

Institution: University of Surrey		
Unit of Assessment: 24 Sport and Exercise Sciences, Leisure and Tourism		
Title of case study: Enhancing tourism policy-making and planning through innovative forecasting		
Period when the underpinning research was undertaken: 2003 – 2019		
Details of staff conducting the underpinning research from the submitting unit:		
Name(s):	Role(s) (e.g. job title):	Period(s) employed by submitting HEI:
Gang Li	Professor of Tourism Economics	September 2003 – present
Li (Jason) Chen	Senior Lecturer in Tourism & Events Management	October 2011 – present
Anyu Liu	Lecturer in Hospitality Management	September 2017 – present
Haiyan Song	Professor of Tourism	April 1997 – August 2004
Stephen Witt	Professor of Tourism Emeritus Professor	January 1998 – January 2005 July 2020 – present
Period when the claimed impact occurred: 2014 – 2020		
Is this case study continued from a case study submitted in 2014? Y		
1. Summary of the impact (indicative maximum 100 words) <p>The University of Surrey has a longstanding reputation in the world of tourism demand forecasting research. Our continuous advancements and innovations in forecasting methodologies have been widely applied by international organisations, government agencies and tourism-related enterprises and so contributed to “evidence-based policy/strategy movement”.</p> <p>Our research has provided the scientific foundation for more effective policy-making, strategic planning and operation management, particularly in terms of planning investments in visitor infrastructure, human resource management, marketing resource allocation and new product development. In addition, the risks of project failures are minimised through improved understanding of tourism demand.</p>		
2. Underpinning research (indicative maximum 500 words) <p>The University of Surrey has been one of the world leaders in tourism demand modelling and forecasting research, led by the research team above. Over the past two decades, the team have been enhancing tourism demand modelling and forecasting methodologies to improve their explanatory power and forecast accuracy.</p> <p>For example, the team introduced the “general-to-specific” approach to tourism demand modelling, which is a scientific procedure to identify significant influencing factors of tourism demand [R1] and overcomes the drawbacks of the traditional “simple-to-general” method which led to <i>ad hoc</i> model specifications and forecasting biases. In addition, the team developed a number of advanced econometric models including the time-varying-parameter (TVP) model [R2], TVP almost ideal demand system (AIDS) model [R3], TVP structural time series model [R4],</p>		

and multi-series structural time series model [R5]. These models all belong to the state space models, which decompose a time series into distinctive components such as trend, season and cycle, by which the dynamic characteristic of a series can be fully captured. In addition, the evolution of tourism demand elasticities can be captured; in other words, these models are able to investigate tourists' behavioural changes over time.

Further research by the Surrey team showed that the combination of these advanced econometric techniques leads to more powerful tools for international tourism demand analysis and forecasting, and improved forecast accuracy [R6]. The models the team have developed represent the most advanced econometric methods for tourism demand modelling and forecasting in the world, in terms of the sophistication of model specifications, and their forecasting performance.

Most of the research activities were awarded public funding from various sources. In addition, on the basis of Professor Gang Li and the research team's expertise in tourism forecasting, a number of

international organisations and enterprises commissioned a series of projects which applied these innovative forecasting tools. These included:

- A sustained contractual relationship with the Pacific Asia Travel Association (PATA) which applies the methods of Song and Witt [R1] and Li, et al., [R2] to produce their annual Asia Pacific Visitor Forecast reports.
- A European Commission-funded project (68/PP/ENT/PPA/12/6470) based on the forecasting methods of Li, et al., [R2] to predict future demand for accessible tourism in Europe.
- The development of a web-based forecasting system for Hong Kong inbound tourism (www.tourismforecasting.net). The forecasting system for Hong Kong is the only one of its type in the world and enables non-expert users to adjust the forecasts based on their own judgement. The statistical forecasting methodology of the system was developed by the team when all were serving at Surrey (e.g., Song and Witt [R2]; Li et al., [R2]). The system received a Silver award in the 6th International Exhibition of Inventions in 2008.

To acknowledge his outstanding research contribution, Gang Li received a number of awards, such as the "University Researcher of the Year 2012"; he was also ranked 12th in the world for significant contribution to tourism research, based on the number of publications in top 3 tourism journals during 2004-2013.

