MANAGEMENT SCIENCE APPLICATIONS IN TOURISM AND HOSPITALITY

ZHENG GU
EDITOR

Management Science Applications in Tourism and Hospitality

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Routledge
Taylor & Francis Group
New York London

First published by

The Haworth Hospitality Press®, 10 Alice Street, Binghamton, NY 13904-1580 USA

The Haworth Hospitality Press® is an imprint of The Haworth Press, Inc., 10 Alice Street, Binghamton, NY 13904-1580 USA.

This edition published 2012 by Routledge

Routledge
Taylor & Francis Group
711 Third Avenue
New York, NY 10017

Routledge
Taylor & Francis Group
2 Park Square, Milton Park
Abingdon, Oxon OX14 4RN

Management Science Applications in Tourism and Hospitality has been co-published simultaneously as *Journal of Travel & Tourism Marketing,* Volume 16, Numbers 2/3 2004.

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Cover design by Jennifer M. Gaska

Library of Congress Cataloging-in-Publication Data

Management science applications in tourism and hospitality / Zheng Gu, editor.
p. cm.
"Management science applications in tourism and hospitality has been co-published simultaneously as Journal of travel & tourism marketing, volume 16, numbers 2/3 2004."
Includes bibliographical references and index.
ISBN 0-7890-2518-3 (pbk : alk. paper)
1. Tourism–Management. 2. Hospitality industry–Management. I. Gu, Zheng, 1947- II. Journal of travel & tourism marketing.
G155.A1M249 2004
910'.68–dc22

2004007836

Management Science Applications in Tourism and Hospitality

CONTENTS

Preface xi

A Multi-Criteria Approach to Destination Benchmarking: A Case Study of State Tourism Advertising Programs in the United States 1
Karl W. Wöber
Daniel R. Fesenmaier

An Exploratory Investigation of Multiunit Restaurant Productivity Assessment Using Data Envelopment Analysis 19
Dennis Reynolds

Hotel Labor Productivity Assessment: A Data Envelopment Analysis 27
Bo A. Hu
Liping A. Cai

Using Data Envelopment Analysis for Measuring and Benchmarking Productivity in the Hotel Sector 39
Marianna Sigala

Modeling Tourism Demand: A Decision Rules Based Approach 61
Rob Law
Carey Goh
Ray Pine

Initially Testing an Improved Extrapolative Hotel Room Occupancy Rate Forecasting Technique 71
Rob Law

Forecasting in Short-Term Planning and Management for a Casino Buffet Restaurant 79
Clark Hu
Ming Chen
Shiang-Lih Chen McCain

Applying City Perception Analysis (CPA) for Destination Positioning Decisions 99
Sara Dolnicar
Klaus Grabler

Index 113

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Zheng Gu holds a PhD degree in Finance from the University of Central Florida. Before he joined the faculty in 1991, he taught tourism at Hangzhou University in China, and Financial Management at the University of Central Florida. As a visiting professor, Dr. Gu also taught courses and conducted research at Institut De Management Hotelier International (sponsored by ESSEC and Cornell University), France.

Dr. Gu's research interests are financial management and operation analyses for the hospitality, tourism and gaming industries. Currently his research focuses on destination capacity optimization, U.S. and European casino operations comparison, hospitality firm bankruptcy prediction, casino industry mergers and acquisitions, and tourism markets in the Asian/Pacific region. Dr. Gu has about 70 articles published in academic and industry journals. He has won a series of awards for his research papers.

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Preface

Management science is an approach to problem solving and decision making using scientific methods that involves extensive use of quantitative analysis. It has been widely applied in the service industries. Recent years have seen an increase in applications of management science in tourism and hospitality operations. To keep readers abreast with new developments in its tourism and hospitality applications, this special volume features eight articles with an emphasis on data envelopment analysis (DEA) and forecasting, two important topics of management science.

