A practical forecasting method for a tourism organization

Session 1: Measuring the flows of visitors

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SUMMARY

Tourism is a complex system as is the socio-economic system denoted as tourism destination, considered today an essential unit of analysis for the understanding of the whole sector. Probably the most important result of this vision is the claimed impossibility to predict fully the dynamic evolution of the system. As most scholar and practitioners know, forecasting, in the tourism area, is a complicated and difficult activity. As well highlighted in the literature, even the most sophisticated methods fail in giving exceedingly reliable results. Furthermore, the effective use of them requires good experience and a sound knowledge of the mathematical techniques.

From a practitioner point of view these are, in many occasions, obstacles difficult to overcome. What would be needed is some Objective of this paper is to present a case in which, by combining both quantitative and qualitative methods, a fast and easy to use method is devised. The results show the possibility to predict, for a reasonable time span, the quantities of interest (tourist arrivals), with an accuracy sufficient to draw scenarios which may help in the decision or planning process.

1. Introduction

Tourism is a complex system as is the socio-economic system denoted as tourism destination, considered today an essential unit of analysis for the understanding of the whole sector. Its behaviour can be well considered to be in that ideal region between a completely ordered conduct and a completely disordered one which has been also called the edge of chaos. This idea has been intuitively with us for a long time. However, only in the last years a group of scholars has considered the system, with a different point of view than usual (Baggio, 2008; Farrell & Twining-Ward, 2004; Faulkner & Russell, 1997, 2001; McKercher, 1999). A linear deterministic description has been deemed largely insufficient to explain the behaviour of a system whose components interact in so many different ways. This is even more noticeable when considering the dynamic behaviour. It is quite impossible to explain in simple terms why for some cases the system is able to resist huge external shocks (natural disasters, for example) or some similar system can be disrupted after an avalanche created by some seemingly insignificant event. It is difficult to understand why the action of some entrepreneur can act as a catalyst for incredible socio-economic growths in some cases, while in other situations similar behaviours do not have any recognisable effects. These motivations are those cited by the scant but growing and important literature on the subject.

Probably the most important result of this vision is the claimed impossibility to predict fully the dynamic evolution of the system (Doran, 1999; Linstone, 1999). As most scholar and practitioners know, forecasting, in the tourism area, is a complicated and difficult activity. It is, though, an important endeavour which has attracted countless studies. Usually, the unit of analysis is the number of tourist arrivals (or overnight stays), predicted by examining an historical time series and employing mathematical and statistical analysis procedures (Song & Li, 2008; Witt & Witt, 1995).

However, as well highlighted in the literature, even the most sophisticated methods fail in giving exceedingly reliable results (Tideswell et al., 2001). Furthermore, the effective use of them requires good experience and a sound knowledge of the mathematical techniques. It is also difficult to choose the most suitable one, as similar methods give different results in different conditions or environments (Papatheodorou & Song, 2005), or even depend on country-specific cultural values or management practices (Wackera & Sprague, 1998).

Finally, no single forecasting method outperforms the others, and, in order to improve accuracy, different methods are often combined even if the results also vary with the combination techniques used (Ashton & Ashton, 1985; Newbold & Granger, 1974; Smeral, 2007).

From a practitioner point of view these are, in many occasions, obstacles difficult to overcome. What would be needed is some fast and easy to use method to predict, for a reasonable time span, the quantities of interest (tourist arrivals), with an accuracy sufficient to draw scenarios which may help in the decision or planning process.

Objective of this paper is to present a case in which, by combining both quantitative and qualitative methods, this need has been satisfactorily addressed: the Vienna Tourism Indicator (VTI).

The project has been carried out by Schloß Schönbrunn Kultur - und Betriebsges. m.b.H. (SKB), the organization managing the Schönbrunn Palace, supported by Bocconi University, Milan and Wirtschaftsuniversität, Vienna. The project aimed at evaluating the short-term development of tourism in Vienna in order to provide the tourism sector with timely and reliable information.

