Towards a sustainable urban tourism development in Europe: The role of benchmarking and tourism management information systems – A partial model of destination competitiveness

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Towards a Sustainable Urban Tourism Development in Europe.

The Role of Benchmarking and Tourism Management Information Systems.

A Partial Model of Destination Competitiveness

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Abstract

The development of indicators and metrics systems has been identified as being of paramount importance by many tourism boards and international tourism organizations. This article discusses the bottom up, micro-level approach of TourMIS, which is a platform for exchanging tourism statistics among tourism organizations, for collecting measures of sustainable urban tourism development. The authors provide a synthesis of various frameworks for sustainable tourism indicators for sub-national regions and cities, concluding that it is more feasible to analyze existing sustainable tourism indicators than to introduce new measures lacking in direct practical applicability for the organizations. The application of data envelopment analysis (DEA) for benchmarking urban tourism destinations is then demonstrated by assessing measures available in TourMIS. Findings include inefficiency scores that suggest both managerial and political implications. Furthermore, the concept of a virtual reference destination assisting managers and politicians to analyze their destination's strengths and weaknesses is introduced.

Keywords: Urban tourism development, sustainable tourism indicators, benchmarking, TourMIS, Data Envelopment Analysis, virtual reference destination

Introduction

All cities in the world have been heavily impacted by the paradigmatic changes in production and consumption patterns, as well as the mobility of capital, people and goods which have taken place in recent decades. It is estimated that by 2050, 70% of the world's population will be living in cities and as soon as 2025, cities will contribute over 30 trillion US dollars to the world economy (Dobbs et al., 2012).

Greater global mobility, the information boom and the increased knowledge-sharing between people have facilitated the development of urban structures and led to higher levels of city tourism demand in recent years. City tourism services are among the most highly standardized products in comparison to other tourism offers, and they have been readily accessible for purchase ever since they became available through online booking engines. Mainly because of the easy access, cities are ideal destinations for short-breaks and they normally offer a wide range of cultural experiences, which perfectly match general trends in travel behavior (Richards, 2014). Many cities have also become more attractive through constantly developing new products, upgrading their quality of services, and consequently enhancing their competitiveness. The "smart city" model, which has been adopted by many cities in Europe, represents an environment where innovation and technology supplement activities and services of the city in order to provide benefits to the residents and visitors (UK Department of Business and Innovation Skills, 2013). Finally, the growth of meetings and shopping as important travel motivators has substantially supported the development of city tourism.

There are many threats which could jeopardize or even prevent the prosperous development of city tourism and they can be classified as economic, environmental, and social threats. While the exact challenges faced are specific to the city, one of the most common problems is that cities are in danger of losing their authenticity. The standardization and transparency of products and services make city tourism offers increasingly interchangeable. In many cities hotels are already exposed to very high levels of competition, which creates a huge pressure on profit margins (HOTREC, 2014). Crowding, congestion, waiting time at tourism attractions, emissions, and pollution caused by mass tourism in cities are negative effects of uncontrolled tourism development in urban regions, which threaten the preservation of the environment, heritage, social and cultural values, and maintenance of a quality of life for residents (Timur and Getz, 2009). A possible consequence is that “quality tourists” avoid crowded places; leaving masses of low-quality visitors who are more of a stress than a benefit to the community. There are often trade-offs to be made between environmental goals and the objectives of maintaining relationships between tourists and citizens, or the tourism industry and the local community. Conflicts arise, for instance, when cities claim that they want to become smart or green yet simultaneously launch strategies to increase air transportation by building additional runways and attracting additional airlines. The relationship between tourists and citizens, or the tourism industry and the local community, is frequently compromised for the environmental reasons. Thus, tourism policy needs to take into the consideration how to market tourism, finance its development, and keep visitor numbers within the limits of carrying capacity of the city (Van der Borg, 1992).

Despite the significant positioning of city tourism in the global marketplace, it is still a relatively immature field of interdisciplinary study and practical expertise. As shown previously by Timur and Getz (2009), different tourism stakeholders view sustainable urban tourism differently, usually due to their focus on one dimension – economic, environmental or sociocultural – which makes collective decision making harder. Developing a clear understanding of city tourism and how to measure its social, cultural and economic impacts, however, will only progress by intensifying communication and cooperation between researchers and professionals. Improving tourism data at sub-national levels like cities may help to galvanize local action, highlight the performance of policies and programs, and drive investment and development projects.

For city tourism in Europe, the most important report on the performance of cities is the ECM Benchmarking Report, published by European Cities Marketing (ECM, 2014). This annual report represents the most comprehensive and regularly maintained source of information on the volume of urban tourism in Europe. The 2014 edition compares the tourism performance of 115 European cities, broken down into nine key source markets, and provides insights into market trends during the preceding 5 years (ECM, 2014). The report includes information on the growth of city tourism in Europe as measured by market volumes of official accommodation data collected by national and regional statistical offices. By providing the latest performance statistics, the report enables policy makers to benchmark the performance of their particular city and to make more objective evaluations of the development of tourism demand in their city.

The data which is included in the ECM Benchmarking Report stems out of the open data marketing information system TourMIS (www.tourmis.info), an online information and decision support system for tourism that compiles tourism statistics from European countries and cities. The system not only includes bednights, arrivals, and bed capacities data, but it also reveals trends in important markets. Users are able to compare the performance of cities based on bednights and arrivals, detect the seasonality of destinations, learn about the diversity of the guest mix at the destination, and apply different options for benchmarking destinations; all of which support strategic tourism decisions, planning, and the forecasting of demand.

