Demand Forecasting: A Review on Qualitative Methods and Surveyed Done By Delphi Technique

Sajad Ebrahim Meimand\textsuperscript{a}, Hadi Ganjalikhan Hakemi\textsuperscript{b}, Hairul Nizam Ismail\textsuperscript{c}

\textsuperscript{a}University Technology Malaysia, #221, S47, KTC, UTM, Johor, Malaysia
E-mail address: S.EBRAHIMI2101@GMAIL.COM

\textsuperscript{b}University Technology Malaysia, #229, S47, KTC, UTM, Johor, Malaysia
E-mail address: HADI.GANJALIKHAN@GMAIL.COM

\textsuperscript{c}University Technology Malaysia, Faculty of Built Environment, Johor, Malaysia
E-mail address: B-HAIRUL@UTM.MY

ABSTRACT

Over the past decades a majority of tourism researchers have published many papers that reviewed demand forecasting methodologies. But most of them have concentrated on quantitative methods rather than qualitative methods and there is a huge gap in qualitative demand forecasting research. In this review, the authors have placed emphasizes on qualitative demand forecasting methods by using previous literature and new findings in recent years, specially published studies on tourism demand modeling and forecasting up to 2010. This paper tries to have a comprehensive look at Delphi method’s definitions and examples conducted by different authors. The advantages and disadvantages of Delphi technique are considered and the accuracy of previous Delphi studies surveyed. The review also includes a clear view of qualitative demand methods comprising the Delphi Model, Judgment-Aided Model and Traditional Approaches.

Key words: Qualitative Methods, Delphi Technique, Demand Forecasting

1. INTRODUCTION:

The last four decades have seen great developments in tourism demand analysis, in terms of the diversity of research interests, the depth of theoretical foundations, and advances in research methodologies (Song and Witt, 2005). Tourism can bring long term benefits to a destination, but it is reasonably dependent on accurate decision and forecast on elements such as tourism infrastructures and superstructures (Uysal and Crompton, 1985), such as railways, airports, highways, accommodation facilities, attractions, promotion and human resources. On the other hand, short-term schedules also need prediction of the number of tourists’ arrivals, price, promotion, distribution and staff employment as well as long term schedules and programming. Consequently, any decision for the future, needs a high degree of forecasts (Sarames, 1973).
Tourism industry forecasting is mainly based on three questions in general: (1). How many tourists will arrive in a given period of time in a certain destination? (2). which origin areas represent the most appropriate target market? (3). what are the most influential factors which effect the tourists’ decision on selecting a destination?

Tourism demand forecasting methods in general are categorized into two main groups: qualitative methods and quantitative methods (Song and Turner, 2006).

2. QUALITATIVE METHODS

The number of published studies on qualitative demand forecasting in the tourism field is very limited (Song and Turner, 2006). In addition to the methodological aspect, qualitative methods receive little attention as they are only standard applications. On the other hand, qualitative approaches do not necessarily require the existence of historic data since they rely on pooled expert opinions. Therefore, these methods are mostly used in studies which lack of previous data is apparent. For example: a newly established destination, tour operator or resorts, would not have any historical data available as a consequence of being new. If there was economic or political instability in an area or region, previous data cannot be useful as much as in a stable environment. In other words, qualitative methods tend to provide reasonably good forecasts in the short term because of the familiarity of experts with ongoing changes in their field. The qualitative methods work best when the forecasting scope is limited. The primary problem with qualitative methods is identifying experts in the appropriate fields and then getting them to agree on a common forecast. In this paper, the authors have tried to present a review of qualitative methods which are mostly used by tourism researchers.

2.1 Traditional Approaches:

Uysal and Crompton in 1985 categorized the traditional approaches into two main categorizes: (1) analysis of national or regional vacation surveys and (2) survey inquiries of potential visitors in tourism-generating areas. However this study did not argue about the accuracy and details which will be provided in the results and just gave a brief definition.