3. References to the research (indicative maximum of six references)

[R1] Song, H. and Witt, S.F. (2003). Tourism Forecasting: The General-to-Specific Approach, *Journal of Travel Research*, 42(1), pp. 65-74. DOI: [10.1177/0047287503253939](https://doi.org/10.1177/0047287503253939) (ABS Grade 4)

[R2] Li, G., Wong, K.K.F., Song, H., Witt, S.F. (2006). Tourism Demand Forecasting: A Time Varying Parameter Error Correction Model. *Journal of Travel Research*, 45 (2), pp. 175-185. DOI: [10.1177/0047287506291596](https://doi.org/10.1177/0047287506291596) (ABS Grade 4)

[R3] Li, G., Song, H. and Witt, S.F. (2005). Time Varying Parameter and Fixed Parameter Linear AIDS: An Application to Tourism Demand Forecasting. *International Journal of Forecasting*, 22 (1), pp. 57-71. DOI: [10.1016/j.ijforecast.2005.03.006](https://doi.org/10.1016/j.ijforecast.2005.03.006) (ABS Grade 3)

[R4] Song, H., Li, G., Witt, S.F. and Athanasopoulos, G. (2011). Forecasting Tourist Arrivals Using Time-Varying Parameter Structural Time Series Models. *International Journal of Forecasting*, 27 (3), pp. 855-869. DOI: [10.1016/j.ijforecast.2010.06.001](https://doi.org/10.1016/j.ijforecast.2010.06.001) (ABS Grade 3)

[R5] Chen, L., Li, G., Wu, C., and S. Shen (2019). Forecasting Seasonal Tourism Demand Using a Multi-Series Structural Time Series Method. *Journal of Travel Research*, 58(1), 92-103, DOI: [10.1177/0047287517737191](https://doi.org/10.1177/0047287517737191) (ABS Grade 4)

[R6] Shen, S., Li, G., and Song, H. (2011). Combination Forecasts of International Tourism Demand, *Annals of Tourism Research*, 38(1): 72–89. DOI: [10.1016/j.annals.2010.05.003](https://doi.org/10.1016/j.annals.2010.05.003) (ABS Grade 4).

4. Details of the impact (indicative maximum 750 words)

Accurate tourism demand forecasts derived from the innovative forecasting methods developed by the research team provide a scientific foundation for formulating effective tourism policies (e.g., planning investments in infrastructure, marketing resource allocation and using tourism to drive regional development) and successful business strategies (e.g., operation management, marketing, business investment and new product/market development). Our research therefore contributed to “evidence-based policy/strategy movement” of tourism organisations and destination governments. The main beneficiaries of our research are the organisations that commissioned the team to conduct consultancy projects or directly adopted our forecasting methodologies and reports.

1. Pacific Asia Travel Association (PATA)

The strongest example of direct impact of the methodologies developed by the research team comes from the relationship with PATA. Since 1951, PATA has been the key membership association driving the development of travel and tourism to, from and within the Asia Pacific region. Since 2012, the research team has been commissioned to produce PATA’s annual visitor forecasting reports. These are made available to all PATA members: comprising 95 government, state and city tourism bodies, 25 international airlines and airports, 108 hospitality organisations, and hundreds of travel industry companies in Asia Pacific and beyond [S1]. The benefit of these reports to the stakeholders that receive them lies in the accuracy of the forecasts, verified by PATA as accurate to within 3% for one-year-ahead predictions. This accuracy allows stakeholders to improve the effectiveness of their strategic planning and reduce the associated risks. Three specific examples illustrate this wider benefit.

2. PATA forecasts facilitate tourism policy decision-making: China Tourism Academy

PATA annual forecasting reports, produced by the research team and relying on the methodological innovations detailed in Section 2, support tourism policy change. Many tourist destination governments use PATA forecasts as a key reference to assist their tourism planning and when revising tourism policies. According to PATA’s testimonial [S2], PATA forecasts are “a staple asset for every tourism policy-maker, planner, and strategist with a vested interest in understanding the changing market dynamics of tourism in the Asia Pacific region. Apart from offering a glimpse into emergent market opportunities, they also provide a means of quantifying risk with origin-destination pairs that might be heading toward a variable cycle of growth and contraction”.

The China Tourism Academy (CTA) is the think tank and research arm of the Chinese state tourism authority and has been using PATA’s forecasts of Chinese inbound and outbound tourist arrivals as a foundation to support their policy research and recommendations to the central government. CTA reports [S3] that, “PATA’s Visitor Forecasts ... have become an essential input into CTA’s policy research, which has led to important tourism policy initiatives and supported the central government’s long-term global development strategy.” For example, based on the predicted tourism trends between China and neighbouring countries involved in the Chinese government’s “One Belt, One Road” global development strategy, the Chinese government has established China-ASEAN, China-Central and East Europe, and China-Russia-Mongolia cultural cooperation mechanisms and promoted tourism and cultural exchange as an effective strategy of international relationship development [S3].