A destination's sustainability is as important as its performance in terms of the number of arrivals or bednights, in order to stay competitive and to maintain visitor satisfaction in the longer term. According to UNEP and UNWTO (2005), sustainable tourism is defined as *"Tourism that takes full account of its current and future economic, social and environmental impacts, addressing the needs of visitors, the industry, the environment and host communities"* (pp.11-12). Sustainable tourism therefore considers not only environmental issues, but also societal and economic issues related to the host regions. Effective management of this growing industry requires the impacts of tourism across these three dimensions to be determined and measured, yet indicators for measuring the sustainability of destinations are still not clearly defined for the industry. The main reasons for not having a universal list of sustainability indicators are: (1) not having an agreed upon definition for sustainable tourism (Butler, 1999), and (2) the multivariate character of sustainability and the difficulty of retrieving the required information (Fernandez and Rivero, 2009).

Urban sustainable tourism in particular is an under-researched area according to Lu and Nepal (2009), who find that only 18% of the studies published in the Journal of Sustainable Tourism between 2003 and 2007 focus on urban tourism.

One of the primary challenges in making tourism sustainable is the difficulty of measuring sustainability at destinations, which in turn hinders decision making, effective management and the capacity to meet the needs of those destinations (Fernandez and Rivero, 2009). As emphasized by Tanguay et al. (2013), it is especially important for tourism destinations to have a minimum number of consistent indicators for assessing sustainable tourism. The reasons include avoiding using sustainability for manipulating marketing efforts, minimizing the risk of excluding important indicators to meet policy objectives, and encouraging compatible sustainable tourism strategies between different levels of government (Tanguay et al., 2013).

It is not just researchers that have identified this need;the development of indicators and metrics systems has also been identified as being of paramount importance by many tourism boards and international tourism organizations (Massieu, 2008; OECD, 2014). At the 1st City Tourism Summit on "Catalyzing Economic Development and Social Progress", held in Istanbul in November 2012, government officials and international networks determined that economic and social progress in city tourism must also ensure a sustainable development vision (UNWTO, 2012). Priority actions included (1) raising awareness of the economic and social impact of city tourism on national and local economies; (2) integrating urban tourism as a key pillar of government policy at all levels; (3) establishing effective and renewed instruments for partnerships among all stakeholders involved in tourism to ensure the exchange of information, initiatives and knowledge; (4) highlighting the importance of human capital and investment in professional training; (5) favoring measures to foster and recognize sustainable local policies and initiatives; (6) implementing innovative strategies to develop new products with high added value by addressing niche markets; and (7) upgrading the quality of the visitor experience, and advancing towards the concept of “Smart Cities” (UNWTO, 2012, p.49).

This article aims to make multiple contributions to several of the Istanbul objectives. Based on a comprehensive literature search, indicators for measuring the performance of city tourism policies are proposed that will increase awareness of the economic and social impacts of city tourism, and thereby improve the governance of city tourism development. Parallel to the sub-national initiatives by UNWTO, OECD, or Eurostat, TourMIS takes a bottom up, micro-level approach by focusing on measurements at the destination management organization level. Zooming into the city level allows one to discover and analyze a wealth of already existing information, which, it will be demonstrated, is more feasible and less time-consuming than introducing new approaches for sustainable development indicators through centralized nationwide proposals. Following a synthesis of various sustainable tourism indicators frameworks, the authors propose the application of data envelopment analysis (DEA) for benchmarking urban tourism destinations. The data included in the case study is provided by TourMIS, and findings comprise inefficiency scores which suggest both managerial and political implications. Furthermore, the concept of a virtual reference destination is introduced to assist managers and politicians to analyze their destination’s strength and weaknesses. The article ends with a discussion of the importance of benchmarking systems in tourism for fostering the development of comparable indicators in city tourism.

The Measurement of Destination Competitiveness

The most comprehensive research on destination competitiveness has been performed by Ritchie and Crouch, with their work on indicators and performance measurement appearing in multiple publications over a period of more than ten years (e.g. Ritchie and Crouch, 1993, 2005; Crouch and Ritchie, 1994, 1995, 1999, 2005; Ritchie et al., 2001). Ritchie et al. (2001), for example, develop a comprehensive list of indicators combining 'subjective consumer measures' and 'objective industry measures' for each of 32 destination competitiveness 'components'.

The Competitiveness Monitor initiated by the World Travel and Tourism Council (WTTC) that later became the Travel and Tourism Competitiveness Report, was the first practical initiative to transform the gargantuan compilation of competitiveness components by Ritchie and Crouch (2003) into a composite destination competitiveness index.

During the search for a composite destination competitiveness index, little attention has been paid by researchers to the aggregation method. Computing (unweighted or weighted) sums of the observed indicators is the simplest way of building compound 'indices' used in several approaches (Gooroochurn and Sugiyarto, 2005; Blanke and Chiesa, 2014). This is far from satisfactory as long as the weights lack theoretical justification. As such, the majority of destination competitiveness models appear to be systems of definitional rather than cause-effect relationships. Enright and Newton (2005) at least aim to determine the relative importance of tourism indicators by incorporating direct expert judgments of the importance of 15 attractors and 37 business factors determining the relative tourism competitiveness of Hong Kong, Singapore and Bangkok. A more advanced model was introduced by Crouch and Ritchie (2005) and Crouch (2011) who applied the eigenvector method for indirectly judging destination competitiveness criteria.

Mazanec et al. (2007) raise a number of criticisms regarding the epistemological nature of definitional models of destination competitiveness and consequently propose a moderately revised latent variable model for transforming the WTTC Competitiveness Monitor into an explanatory model. The authors find that neither the tourism related factors 'tourism price competitiveness' and 'tourism related infrastructure' nor the more loosely associated dimensions of 'environmental preservation' and 'openness' were confirmed as factors contributing to overall destination competitiveness, as defined by market share and market growth indicators. From the eight dimensions originally proposed under the WTTC framework, only two sub-fields remained: the education ('human resources') and the economic wealth ('social') index. Without adding the 'heritage and culture' component (represented by the number of UNESCO heritage sites per country) the entire model performed poorly. This study led to a number of questions, such as: should external criteria for destination competitiveness be characterized as indicators, or considered to be effects within the overall causal chain? And how should tourism destination policy makers decide which destinations to consider as tough competitors?