DEA is a performance evaluation technique based on linear programming that involves weighted outputs and inputs. Unrestricted by any assumptions of its operational form, DEA is a nonparametric method that can provide a viable efficiency benchmark for tourism and hospitality operations. In their article, Wöber and Fesenmaier introduce DEA for evaluating efficiency in tourism advertising programs and identify optimal comparison partners for benchmarking. Evaluating state tourism advertising programs in the United States, they demonstrate how DEA can be implemented for benchmarking tourism destinations. Using data from sample restaurants, Reynolds' study reveals that DEA offers considerable potential for managers attempting to accurately assess productivity. As the study shows, the potential of the DEA model to include multiple output and input factors underlines the technique's versatility and portability. In this special volume, two articles explore DEA applications in the hotel industry. In their empirical illustration using California hotels data, Hu and Cai propose DEA as an effective method to measure hotel labor productivity and further recommend a relational model to identify determinants of labor productivity variance. On the other hand, utilizing data of UK hotels, Sigala demonstrates the value of stepwise DEA for measuring and benchmarking hotel productivity.

Another focus of this special volume is forecasting methodology. In their paper, Law, Goh, and Pine apply the rough sets theory to establish a forecasting model for tourism demand. Utilizing Japanese arrivals data in Hong Kong, they show that the induced decision rules could forecast arrivals with reasonably high accuracy. Another study by Law proposes an improved extrapolative time series technique for forecasting hotel occupancy. His empirical results based on Hong Kong hotels indicate the new technique's potential in raising forecasting accuracy. Hu, Chen and McCain compare eight forecasting models using the data of an on-premises buffet restaurant in a Las Vegas casino. They show that the double moving average model is the best forecaster. Finally, in their article on a separate subject, Dolnicar and Grabler propose a city perception analysis model, a destination marketing decision-making approach designed to avoid sub-optimal decisions.

It would be impossible to publish this special volume without the assistance of many people, especially the reviewers. Therefore, I would like to express my sincere thanks to them for their critiques and constructive comments that have helped enhance the quality of the articles.

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[Haworth co-indexing entry note]: "Preface." Gu, Zheng. Co-published simultaneously in *Journal of Travel & Tourism Marketing* (The Haworth Hospitality Press, an imprint of The Haworth Press, Inc.) Vol. 16, No. 2/3, 2004, pp. xvii; and: *Management Science Applications in Tourism and Hospitality* (ed: Zheng Gu) The Haworth Hospitality Press, an imprint of The Haworth Press, Inc., 2004, pp. xi. Single or multiple copies of this article are available for a fee from The Haworth Document Delivery Service [1-800-HAWORTH, 9:00 a.m. - 5:00 p.m. (EST). E-mail address: docdelivery@haworthpress.com].

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A Multi-Criteria Approach to Destination Benchmarking: A Case Study of State Tourism Advertising Programs in the United States

Karl W. Wöber
Daniel R. Fesenmaier

SUMMARY. This paper introduces Data Envelopment Analysis (DEA) for the evaluation of inefficiencies in tourism advertising programs and the identification of optimal comparison partners for benchmarking. The implementation of DEA for benchmarking tourism destinations is demonstrated by assessing state tourism advertising programs in the United States. This evaluation includes information on the advertising budgets of state tourism offices, the allocation of market effort in international and domestic segments, and the number of visitors and expenditures generated in the various destinations. A proximity measure was used as an exogenously fixed input variable in order to reflect differences in domestic market size. Findings include efficiency scores for state tourism offices offering several possibilities for managerial implications. Furthermore, the concept of a virtual reference destination assisting managers to analyze their individual strength and weaknesses is introduced. Finally, a discussion of the potential and limitations of DEA for benchmarking of tourism destinations is provided. *[Article copies available for a fee from The Haworth Document Delivery Service: 1-800-HAWORTH. E-mail address: <docdelivery@haworthpress.com> Website: <http://www.HaworthPress.com> © 2004 by The Haworth Press, Inc. All rights reserved.]*

KEYWORDS. Destination benchmarking, Data Envelopment Analysis, efficiency analysis, tourism advertising

INTRODUCTION

Benchmarking has experienced increased popularity, both in the hospitality as well as in the tourism industry. The increased interest in benchmarking has been stimulated with the publication of Xerox's manager Robert Camp's book on benchmarking (Camp, 1989). Since then, the phenomenon of benchmarking has been discussed by many authors primarily in the form of management guidebooks (e.g., Spendolini, 1992; Watson, 1992; Cook, 1995;