3. PATA forecasts improved destination marketing: China National Tourist Office

Accurate PATA forecasts enabled destination management/marketing organisations’ successful marketing planning and efficient resource allocation in their overseas markets. For example, China National Tourist Office (CNTO) in London is in charge of promoting China as a tourist destination in the UK market. Using our forecasts of UK tourist arrivals into China in the PATA reports since

2013, which showed a trend of promising growth of this market in the medium term (5-years ahead), CNTO-London secured increased investment from the Chinese government, compared to previous years before adopting PATA forecasts. The resulting additional resources allowed CNTO-London to host a series of promotional affairs to realise the market potential [S4]. Over 2014-2018, inbound tourism from the UK to China increased by 6.5% annually, 44% higher than the average growth rate of UK's outbound tourism during this period (4.5% per annum) [S5]. Similar impacts are seen in other overseas offices of CNTO.

4. PATA forecasts improved corporate planning and investment: Dusit Hotels

Through PATA forecasts, Surrey's research also benefits PATA industry members' short- and medium-term business planning such as capital investment in human and resource deployment. The hotel group Dusit Hotels & Resorts, based on PATA predictions of fast growth international tourist arrivals in Southeast Asia, has invested in expanding its network of hotels in Thailand and the Asia Pacific region from 2,782 rooms in 2013 to 5,113 rooms in 2019. As part of its long-term strategic planning, Dusit expanded its education division and decided to open a new Dusit Hospitality Management College in Manila, in order to grow their own talents and meet the increasing demand for human resources in hospitality in the region where they operate their hotel business [S6].

The European Commission

Finally, Surrey research forecasted the travel patterns and economic benefits of accessible tourism in Europe, contributing to long-term policy development on accessible tourism at regional and international levels. In a report commissioned for the European Commission (EC) [S7], the Surrey team found that the European tourism sector has and will continue to lose out on as much as €142 billion every year due to poor infrastructure, services and attitudes towards travellers with special access needs.

The previously unforeseen scale of forecasted demand became a key tool for policy actors to encourage policy momentum for accessible tourism. The director of the European Network of Accessible Tourism explained that the report became and still is *"a key reference for the sector, which has not been superseded by any other comparable studies these last 6 years. (...) It provides a benchmark which other studies and trends can be measured by"* [S8].

In line with the report's recommendation to encourage service providers to invest in accessible tourism, the EC then developed a number of policy initiatives designed to improve the facilitation of accessible tourism and capitalise on this unmet demand. For instance, in response to demand forecasts from the report that predicted 25% growth in demand if accessibility service and infrastructure is improved, the EC allocated €1.7million to support new SME led tourism accessibility programmes across Europe [S9]. Further Initiatives included the European Excellence Awards for Accessible Tourism [S10], and an EU Disability Card which aims to make it easier for people with disabilities to travel across Member States [S11].

5. Sources to corroborate the impact (indicative maximum of 10 references)

[S1] Pacific Asia Travel Association (PATA) <https://www.pata.org/about-pata>

[S2] PATA testimonial letter (PDF)

[S3] Chinese Tourism Academy testimonial letter (PDF)

[S4] Chinese National Tourism Office testimonial letter (PDF)

[S5] Office for National Statistics (2019). UK outbound tourism statistics (2014-2018) <https://www.ons.gov.uk/peoplepopulationandcommunity/leisureandtourism/datasets/ukresidentsvisitsabroad>

[S6] Dusit Testimonial Letter (PDF)

[S7] Economic Impact and Travel Patterns of Accessible Tourism in Europe, project funded by European Commission, DG Enterprise and Industry (PDF)

[S8] Testimonial E-mails from Ivor Ambrose, Director of the European Network of Accessible Tourism (PDF)

[S9] European Commission – Executive Agency for Small and Medium-sized Enterprises – Supporting Competitive and Sustainable Growth in the Tourism Sector (PDF)

[S10] European Excellence Awards for Accessible Tourism

https://ec.europa.eu/growth/content/european-excellence-awards-accessible-tourism-0_en#:~:text=The%20European%20Excellence%20Awards%20for,to%20tourists%20with%20special%20needs

[S11] EU Disability Card <https://ec.europa.eu/social/main.jsp?catId=1139>