Many other authors have also proposed sustainability indicators (Dwyer and Kim, 2003; Dwyer et al., 2004; Enright and Newton, 2004, 2005), but none of them have been adjusted to the particular needs of city tourism. For instance, Miller (2001) conducted a Delphi study to identify sustainability indicators in tourism. The suggested indicators ranged from environmental issues to policy, employment, financial leakages, and customer satisfaction. Also based on a Delphi study, Choi and Sirakaya's (2006) research into sustainability indicators for community tourism identified 125 indicators across political, social, ecological, economic, technological, and cultural dimensions. However, the results from these two studies show that there is no agreement among tourism researchers regarding which indicators are appropriate for evaluating sustainability in tourism.

Sustainable tourism development research lacks a common set of indicators with standardized measurement procedures, since the indicators employed vary from one destination to another (Ko, 2005). Despite recognizing the importance of comparability, Ko (2005) nevertheless suggests that individual destinations choose which indicators to apply for measuring sustainability, which leaves the door open for different interpretations by different destinations. The implication of this advice is the application of varying sets of indicators from one destination to another, yielding measurements which cannot be meaningfully compared. To address this issue, Cernat and Gourdon (2012) suggest a methodological framework – the Sustainable Tourism Benchmarking Tool (STBT) - that can be used to create sustainable tourism benchmarks. STBT has seven dimensions (assets, activities, linkages, leakages, sustainability, attractiveness, infrastructure), which include 54 indicators ranging from the number of tourist arrivals and tourist expenditures to CO_2 emissions and the ratio of tourism to locals. The study indicates that STBT methodology was useful in three case studies: Indonesia, Malaysia and Thailand. However, the universal applicability of this tool is questionable due to data availability. If a destination wants to measure and benchmark its sustainability efforts, then the widespread availability and maintenance of data for these 54 indicators is necessary. This challenge is amplified by the fact that these indicators draw on a variety of different data sources which may not be available for all destinations.

Many different organizations have been involved in the development of alternative sets of sustainability indicators, some of which include the European Environment Agency (EEA), United Nations Environment Program (UNEP), United Nations Development Program (UNDP) and The World Bank, WTO (World Tourism Organization), and European Commission. One example is the European Tourism Indicator System (ETIS) developed by European Commission that aims to help destinations to monitor and measure sustainability, which in return can help destinations to generate more economic benefits, improve destination management and increase visitor satisfaction (Marzo, 2014). ETIS is an ambitious initiative for creating a common understanding of sustainable destinations and for measuring sustainability at the destination level.

The various proposals initiated by different organizations generally feature significant overlaps in terms of the objectives sought, with some peculiarities in terms of the indicators recommended. Based on previous literature, potential objectives for city tourism policy makers are shown in Table 1, as well as indicators for their measurement. These objectives and indicators are categorized as economic, social or environmental, in line with the recognized dimensions of sustainability. In addition, Table 2 shows the resources which represent inputs into tourism processes and are categorized as capital, land or labor.

Tables 1 and 2 here

Previous research has identified a variety of sustainability indicators; however, although these indicators are scientifically relevant, they are too complex to be operational due to the lack of data or human resources to collect the data. This study is not concerned with identifying new indicators, but rather with using the commonly accepted indicators for measuring sustainability efforts of city destinations by applying the well-known data envelopment analysis (DEA) methodology. Thus, to form a partial model of urban destination competitiveness based on the previously accepted indicators.

DEA is a non-parametric technique that measures the relative efficiency of Decision Making Units (DMUs) which are assumed to have the same objectives; a few examples of DMUs include banks, hotels, travel agencies, hospitals, and destinations (Bauernfeind and Mitsche, 2008; Wöber, 2002). DEA is primarily described as "…a method for performance evaluation and benchmarking against best-practice" (Cook et al., 2014, p.1). What makes this method particularly interesting is the fact that multiple input and output variables can be processed, irrespective of the units of their measurement, without having any a priori information about the importance of the individual variables (Herrero and Salmeron, as cited in Bauernfeind and Mitsche, 2008; Wöber and Fesenmaier, 2004).

Its popularity is evident from even a brief glimpse at the comprehensive bibliography section at the DEAzone, a webpage fully devoted to DEA methodology that outlines its origins, various models, terminology, application areas, courses, etc. (Emrouznejad, 1995-2012). Within the tourism and hospitality domain, DEA has been applied widely in studies concerning hotels (evaluation of hotel general managers´ performance by Morey and Dittman, 1995; hotel productivity by Johns et al., 1997; Internet marketing strategies in the Greek hotel sector by Sigala, 2003), corporate travel management (Bell and Morey, 1994), destinations (competitiveness of 103 Italian regions by Cracolici et al., 2008; sustainable tourism management of 20 Italian regions by Bosetti et al., 2006; tourism advertising programs in the US by Wöber and Fesenmaier, 2004; marketing strategies of European museums by Remich, 2002), tourism website evaluations (Bauernfeind and Mitsche, 2008), travel agencies (Köksal and Aksu, 2007), to name a few examples of its application areas.

Taking the above information into account, the purpose of applying DEA to benchmarking urban tourism destinations in the current study was therefore twofold: (1) the identification of efficient and inefficient cities (DMUs), and (2) the proposal of benchmarking partners and virtual reference or the inefficient ones.