2. Vienna and the Schönbrunn castle

The city of Vienna is one of Europe's most attractive destinations. The "Greater Vienna" records some 9.7 million overnights a year, with some 4.2 million arrivals. The annual economic contribution generated by tourism amounts to over 3.7 billion euros. This corresponds to about 6% of Vienna's gross regional product, and more than 15% of the whole Austria (VTB, 2008).

The Schönbrunn Palace is one of the most important cultural monuments in Austria, since 1996 it is part of the UNESCO World Cultural Heritage Sites. It is one of the major tourist attractions in Vienna, receiving some 2.6 million visitors per year (VTB, 2008).

3. Background and methods

Even if it has been stated the impossibility to make correct long-term predictions for a complex system, we may still use the methods devised so far to attempt a forecast, with the only limitation of not extending it too far in time. The underlying hypothesis, never declared but implicitly assumed in almost all of the forecast works, is that, for limited amounts of time, a complex system, unless it experiences a very big shock, has a kind of inertia which pushes it along a temporarily stable evolutionary path (Arthur et al., 1997; Lewin, 1999; Waldrop, 1992).

The basis for the set-up of consistent and reliable forecasting models is a thorough knowledge of all the aspects that can influence the course of tourism activities in an area (Antonioli Corigliano, 2000). Moreover, a sound modelling of a tourism district (see for example Antonioli Corigliano, 1999a, 1999b) can help providing a basis for the interpretation of the different phenomena.

Forecasting has been so far approached in two ways: quantitative and qualitative. Although, as said above, a time series quantitative forecast may be quite refined, it still shows areas of uncertainty (Chatfield, 1996; Davies, 2003; Hamilton, 1994). The main issue is an oversimplification of the parameters defining the system and the lack of consideration of extraordinary events or other exogenous elements that influence the development of tourism (Frechtling, 1996).

On the other hand, a qualitative method, typically based on experts' opinions, is able to predict future behaviours and outcomes through the capability to 'read' the market. Such methods rely on the subjective judgement of the interviewees, who can be strongly biased, and, obviously, are able to provide only 'hints', without any numeric indication (Uysal & Crompton, 1985). As much literature states, one possible solution is to combine the two approaches thus compensating their weaknesses and reinforcing their predictive powers (Davies, 2003; Faulkner & Valerio, 1995).

This is the approach taken in the case of VTI. The first step in the implementation is the analysis of a time series containing arrivals of tourists at the destination (Vienna). This has always been considered to be an indicator of the health of the destination and of its growth.

The quantitative analysis was kept quite simple and employed a basic time series decomposition method. As argued by many authors, simple methods may often outperform more complex ones and provide similar accuracy while being more effective in both time and cost (Athiyaman & Robertson, 1992; Chen et al., 2008; Smeral, 2007; Witt & Witt, 1992). Some researchers (see for example Faulkner & Valerio, 1995) even argue that using highly sophisticated statistical approaches can be detrimental for the planning as such methods tend to turn practitioners away from the forecasting process, and "… in the strategic planning context, many practitioners have lost sight of the suggestion that the process of forecasting is as important as the outcome. Accordingly, a method that actively engages decision makers in the forecasting exercise can contribute more to the broader strategic planning process than one that does not" (Tideswell et al., 2001: 163).

The approach chosen for the VTI is similar to the one advocated by authors such as Frechtling (1996) or Tideswell (2001). It consists of a combination of basic statistical time series prediction with the evaluation of the opinion of a panel of experts in a quasi-Delphi process.

The forecast is produced every six months. The quantitative component is based on a simple econometric model using a time series of monthly tourism arrivals. Technically, a simple decomposition method is implemented with a spreadsheet application in order to ease the process of analysis. The forecast extends for the six months following the date of publication. An overall forecast is then derived by considering the outcomes of a qualitative investigation and averaging both predictions.

A panel of tourism experts was chosen. It consists of 70 people, mainly travel agents and tour operators from several countries having Vienna as one of the major destination. They agreed to take part in the (recurring) survey. An email questionnaire asks them to evaluate, on a scale from 0 (much worse) to 200 (much better), the performance and the course of their outgoing market for a six months time span. Questions look like:

- what is your assessment of the tourism performance of tourists who came to Vienna in the past six months compared to what you would normally expect for this time of the year? and
- what are your prospects for your country's tourism performance in Vienna in the coming six months compared to what you would expect for this time of the year?