Kazuo Yamaguchi, in his Master thesis about the prediction of Japanese travelers to the United State of America in 1993, compared the analysis of national and vocation survey with timed trend analysis and concluded that this approach (such as quantitative approaches) uses previous data and information from an available database. Some surveys already have their own forecasts as well as past data analysis. This technique is less expensive and does not require a lot of experience in the tourism field or special analysis skills. In 2000, Jens Kristian also used this technique in a survey on the topic “Anti-tourist Attitudes Mediterranean Charter Tourism”. In this study, the conclusion was more about the causes of Mediterranean attitudes and no information about the definition was provided except a brief one in the paper’s abstract.

Since this method can be classified as a quantitative method, (a method that has used the previous data to recognize the changes over the time) uses a common methodology, and methods such as time series data analyzing. Therefore a large number of published papers in demand forecasting have used these methodologies because time series is a common tool in predicting future demand (Harvey, 1989).
The second traditional approach concentrates on inquiries of potential visitors in tourism-generating areas and fields such as resorts, railway stations, airports as well as tour operators. This approach relies on the estimations of non-expert groups but still needs the experts’ opinions for the final forecasting. In this light, Uysal and Crompton (1985) wrote, “Inquiries within a potential generating population may offer useful insights about the attitude or prevailing image of the potential market towards a tourist-receiving destination. This approach may be combined with a survey of the opinions and intentions of tour operators, travel agencies, and/or airlines.”

In this light, Japan travel bureau used this technique to forecast Japanese traveling trends for outbound travels (JTB, 1991 and 1992). This survey emphasized both time and money while many believed the first technique could analyze the data with lower expense and with less time by using secondary data in comparison to the second data.

Econometric methodologies in comparison to traditional approaches use the ‘general-to-specific’ approach which many researchers are recently applying in their research. In brief, general-to-specific framework starts from a general autoregressive distributed lag model. This model attempts to combine many variables relevant to the economic theory, and takes the form:

\[ y_i = \alpha_0 + \sum_{j=1}^{k} \sum_{i=0}^{l} \alpha_{ji} x_{ji-i} + \sum_{i=1}^{n} \beta_i y_{i-i} + \text{dummies} + \varepsilon_i \]

Song et al. 2003

Where \( y \) and \( x \)s are dependent (tourism demand in this specific case) and explanatory variables, respectively; \( l \) is the lag length, \( k \) is the number of explanatory variables, and \( \alpha \)s and \( \beta \)s are parameters that need to be estimated. In this case Stephen et al noted that traditional approaches seem useful while there are some reliable econometric techniques.

2.2 Judgment-Aided Model

Judgment-Aided Models are one the most common methods of qualitative forecasting. These models try to gather a panel of experts and attempt to achieve a consensus among the panels about the specific problem or the case which should be forecasted. The experts’ gathering may occur by performing seminars or committee meetings. The final aim of such committee or seminar is reaching an agreed upon forecast by generating as much debate and interchange of ideas as possible. Baron in 1971 announced an application of JAM to Thailand tourism. According to his report, the scenarios were written based on an optional hypothesizes by paying attention to the inherent trends of international tourism. Most of the scenarios in this method concentrated on political factors, economic tourism development and promotion.

In terms of accuracy, Matthews, McHugh and Weber argued that, if these types of investigations are limited to pure description, they offer little scope for understanding the dynamics of tourism. In addition, this technique can be used for both forecast and educational issues while conducting a seminar; in other words, this technique can be instructive (Vanhove, 2005). Another judgment-aided method is known as scenario writing. In fact, a scenario takes into account any possible known fact and trend. In other words scenario writing is the process of
constructing a hypothetical sequence of events to focus on the subject area. Actually, the intent is to recognize what actions can be taken to influence the level of demand at each stage (Uysal and Crompton, 1985).

Archer, in 1975, discussed the scenario writing. He stated that it is not a real forecasting method, but a manner of categorizing the involved issues. This method tries to clarify on a possible and plausible future. It can also be seen as a kind of Delphi forecasting method for group prediction. Archer also defined the three main components of the scenario-writing method:

1. A description of current situation (Baseline analysis)
2. At least one future image (a description of the potential situation in the future)
3. For each future image, at least one future path showing how the current situation could develop into the eventual future image.