The Tourism Management Information System TourMIS – A Partial Model

TourMIS is a tool for exchanging data, information and knowledge not only for tourism associations like European Cities Marketing and the European Travel Commission, but also for students, researchers, journalists, and anybody interested in the development of tourism on national or sub-national levels (Wöber, 2003). Like in other social media applications, the data in TourMIS is not entered by a single authority or organization, but collaboratively by qualified tourism experts from various destinations. Similar to Wikipedia, the quality of the data presented in TourMIS is maintained by the feedback and responses of all users visiting the system. According to the self-reported statistics available on TourMIS, the system has more than 20,000 registered users, of whom approximately 60% are working in the tourism industry. Free access to data and the integration of tools and automatic reports allow users to apply and understand scientific concepts, methods and models, which normally would be difficult to access.

TourMIS provides a huge number of tools which support managers not only for monitoring their competitiveness, but also for strategic tourism planning (Mazanec and Wöber, 2010). The system provides support for calculating and monitoring market volumes and market shares, for measuring and benchmarking seasonality, for identifying and understanding guest mix problems of destinations, and for forecasting tourism demand.

Figure 1 here

TourMIS also includes an interface for cities that want to participate in an interregional comparative visitor survey, which provides much more valuable insights than just a single, unstandardized visitor survey. TourMIS users also share information on the number of visitors to important attractions and sights, and the system provides tools that monitor and evaluate the relationship between the general demand for tourism and the number of visitors to cultural attractions. New features in TourMIS provide city tourism managers with the opportunity to analyze and compare the performance of their website and to gain knowledge on the relationship between demand for online travel information and the actual tourism demand to their destination.

In addition to the above mentioned features of TourMIS, there are indicators that can be used for measuring the sustainability of destinations, such as the seasonality index. Specifically, 6 indicators were modeled in the DEA framework of the current study, as shown in Figure 2 below.

Figure 2 here

Decision on the choice of destination-oriented indicators was made with respect to data availability and previous research as shown in Tables 1 and 2, when attempting to have all dimensions of sustainability (economic, environmental, and social) represented in the analysis. In more detail, 2 input variables were used: bed capacities (controllable variable) and estimated number of attractions (natural + cultural, uncontrollable variable). Input variables are classified as either controllable or uncontrollable depending on if they are under control of the decision makers or not (Anderson et al., 2008; Wöber and Fesenmaier, 2004). In terms of type, both of these are capital indicators, whilst attractions can additionally be labeled as a land indicator, as the data include natural as well as cultural attractions. On the output side, 4 indicators were used: (1) total foreign bednights (economic); (2) average % change in total foreign bednights between 2009 and 2014 (economic); (3) seasonality based on total foreign and domestic bednights (economic/ environmental/social); and lastly, (4) density (environmental). In the authors' view, density could also be argued to relate to the social dimension, as more visitors per unit area will have a higher impact on the host community.

The classification of each indicator was performed according to the information in Tables 1 and 2. The number of variables (2 inputs and 4 outputs) used in the current model is far from exhaustive, hence the partial rather than holistic model. What is important though is that the proposed model embraces all dimensions of the sustainability paradigm, whilst using the previously accepted metrics. All data used in the current analysis are from 2009 and stem out of TourMIS, with the exception of the estimated number of natural and cultural attractions (figures collected by contacting city tourism organizations directly).

The final sample for the case study included 27 European cities, selection of which was made solely on the data availability for all 6 indicators (thus, no missing values in the dataset). A list of the cities that formed part of the study is shown in the second column of Table 4, which summarizes the main findings of DEA. The number of DMUs in the study sample (27) also meets the "rule of thumb" principle that number of DMUs should be twice (or even three times) the sum of inputs and outputs used in the study (Cook et al., 2014).

The process of DEA modeling employed an output-oriented BCC radial model as the aim was ultimately to improve the outputs, whereas input values remain constant (Scheel, 2000). Hence, as DEA maximizes all output measures in the output-oriented model, reciprocal values were used for seasonality and density in the current model, as these are the variables that should ideally be minimized, whereas opposite holds true for remaining two output variables. Further, Efficiency Measurement System (EMS) software version 1.3 was used for all DEA computations due to number of advantages this non-commercial software provides: free for academic users, various models and features, inclusion of uncontrollable variables, single summary table of results, etc. (Scheel, n.d.; Barr, 2004).

Findings

A brief look into descriptive statistics reveals heterogeneity among the cities on all 6 indicators used in the current study, which is not surprising when taking into account the varying sizes of cities that were represented in the sample. When it comes to seasonality and density indicators, actual numbers are shown, whilst reciprocal values were used in the computations of efficiency scores, for the reasons mentioned previously. Descriptive results are detailed in Table 3 below.

Table 3 here

Table 4, below, summarizes the DEA results. This table is sorted by the efficiency score for each city (column 3). The fourth column provides suggestions for benchmarking partners and their associated weights for every inefficient city, whereas for each efficient city the column indicates the number of other cities for which that unit is proposed as a benchmarking partner.

Table 4 here

The results show that 10 cities were inefficient, while remaining 17 were efficient based on the given input/output combination. More specifically, the most inefficient city was Bratislava (37.22% inefficient), followed by Dresden (34.79% inefficient) and Helsinki (30.42%). As this is an output-oriented model, the aforementioned percentages represent the extent to which each of the three cities has the potential to improve at least one of its output values with their given resources. In case of Bratislava, five benchmarking partners have been proposed as the best practice examples; however, when looking into the corresponding allocation of weights, this city should look primarily toward the performance of Vilnius, as it has the highest weight allocated (0.39). Further, four benchmarking partners have been proposed for Dresden, the most important being Turin (weight of 0.54), whereas Ljubljana (0.36) was identified as the most important point of comparison for Helsinki. The best performer of the inefficient cities, based on the given input/output combination, was Copenhagen (6.19%) and one could argue that this is a case of only marginal inefficiency. Nevertheless, four benchmarking partners have been identified for this city, the most relevant again being Ljubljana (weight of 0.43).