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[Haworth co-indexing entry note]: "A Multi-Criteria Approach to Destination Benchmarking: A Case Study of State Tourism Advertising Programs in the United States." Wöber, Karl W. and Daniel R. Fesenmaier. Co-published simultaneously in *Journal of Travel & Tourism Marketing* (The Haworth Hospitality Press, an imprint of The Haworth Press, Inc.) Vol. 16, No. 2/3, 2004, pp. 1-18; and: *Management Science Applications in Tourism and Hospitality* (ed: Zheng Gu) The Haworth Hospitality Press, an imprint of The Haworth Press, Inc., 2004, pp. 1-18. Single or multiple copies of this article are available for a fee from The Haworth Document Delivery Service [1-800-HAWORTH, 9:00 a.m. - 5:00 p.m. (EST). E-mail address: docdelivery@haworthpress.com].

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Digital Object Identifier: 10.1300/J073v16n02_01

Zairi, 1996; Cross, 1998). The practice of benchmarking as detailed by Camp and widely followed by practitioners has focused attention on the search for specific practices which will enhance performance with a controlled allocation of resources. This improved efficiency is achieved by the discovery of specific practices relying on simple engineering ratios.

In tourism the focus and methodologies used in benchmarking studies can be very different and can be classified into three approaches: (1) benchmarking of profit-oriented tourism businesses (e.g., accommodation suppliers, restaurants, tour operators and travel agencies, airlines); (2) benchmarking of non-profit oriented tourism businesses/organizations (e.g., tourist boards/organizations, attractions operated by public authorities or other forms of non-profit oriented businesses); and (3) destination benchmarking (national, regional or local benchmarking). The majority of benchmarking initiatives can be found among profit-oriented tourism businesses, particularly in the hospitality sector. Benchmarking in all other tourism areas has been very limited in terms of number and their technical quality. Few attempts have been made to apply benchmarking methodologies for measuring the efficiency of regional tourism management or to assess the competitiveness of tourism destinations.

The evaluation of destination marketing performance involves multiple objectives and resources. A large literature exists describing the operational requirements and managerial implications of benchmarking (e.g., McNair & Leibfried, 1992; Watson, 1992; Karlof & Ostblom, 1994; Cross, 1998); however, very little attention has focused on methodological aspects in conjunction with situations where managers are facing multiple objectives and resources. Data Envelopment Analysis (DEA) has been identified as an appropriate technique for the evaluation of efficiencies and the identification of benchmarking partners in situations where multiple inputs and outputs occur. DEA is a linear programming model which was first introduced by Charnes, Cooper and Rhodes (1978) to measure the relative efficiency of operating units (for this study state tourism offices) with the same goals and objectives. DEA can be used to separate efficient units from inefficient ones on the basis of whether or not they lie on the "efficient frontier," which is defined by the best units in the data set. More specifically, the efficiency measure employed in DEA is established mathematically as the ratio of the weighted sum of outputs to the weighted sum of inputs.

DEA has been successfully applied for the selection of benchmarking partners in the hospitality industry (Morey & Dittman, 1995; Morey & Morey, 1999; Wöber, 2002). However, several important issues remain to be addressed when it comes to implementing this methodology within the context of tourism destination management. This paper introduces this tool for evaluating the performance of tourism management in 48 state tourism offices in the United States. The evaluation was based upon their advertising budgets, the allocation of market effort in international and domestic segments, and the number of visitors and expenditures generated in the various destinations. Furthermore, the concept of a virtual reference destination assisting managers is introduced as means for state tourism offices to analyze their individual strength and weaknesses. Finally, the article ends with a discussion of the strengths and weaknesses of DEA for benchmarking tourism destinations.

TOURISM DESTINATION BENCHMARKING

Studies on tourism destination benchmarking are rare (Kozak, 2002). Probably one of the most comprehensive examples of regional benchmarking was first presented by Wöber (1997). In this study Wöber described a Web-based decision support system that enables European tourism organizations to compare the market segment performance of one city with other cities in Europe. More recently, Kozak and Rimmington (1999) reviewed the literature on tourism destination competitiveness, stressing the requirement to establish which destinations are in direct competition. They noted the importance of systematically evaluating such competitiveness both quantitatively through measurement of hard data (such as arrivals and tourism receipts) and qualitatively through soft data. To demon-