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12 February 2019

PolyU Study advises Hotels to Look Ahead Accurately basing on Publicly Available Data

Given that tourism is a global industry consuming a diversity of goods and services, the prediction of future trends needs to take account of the wider economic context, according to Professor Brian King and Dr Stephen Pratt of the School of Hotel and Tourism Management (SHTM) at The Hong Kong Polytechnic University and a co-author. In a recently published study, the researchers use publicly available data to improve predictions about hotel occupancy rates in different classes of Hong Kong hotels. Their method can be adopted by individual hotels that have insufficient resources to collect expensive data, or for employing consultants, to predict demand. The researchers maintain that this has important implications for the hotel sector, both in Hong Kong and elsewhere.

Occupancy forecasting is more than just a way of predicting demand – it can also determine profitability. Indeed, the researchers warn that inaccurate forecasting of hotel occupancy rates can lead to costly decisions. If a hotel is predicted to have strong bookings three months ahead, the “relevant departments may start to deploy additional resources accordingly. For instance, the bookings department may stop taking lower-yield reservations and additional staff may be employed to cope with the extra demand. Yet if the prediction turns out to be over-optimistic, “a wastage of resources is likely to ensue, leading to loss of revenue”. In the opposite case, a shortage of resources and staff may occur when demand exceeds what has been predicted.

Both scenarios can be damaging for a hotel’s reputation. Even a hotel that is “internally proficient and offers friendly effective staff and efficient systems and procedures” will suffer a drop in occupancy rates if the external economic environment is “soft”, argue the researchers.

Nevertheless, while it is agreed that hotels should base their budgets on forward-looking occupancy rates, this is in practice challenging, according to the researchers, because the industry is “highly competitive and vulnerable to volatile political and economic conditions, locally and internationally”. Other factors, such as the development of online technologies and the growth of Internet travel agencies, have also changed the way hospitality organisations “distribute and price their products” and made it more difficult to predict demand.

Yet tourism operators can benefit from “informative longer and shorter term economic insights” when predicting future trends, the researchers argue. Many international hotel chains have the comfort of sufficient resources for the deployment of “intelligent systems” and for investments in “the development of accurate forecasts to address the volatile and difficult prediction of hotel occupancies”. Other well-resourced hotels recruit “in-market expertise” to improve their predictions of demand. Nevertheless, smaller and independent hotels can rarely afford to invest in such resources, although their need for accurate predictions is just as great.

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The Internet, however, offers access to potentially useful information that could be used to improve the accuracy of forecasting for even the most resource constrained of hotels. The researchers looked at easily accessible online data that is available from the Organisation for Economic Cooperation and Development (OECD). The OECD, established in 1957, comprises 34 member states and a further 25 non-member states, including China, that participate as committee observers. Its purpose, the researchers note, is to “gather economic statistics from members” that are used to provide comprehensive information about the global economy.

The OECD produces various quantitative indicators of specific aspects of the global economy, three of which were used by the researchers. First, the composite leading indicator (CLI) combines various economic variables, such as GDP, that indicate a country’s economic situation and provide “early signals of turning points in economic activity”. The researchers predicted that the CLI for tourist origin countries would predict hotel occupancy rates in the destination country.

The business survey index (BSI) collects qualitative information from business executives and managers that is reflective of “confidence within the business community about prevailing economic conditions”. The researchers argue that the BSI reflects the “motives of business travellers and conference delegates”, which affect the volume of business in the accommodation sector.

The consumer confidence index (CCI), in contrast, reflects consumer sentiment based on the economic climate and household finances. The information is collected through a monthly survey of 19 member and non-member countries. The researchers predicted that more positive feelings towards the local economy expressed through the CCI would be associated with increased hotel occupancies in the destination.

To test their predictions, the researchers used quarterly data on hotel occupancy rates in Hong Kong from the first quarter of 1972 up to the final quarter of 2010. They initially applied a method of “smoothing” the data to reduce the effects of seasonal fluctuations, so that they could identify the real peaks and troughs that reflected upturns and downturns in demand.

In the next step, they assessed the abilities of the three OECD indicators to predict peaks and troughs in the Hong Kong hotel occupancy data, categorised according to the Hong Kong Tourism Board’s classification of hotels as “high tariff A, high tariff B and medium tariff hotels”.

First, they demonstrated that the three OECD indices are leading indicators of hotel occupancy rates by showing that changes in the indices occurred before changes in demand. Then, they determined the correlations between each OECD indicator and the peaks and troughs in demand for each hotel type, finding that the CCI is the best predictor of overall Hong Kong hotel occupancy rates. However, the CLI provides better predictions for tariff B hotels.

The researchers suggest that their method could be used by hoteliers to supplement their revenue management systems and to formulate their own “predictive systems”. Although they used expensive statistical software to perform their analyses, they explain that hoteliers could easily

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download the relevant OECD data for their own source markets and conduct analyses in Excel, which are used by most businesses. Rather than deploying generic data on hotel categories, individual hotels could take their own occupancy data and apply the OECD indicators to predict their future occupancy rates.

This approach, the researchers argue, “offers the prospect of optimal hotel resource utilization and improved management”. Indeed, the use of publicly available data, such as the OECD indicators, makes it possible to plan for and target distinct markets at different times, rather than simply relying on historical occupancy rates.

The researchers use Hong Kong as an example to demonstrate their method of forecasting demand because it is a “leading international tourism destination” and has a “diverse and substantial accommodation sector”. However, the method could be applied as readily in other markets. And although they used data from the OECD, the researchers note that other sources are available, such as the World Tourism Barometer which is produced by the United Nations World Tourism Organisation and outputs from the Australian government’s Tourism Forecasting Reference Panel. There is, they explain, “growing interest at both national and international levels in improving the accuracy of predictions through multiple inputs”. The greater availability of such data, and the use of relevant methods to exploit them, means that policymakers and hoteliers will be better equipped to predict future demand.

Tang, Candy Mei Fung, King, Brian and Pratt, Stephen. (2017). Predicting Hotel Occupancies with Public Data: An Application of OECD Indices as Leading Indicators. *Tourism Economics*, 23(5), 1096-1113.

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