One strategy adopted in DEA to address problems of incomparability of individual units is to merge potential benchmark units into a composite unit (frequently referred to as *virtual unit*) according to their allocated weights. In calculation of the virtual references it is understood that such a virtual or composite unit is the result of merging individual potential partners according to the assumption that the resulting composite represents a feasible solution for the unit under evaluation (Wöber and Fesenmaier, 2004). In this particular case study, such a reference city was defined for Bratislava (the most inefficient city) through the linear combination of its 5 referenced peers: Antwerp, Barcelona, Gijon, Turin, and Vilnius, according to the corresponding weights of 0.18, 0.04, 0.37, 0.02, and 0.39 respectively. This result is shown in Table 5 below.

Table 5 here

It is evident that one of Bratislava´s input values (bed capacities) is higher than that of its virtual reference, whereas when it came to the uncontrollable variable, attractions, the values of Bratislava and its virtual reference were equal. However, differences were apparent when it came to all four output values. First, seasonality and density figures of both Bratislava and its virtual benchmark were converted back to the original scale after computations. It is apparent that in both cases Bratislava had higher figures compared to its virtual reference. Lower seasonality figures imply that visitor arrivals to the city are spaced throughout the year – a goal that many destinations aim to achieve. In addition, lower density values indicate a lower visitor to resident ratio. On one hand, higher density translates into more visitors (more arrivals, more bednights, more money spent at the destination, etc.), which yields economic benefits for the destination; however, from the environmental and social point of view, any increase in density may not be considered as optimal since it can cause crowding in specific areas and lower resident satisfaction.

Further, the performance of Bratislava is striking with respect to the remaining two output metrics. In 2009, the city was underperforming in regards to total foreign bednights (72.88% of its virtual reference) and average % change in total foreign bednights between 2009 and 2014 (72.83% of its virtual reference). This evidence suggests that Bratislava is not utilizing its resources efficiently, and that with the given inputs it has potential to improve its outputs up to the values suggested by its virtual reference, as shown in Table 5.

Regarding the efficient cities, the DEA reported ´big´ under their efficiency scores for three cities (Ljubljana, Malmö and Turku), which indicates infeasible solutions arguably due to their extremely high efficiency results (Boljuncic, as cited in Wöber and Fesenmaier, 2004). Of the efficient cities with numerical scores, it is evident that Barcelona was the most efficient, closely followed by Paris and Turin. What is also interesting to observe is that while both Barcelona and Graz are considered to be efficient cities, Barcelona outperforms Graz by 57.67% based on the six sustainability indicators used in this study. In terms of benchmark appearances, Barcelona and Turin are the leaders as they are each identified as reference cities for seven other cities in the sample, followed by Ljubljana (reference for six cities), and Vilnius (reference for five cities). Four cities did not appear as benchmarks at all. Hence, these cities were not considered to be examples of best practices, despite being efficient themselves.

Conclusions

In this case study, an attempt was made to run DEA using data from TourMIS relating to the three dimensions of sustainability. Results, in spite of evaluating the performance of cities at one moment in time (2009), still point toward a number of managerial and political implications for city tourism policy makers. A number of best practices examples are proposed for each of the inefficient cities in order to inform and improve their performance. In other words, policy makers may investigate how these cities use their resources in order to reach their objectives and thus learn how to optimize their own performance. Each of the proposed benchmarks has a weight allocated, which reveals the importance of that benchmarking partner for the inefficient unit. Although there is no such thing as a universal best practice for all cities based on a given input/output combination, it is very much apparent which of the efficient cities were absolute winners when it came to their number of appearances as benchmarks, so one could argue that they come as close as possible to being labeled as THE best practices.

Further, the concept of virtual reference that was calculated for the most inefficient unit in the sample, Bratislava, can be of help to the city tourism organizations in order to analyze the strengths and weaknesses of their destinations. For instance, it is apparent that Bratislava must deploy its given input variables more efficiently if it is to boost its output values – and also that it has potential to do so. Again, a word of caution is in order, as the analysis for this case study was made only for one year, and results as such, may not be generalizable for the individual destinations. This is to say that even though Bratislava was inefficient in 2009, that does not automatically mean that it is still inefficient in 2015. In order to overcome this limitation, future research should orientate towards a longitudinal study which monitors how the performance of the same cities has changed over time whilst using the same input/output combination. The same sample and variables are needed for consistency reasons if one is to monitor changes in efficiency scores over time in order to propose lessons for each city. DEA results may change entirely if there are any alterations either in the sample or in variables (or in both), which happens to be one of the major limitations of DEA that must be taken into account (Bauernfeind and Mitsche, 2008). Another future research path to take would be to look into sustainability indicators that stem from the alternate sources and cover all three sustainability dimensions, run DEA on the same sample, and compare the findings between the two studies. However, this remains very much subject to data availability.

This study shows that applying DEA to TourMIS data for calculating efficiency scores for cities yields valuable information for tourism decision makers to enhance their destinations in various ways. Although sustainability indicators were used to measure efficiency in the study, TourMIS has many more indicators that can be used for benchmarking destinations and for improving destination management. The core advantage of this approach is that TourMIS is a system which already has many indicators that are available to its registered users without any fee.

Given recent trends, it appears reasonable to assume that city tourism will continue to grow in terms of market share. In this context, tourism boards need to take environmental and social objectives in tourism policy and research related to the evaluation of multiple objective situations more seriously. Professional networks in tourism on all regional levels must go beyond marketing and branding, to emphasize responsible tourism and strengthen the link between the various stakeholders in their destinations. By raising awareness of the economic, environmental and social impacts of city tourism, cities will lead the way in supranational tourism policy.