In addition, they are asked to freely include comments and remarks on the same subject, these are also used to 'correct' the overall forecast.

Results are averaged and broken down by national markets, a specific focus is given to Germany, Italy and Spain, the major markets for Vienna and Schönbrunn. A short newsletter summarising the results is then prepared and made available to interested parties.

All the outcomes and the whole forecasting process are assessed over time, providing a comparison between the actual performance of the past six months with the predicted values for the same period, and allowing to refine the methodology.

4. Results

The combined method has provided very satisfactory results. The technique has proven to be reasonably easy to use and, for the automation of the whole process, able to provide timely evaluations.

As an example, Table 1 shows two consecutive semesters worth of data. Time series forecasts and experts' panel assessments are combined in an overall forecast which is compared with the actual visitors' arrivals. Numbers shown are indices using the previous semester as a basis.

The overall average difference between forecast and actual values is in the range of 10%. More marked differences for some of the national markets have then been explained with a deeper analysis and these considerations will be used to further refine future forecasts.

Table 1. Example of the combined forecasts along with the actual values. Last column highlights the differences between the forecast and the actual values

Market	Time series forecast	Experts' panel forecast	Combined overall forecast	Actual	Differ.
October 2005 - March 2006					
Global	105	109	107	108	1
Germany	101	100	100	99	-1
Italy	111	100	105	112	7
Spain	129	127	128	122	-6
April-September 2006					
Global	100	125	115	109	-6
Germany	105	115	110	100	-10
Italy	112	120	115	104	-11
Spain	120	130	125	109	-16

All in all, using the accuracy scale by Lewis (1982: 40), the combined method used can be considered to provide good outcomes.

5. Concluding remarks

Forecasting tourism related phenomena is a complex task and usually yields outcomes with different reliability. Actually, as well pointed out by Smith (1989), all methods or models used require a trade-off between accuracy or precision and the obvious constraints of time and resources.

Additionally, given the impossibility to identify techniques able to outperform others, the literature suggests to combine different ‘styles’ (Ashton and Ashton 1985; Newbold and Granger 1974; Smeral 2007).

The case presented here is based on a choice of minimum effort which could give reasonable results in short periods of time. The combined methods employed indicate that the pattern of tourism within a destination can be tracked and predicted with an acceptable degree of accuracy. An accuracy more than sufficient, in the feelings of the people involved in the project, to provide guiding information for planning purposes.

The methodology is rather inexpensive and once developed requires only a limited effort for data updating. The management of the SKB has been able to use the outcomes of this approach to measure and predict the development of tourism with a short term prospective. Possible improvements of the technique presented in this work will concern the addition of new experts from different nations to the panel and an increase in the experience of the evaluation of the qualitative correctors to the quantitative results.

ACKNOWLEDGEMENTS

The authors would like to recognize the efforts of Giulia Daniele for the contributions given to this work. The authors wish also to thank Dr. Franz Sattlecker, director of Schloß Schönbrunn Kultur - und Betriebsges for the help and the support provided.

REFERENCES

Antonioli Corigliano, M. (1999a). I distretti turistici e le aggregazioni tra attori per lo sviluppo del prodotto-destinazione. In M. Colantoni (Ed.), *Turismo: una tappa per la ricerca* (pp. 99-140). Bologna: Patron Editore.

Antonioli Corigliano, M. (1999b). *Strade del vino ed enoturismo. Distretti turistici e vie di comunicazione*. Milano: Franco Angeli.

Antonioli Corigliano, M. (Ed.). (2000). *L' osservatorio turistico: obiettivi, metodologie, strumenti*. Milano: EGEA.

Arthur, W. B., Durlauf, S. N., & Lane, D. (Eds.). (1997). *The Economy as an Evolving Complex System II*. Reading, MA: Addison-Wesley.

Ashton, A. H., & Ashton, R. H. (1985). Aggregating subjective forecasts: Some empirical results. *Management Science, 31*, 1499.

Athiyaman, A., & Robertson, R. W. (1992). Time Series Forecasting Techniques: Short-term Planning in Tourism. *International Journal of Contemporary Hospitality Management, 4*(4), 8-11.

