competition and more discerning customers make it a requirement that tourism organisations constantly re-appraise the effectiveness of their competitive strategies.

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The increasing use of social media in the tourism industry has resulted in electronic Word of Mouth (eWOM) reviews having a strong influence in consumer decision-making (Blal & Sturman, 2014). Moreover, the influence of the Internet has created the growth of new hospitality and tourism applications. A detailed analysis by Scaglione, Schegg, and Murphy (2009) of monthly revenue indicators of 147 Swiss hotels between 1992 and 2003 indicates that website adoption is positively related to performance. Their results suggest that the adoption of an innovation, i.e. the creation of a website, relates to a performance indicator – Revenue per Available Room (RevPar). Consequently, hoteliers are diverting increasing resources to efficiently aggregate, organise and manage their online reputations. When online reputations are effectively managed, hoteliers can perform better internal and external analyses of their operations. Monitoring can take place at the individual unit, brand and chain level.

User generated content (UGC) and in particular, online reviews have seen rapid growth in recent years. Interestingly, according to TripAdvisor (2014a) a significant proportion of its four million business and properties relates to accommodation with hotels, B&B and speciality lodging, accounting for 810,000 units. In February 2014, TripAdvisor (2014b) issued a press release announcing a UGC milestone making it the first travel site to offer consumers 150 millions reviews and opinions. The increase in online reviews echoes a similar pattern to the growth of hotel room bookings through e-distribution (O'Connor, 2008; Schegg & Scaglione, 2013; Toh, Raven, & DeKay, 2011). However, despite the achievement of the eWOM stream of research (Cantalops & Salvi, 2014), research can go further in providing broader insights of eWOM as a determinant of hotel performance.

This paper asserts that while eWOM research has enriched our knowledge of the impact on performance; it has not yet fully considered a comprehensive view of performance determinants. Previous eWOM performance studies assume a direct relationship between online consumer reviews and performance with studies deploying a bi-variate methodology (Anderson, 2012; Tuominen, 2011; Ye, Law, & Gu, 2009). While bi-variate approaches are important for articulating initial insights, the changing business dynamics necessitate broader insights into what underpins hotel performance. In addition, future eWOM performance research should focus on broader geographic areas and include different types of hotels (Levy, Duan, & Boo, 2013).

The motivation for our current work is to develop the notion of determinants of tourism performance. Specifically we draw from and extend prior works of Anderson (2012); Duverger (2013); Tuominen (2011) and Ye, Law, Gu, and Chen (2011). In this context, our study makes several contributions to the literature. The first is to comprehensively assess the impact of online reviews on RevPar across a single country, Switzerland, taking into account different locations, regions, types of hotels in terms of number of rooms and number of beds, and hotel quality. Second, our model proposes the utilisation of an aggregated evaluation score in order to evaluate UGC. The study uses the aggregated TrustYou ([www.trustyou.com](http://www.trustyou.com)) score, a propriety measure based on reviews across 69 review and social media sites worldwide. By combining actual hotel performance data with hotel profile and UGC data, we contribute to the tourism literature in that we evaluate the relationship between the aggregated score and performance of a wide range of hotels. Third, methodologically, the study contributes to the existing tourism literature by validating a new approach to determine the relationship between user-generated online reviews and hotel performance. We propose Artificial Neural Network (ANN) as a method for analysing the determinants of hotel performance. ANNs do not require prior knowledge of the distribution, which make them particularly suitable for complex relationships.

Finally, our findings make a meaningful theoretical and practical contribution to the Swiss hotel sector, which can help decision-makers enhance the level of economic and social benefits.

The structure of this paper is as follows. First, the concept of UGC and its use in the tourism industry are discussed. Second, UGC and tourism performance studies are reviewed. Third, ANNs are introduced followed by the method of the study. The background, sample, model and data analysis are presented. Finally, conclusions and implications are offered.

## 2. User generated content

In the past decade there has been growing interest in the application of social media to the hospitality and tourism domain. Much of this interest has arisen from the emergence of Web 2.0, which has resulted in numerous UGC websites capturing online reviews, online recommendations, or online opinions shared by customers (Aye, Au, & Law, 2013; Cantalops & Salvi, 2014). Within the tourism industry, hotel businesses are probably most affected by UGC, which is shared on social networks, online travel communities, and review sites (Aye et al., 2013; Tuominen, 2011).

Nevertheless, due to the increasing number of platforms and online reviews there is now awareness among tourism managers that consumers' online reviews form a rich source of data. According to a SAS Institute Inc. study (McGuire, 2013), the bottom line is that driving revenue in the hospitality industry is no longer just about competing on price as consumers are clearly turning to UGC to inform their purchase decisions. Reviews as a resource can contribute to the effective management of the entire sector and to the achievement of competitive advantage of tourism businesses (Kim & Hardin, 2010; Leung, Law, van Hoof & Buhalis, 2013; Lu & Stepchenkova, 2012; Robson, Farshid, Bredican, & Humphrey, 2013). User generated reviews are a significant source of information for companies and the analysis of the information can facilitate improvement in the quality of the products/services, the identification of customer needs and the implementation of new marketing strategies (Jun, Vogt, & MacKay, 2010; Loureiro & Kastenholz, 2011; Yacouel & Fleischer, 2012).

The significance of online reputation implies that its management should be seen as a strategic issue, and the links between the management of reputation and financial performance explored (Davies, Chun, & Kamin, 2010). Yet, research on the impact of user generated online reviews on business activities has focussed on sales and bookings (e.g. Ye et al., 2009 and Ye et al., 2011) and to a lesser extent on the impact on financial performance. Within the tourism literature, research on this relationship seems to be scarce and Tuominen (2011) argues that the issue of the impact of online consumer generated reviews on the performance of hospitality businesses has been overlooked previously. Ye et al. (2011) state that the influence of user-generated online reviews is largely unknown in the tourism industry.

### 2.1. User generated content and performance

Within the tourism context, researchers such as Dickinger and Mazanec (2008), Ye et al. (2009, 2011) analysed the impact of online reviews on hotel bookings and found that positive reviews can significantly increase the number of bookings and that the variance or polarity of eWOM for the reviews of a hotel had a negative impact on the amount of online sales. Cantalops and Salvi (2014) and Ye et al. (2011) call for more research into the relationship between online reviews and business performance arguing that this relationship has not been explored in great detail. The lack of attention might be explained by the fact that obtaining actual business performance data matched to the online reviews for

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