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Tables

Objectives	Indicators	Type	References
Competitiveness (max)	bednights, arrivals, tourism revenues, value added (absolute values or market shares)	economic	Wöber (1997), UNWTO (2014), EU (2013)
Growth (max)	bednights, arrivals, tourism revenues, value added (changes of values or market shares)	economic	Wöber (1997), UNWTO (2014)
Tourism supply chain (max)	% of value added by local tourism enterprises	economic	EU (2013)
Market risks (min)	guest mix distribution	economic	Wöber (1997)
Satisfaction of visitors (max)	overall, repeat visitor rate/intention (survey)	economic, social	Kozak (2004)
Use of resources (max)	occupancy rate	economic, environmental	Wöber (1997), EU (2013)
Seasonality (min)	distribution of demand	economic, environmental, social	EU (2013)
Emissions during arrival and departure (min)	CO2 for travelling to/from the city, mix of modes of transportation of guests, average distance of travelers, average length of stay	environmental	UNWTO (2014), EU (2013)
Emissions during stay (min)	CO2 emissions in the city	environmental	UNWTO (2014), EU (2013)
Energy use (min)	Consumption of non-renewable energy per tourist night	environmental	EU (2013)
Water consumption (min)	volume of fresh water consumed by tourists	environmental	UNWTO (2014)
Waste (min)	volume of solid waste generated by tourists	environmental	UNWTO (2014), EU (2013)
Congestion and intrusion (min)	tourism density rate, percentage of same day visitors to total number of visitors to the city	environmental	UNWTO (2014), EU (2013)
Employment (max)	tourism employment rate	social, economic	UNWTO (2014), EU (2013)
Equal opportunity of tourism enterprises (max)	distribution of bedspaces	social, economic	EU (2013)
Satisfaction of employees (max)	overall (survey)	social, economic	
Satisfaction of residents with tourism (max)	overall (survey)	social	UNWTO (2014), EU (2013)

Table 1: Potential objectives and indicators (output factors) for city tourism policy makers

Resources	**Indicators**	**Type**	**References**
Size	square kilometers, population	land	UNWTO (2014)
Climate	# of sunny days, # of days >20 degree Celsius	land	Ritchie et al. (2001)
Natural resources	% of green spaces (designated protection) in the city, # and distance to recreational areas (e.g. sea, lakes, mountains)	land	Ritchie et al. (2001), EU (2013), Blanke and Chiesa (2014)
Accessibility and mobility	distance to main travel markets weighted by size/importance, # of connections by airlines; time x price to the airport by public transportation; density of inner city public transportation system; percentage of public transportation stops accessible for people with disabilities	land, capital	Ritchie et al. (2001), Wöber and Fesenmaier (2004), Mazanec et al. (2007), EU (2013), Blanke and Chiesa (2014)
Governance	total budget of local tourism organization, total investment in public infrastructure, safety and health; openness of country	capital	Ritchie et al. (2001), Wöber and Fesenmaier (2004), EU (2013), Blanke and Chiesa (2014)
Capacity of primary tourism infrastructure	# of accommodation establishments, bedspaces	capital	Ritchie et al. (2001), UNWTO (2014), Blanke and Chiesa (2014)
Quality of primary tourism infrastructure	% of capacity in 4 or 5 star categories, investments made by the private tourism sector during the last 3 years in % of total capital of the sector	capital	Ritchie et al. (2001), Blanke and Chiesa (2014)
Cultural resources	# of cultural attractions, # of UNESCO sites, # of major events/festival days per year	capital	Ritchie et al. (2001), Blanke and Chiesa (2014)
Resources of the meetings industry	total conference center capacity, conference capacity of accommodation providers	capital	Ritchie et al. (2001)
Shopping facilities	# of shops of touristic interest, # of shopping hours per year	capital	Ritchie et al. (2001)
ICT infrastructure	# of free wifi spots in the city, average bandwidth of free wifi spots, online presence of destination and its touristic offer	capital	Blanke and Chiesa (2014)
Prices of tourist services	consumer prices (of tourism goods), currency exchange rates, purchasing power parity index	capital	Ritchie et al. (2001), EU (2013), Blanke and Chiesa (2014)
Human resources	average number of years of education and/or professional experience of people working in the tourism sector	labor	Ritchie et al. (2001), Blanke and Chiesa (2014)

Table 2: Potential resources (input factors)

Inputs	Maximum	Minimum	Mean	Standard deviation
Bed capacities	152618	4114	28060,26	34821,31
Estimated number of attractions (natural + cultural)	9155	20	562,56	1860,40
Outputs				
Seasonality (total foreign and domestic bednights)	0,24	0,07	0,14	0,05
Density	15,16	1,84	6,42	3,88
Total foreign bednights	21693993	69872	2835253,70	4560233,39
Average % change in total foreign bednights between 2009 and 2014	16,60	-4,29	4,71	4,27