Baggio, R. (2008). Symptoms of complexity in a tourism system. *Tourism Analysis, 13*(1), 1-20.

Chatfield, C. (1996). *The Analysis of Time Series* (5th ed.). New York: Chapman & Hall.

Chen, R. J. C., Bloomfield, P., & Cubbage, F. W. (2008). Comparing Forecasting Models in Tourism. *Journal of Hospitality and Tourism Research, 32*, 3-21.

Davies, B. (2003). The Role of Quantitative and Qualitative Research in Industrial Studies of Tourism. *International Journal of Tourism Research, 5*, 97-111.

Doran, C. F. (1999). Why Forecasts Fail: The Limits and Potential of Forecasting in International Relations and Economics. *International Studies Review, 1*(2), 11-41.

Farrell, B. H., & Twining-Ward, L. (2004). Reconceptualizing Tourism. *Annals of Tourism Research, 31*(2), 274-295.

Faulkner, B., & Russell, R. (1997). Chaos and complexity in tourism: in search of a new perspective. *Pacific Tourism Review, 1*, 93-102.

Faulkner, B., & Russell, R. (2001). Turbulence, chaos and complexity in tourism systems: a research direction for the new millennium. In B. Faulkner, G. Moscardo & E. Laws (Eds.), *Tourism in the 21st century: lessons from experience* (pp. 328-349). London: Continuum.

Faulkner, B., & Valerio, P. (1995). An integrative approach to tourism demand forecasting. *Tourism Management, 16*(1), 29-37.

Frechtling, D. C. (1996). *Practical Tourism Forecasting*. Oxford: Butterworth-Heinemann.

Hamilton, J. D. (1994). *Time series analysis*. Princeton: Princeton University Press.

Lewin, R. (1999). *Complexity, life on the edge of chaos* (2nd ed.). Chicago The University of Chicago Press.

Lewis, C. D. (1982). *Industrial and business forecasting methods*. London: Butterworths.

Linstone, H. A. (1999). Complexity Science: Implications for Forecasting. *Technological Forecasting and Social Change, 62*, 79-90.

McKercher, B. (1999). A Chaos Approach to Tourism. *Tourism Management, 20*, 425-434.

Newbold, P., & Granger, C. W. J. (1974). Experience with Forecasting Univariate Time Series and the Combination of Forecasts. *Journal of the Royal Statistical Society. Series A, 137*(2), 131-165.

Papatheodorou, A., & Song, H. (2005). International tourism forecasts: time-series analysis of world and regional data. *Tourism Economics, 11*(1), 11-23.

Smeral, E. (2007). World tourism forecasting - keep it quick, simple and dirty. *Tourism Economics, 13*(2), 309-317.

Smith, S. L. J. (1989). *Tourism analysis: A handbook* (2nd, 1995 ed.). Harlow: Longman.

Song, H., & Li, G. (2008). Tourism demand modelling and forecasting - A review of recent research. *Tourism Management, 29* 203-220.

Tideswell, C., Mules, T., & Faulkner, B. (2001). An Integrative Approach to Tourism Forecasting: A Glance in the Rearview Mirror. *Journal of Travel Research, 40*, 162-171.

Uysal, M., & Crompton, J. L. (1985). An Overview of Approaches to Forecast Tourism Demand. *Journal of Travel Research, 23*(4), 7-15.

VTB. (2008). Statistics & Market Research, Vienna Tourist Board. Retrieved January, 2008, from http://b2b.wien.info/.

Wackera, J. G., & Sprague, L. G. (1998). Forecasting accuracy: comparing the relative effectiveness of practices between seven developed countries. *Journal of Operations Management, 16*(2-3), 271-290.

Waldrop, M. (1992). *Complexity: The Emerging Science and the Edge of Order and Chaos*. London: Simon and Schuster.

Witt, S. F., & Witt, C. A. (1992). *Modelling and Forecasting Demand in Tourism*. London: Academic Press.

Witt, S. F., & Witt, C. A. (1995). Forecasting tourism demand: A review of empirical research. *International Journal of Forecasting, 11* 447-475.