Table 3: Descriptive statistics of the indicators used in the DEA model

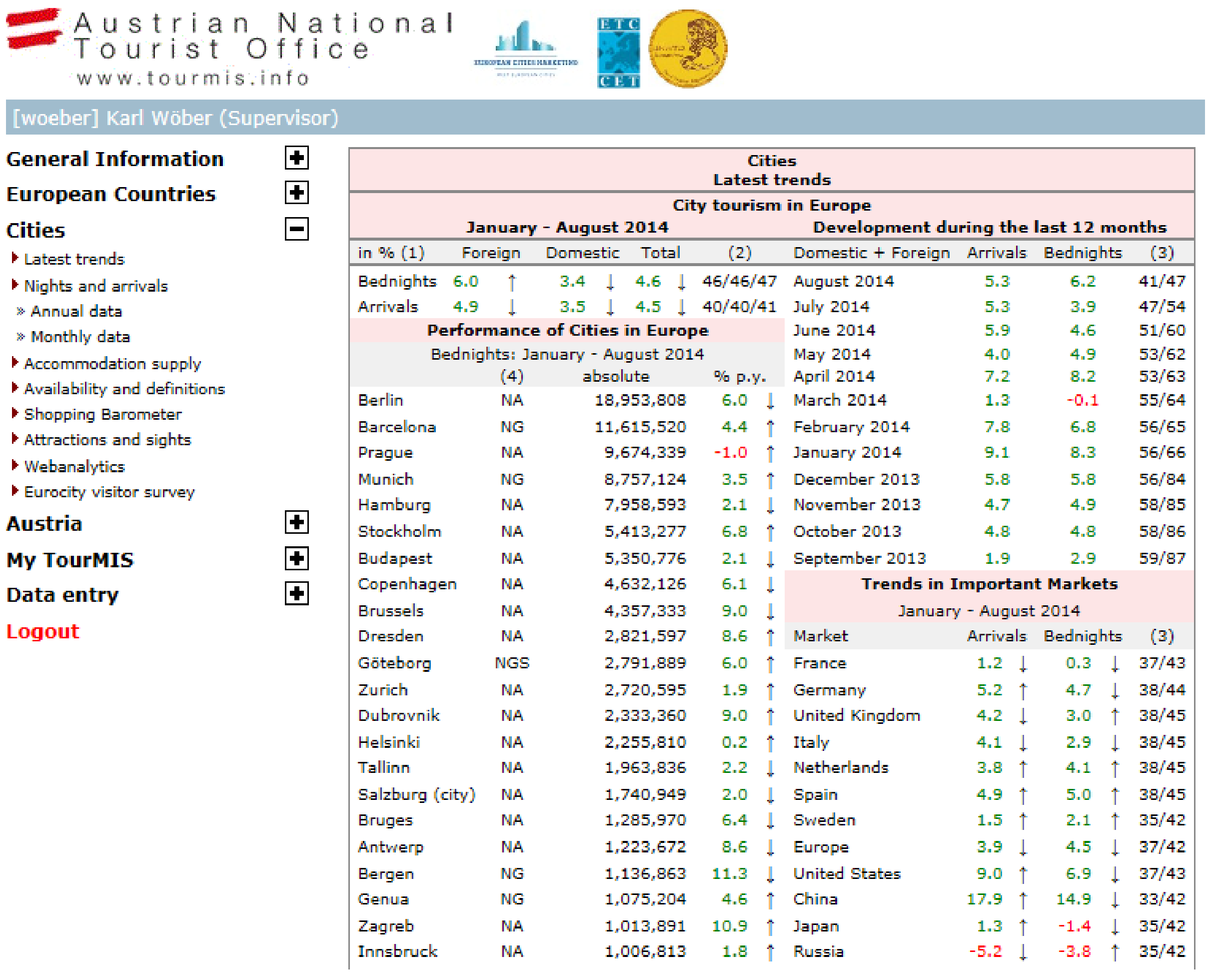
	City	Score	Benchmarks & Weights (Ineff.) / Benchmark Appearance (Eff.)
Inefficient DMUs			
4	Bratislava	137,22%	1 (0,18) 2 (0,04) 9 (0,37) 23 (0,02) 26 (0,39)
7	Dresden	134,79%	2 (0,02) 15 (0,31) 23 (0,54) 26 (0,13)
13	Helsinki	130,42%	1 (0,12) 2 (0,08) 15 (0,36) 21 (0,10) 27 (0,34)
18	Munich	125,11%	2 (0,49) 19 (0,03) 21 (0,30) 23 (0,18)
20	Salzburg	115,25%	2 (0,13) 8 (0,62) 17 (0,25)
5	Bruges	114,54%	1 (0,00) 15 (0,34) 16 (0,34) 27 (0,32)
3	Berlin	111,48%	19 (0,37) 23 (0,63)
22	Tallinn	108,24%	15 (0,64) 23 (0,08) 25 (0,16) 26 (0,11) 27 (0,00)
14	Lisbon	107,90%	2 (0,24) 15 (0,26) 23 (0,17) 25 (0,22) 26 (0,10)
6	Copenhagen	106,19%	2 (0,29) 15 (0,43) 23 (0,17) 26 (0,12)
Efficient DMUs			
10	Graz	94,96%	0
25	Vienna	94,38%	2
11	Hamburg	93,97%	0
16	Lucerne	92,11%	1
8	Ghent	87,76%	1
12	Heidelberg	86,08%	0
27	Zurich	78,07%	3
26	Vilnius	75,61%	5
9	Gijon	72,75%	1
1	Antwerp	67,65%	3
21	Stuttgart	59,78%	2
23	Turin	54,72%	7
19	Paris	44,36%	2
2	Barcelona	37,29%	7
15	Ljubljana	big	6
17	Malmö	big	1
24	Turku	big	0

Table 4: Main findings of DEA

Inputs	Bratislava	Virtual reference	Difference
Bed capacities	12086	11384	702
Estimated number of attractions (natural + cultural)	150	150	0
Outputs			
Seasonality (total foreign and domestic bednights)	0,20	0,14	0,06
Density	3,11	2,27	0,84
Total foreign bednights	707272	970503	-263231
Average % change in total foreign bednights between 2009 and 2014	2,60	3,57	-0,97

Table 5: Virtual reference for Bratislava

Figures


Austrian National Tourist Office
www.tourmis.info

[woeber] Karl Wöber (Supervisor)

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City tourism in Europe

January - August 2014

in % (1)	Foreign		Domestic		Total		(2)
Bednights	6.0	↑	3.4	↓	4.6	↓	46/46/47
Arrivals	4.9	↓	3.5	↓	4.5	↓	40/40/41

Development during the last 12 months

Domestic + Foreign	Arrivals	Bednights	(3)
August 2014	5.3	6.2	41/47
July 2014	5.3	3.9	47/54
June 2014	5.9	4.6	51/60
May 2014	4.0	4.9	53/62
April 2014	7.2	8.2	53/63
March 2014	1.3	-0.1	55/64
February 2014	7.8	6.8	56/65
January 2014	9.1	8.3	56/66
December 2013	5.8	5.8	56/84
November 2013	4.7	4.9	58/85
October 2013	4.8	4.8	58/86
September 2013	1.9	2.9	59/87

Performance of Cities in Europe

Bednights: January - August 2014

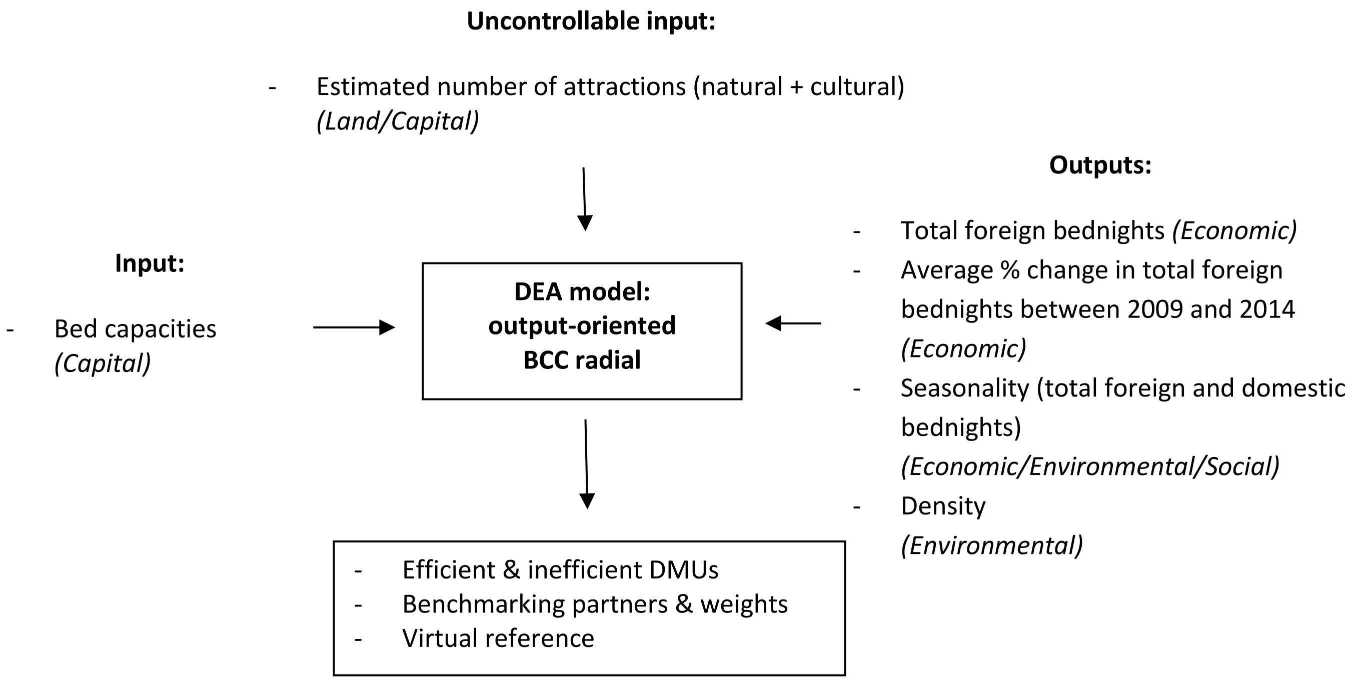
	(4)	absolute	% p.y.	
Berlin	NA	18,953,808	6.0	↓
Barcelona	NG	11,615,520	4.4	↑
Prague	NA	9,674,339	-1.0	↑
Munich	NG	8,757,124	3.5	↑
Hamburg	NA	7,958,593	2.1	↓
Stockholm	NA	5,413,277	6.8	↑
Budapest	NA	5,350,776	2.1	↓
Copenhagen	NA	4,632,126	6.1	↓
Brussels	NA	4,357,333	9.0	↓
Dresden	NA	2,821,597	8.6	↑
Göteborg	NGS	2,791,889	6.0	↑
Zurich	NA	2,720,595	1.9	↑
Dubrovnik	NA	2,333,360	9.0	↑
Helsinki	NA	2,255,810	0.2	↑
Tallinn	NA	1,963,836	2.2	↓
Salzburg (city)	NA	1,740,949	2.0	↓
Bruges	NA	1,285,970	6.4	↓
Antwerp	NA	1,223,672	8.6	↓
Bergen	NG	1,136,863	11.3	↓
Genua	NG	1,075,204	4.6	↑
Zagreb	NA	1,013,891	10.9	↑
Innsbruck	NA	1,006,813	1.8	↑

Trends in Important Markets

January - August 2014

Market	Arrivals		Bednights		(3)
France	1.2	↓	0.3	↓	37/43
Germany	5.2	↑	4.7	↓	38/44
United Kingdom	4.2	↓	3.0	↑	38/45
Italy	4.1	↓	2.9	↓	38/45
Netherlands	3.8	↑	4.1	↑	38/45
Spain	4.9	↑	5.0	↑	38/45
Sweden	1.5	↑	2.1	↑	35/42
Europe	3.9	↓	4.5	↓	37/42
United States	9.0	↑	6.9	↓	37/43
China	17.9	↑	14.9	↓	33/42
Japan	1.3	↑	-1.4	↓	35/42
Russia	-5.2	↓	-3.8	↑	35/42

Figure 1: Screenshot of TourMIS (www.tourmis.info)



Source: Authors' own elaboration from Bauernfeind and Mitsche (2008, p.250).

Figure 2: Proposed DEA model