Martin and Mason (1990) utilized the scenario method to analyze the two main areas of uncertainty about the future trends in the UK: the way attitudes and social values will develop and the outlook of the economy and the future rate of growth. An example of the usage of this method specifically in tourism has been done by Schwaninger (1989). He tried to analyze the interaction between economic, political, socio-cultural, ecological and the technological aspects of tourism.

Judgment-aided methods however seem similar to Delphi as both use panel comments, but with little differentiations. In judgment-aided modeling, experts discuss face-to-face, but in Delphi the comment will reach to the experts by questionnaires. Consequently, in the Delphi model the experts have enough time to comment and they can think from different dimensions.

Mr. Baron, of the Israel Tourism Administration, illustrated tourism forecasting in both the theatrical and empirical study of tourism. He explained that prediction is a numeric estimate of what is going to happen if something specific was to occur. In addition, he defined three types of forecasting:

(1) Automatic extrapolation
(2) Guesstimates
(3) Judgment-aided models

Mr. Bar On also in Judgment-aided Models emphasized this by describing this model as the best one. In the same vein he discussed forecasting methods such as short-term forecasts, Delphi technique, econometric models and tourist information systems and finally concluded by stating that “losses must be considered if mistakes are made in forecasts”.

2.3 Delphi Model:

The Delphi method of forecasting is the most famous qualitative forecasting method that has attracted the most attention in the tourism literature (Stephen et al, 2003). The Delphi technique was first introduced by Dalkey and Helmer (1963). This method is based on the accumulated experience of experts and tries to gather a panel of experts from different disciplines to obtain a general consensus about the outcome of a future event (Archer, 1987). It is
in contrast with the judgment-aided method, which was explained in the previous section. In this method, the panels do not gather in a conference or a place to discuss about the subject, they receive just the questionnaires. All participating experts are given feedback at each stage of the process and allowed to reconsider their responses before they go to the next round.

The results in a Delphi technique are supposed to be interpreted as a “subjective assessment of possibility” rather than a “precise, statistical, statement about the possibility that particular events or trends may occur” (Uysal and Crompton, 1985).

The Delphi method has its own advantages and disadvantages. Research directors of a Delphi survey can change the directions on their own favorites by the information they are going to fed back to the participants. This is therefore a weakness of the Delphi survey because individual decisions affect the final results. In addition to that, a non-response situation may happen as the participants are anonymous. Finding experts as participants in a Delphi technique is also another challenging problem. In addition, in this method, experts judge and make estimates based on their own knowledge and level of expertise (Uysal and Crompton 1985). In some cases the panel members or experts may not reach a general agreement (Var, 1984). This method may also take several weeks and sometimes months, so it is a time consuming method (Preble 1983).

On the other hand, in this method, the participants are not discussing face-to-face and this causes the elimination of pressure from other participants.

An early Delphi forecast by English and Kearnan (1976) was concerned with the predicting of air travel up to the year 2000. Their forecast was quite inaccurate. They predicted that the demand of air travel will slightly decrease because of; a) airport saturation; (b) noise control at airports; and (c) increased real fuel costs. In fact their prediction was accurate only to the year of 1990, and after this year everything changed and dispersions in air travels were too high.

Another example of the Delphi method is a survey which was carried out during the International Symposium on Tourism in Washington, DC, in 1979 (Seely et al. 1980). The study considered a comprehensive list of events that are likely to happen in the tourism businesses during the 1980s. In 1981 Kibedi presented the main results which discussed the finding from different aspects: economic environment; natural resources environment; social, cultural and political environments; the technology environment; international environment; travel environment; tourism information; tourism employment and training; tourism and energy; tourism impacts; and tourism co-operation and co-ordination.

Liu in 1988 conducted another Delphi survey. He utilized the Delphi technique in predicting both domestic and international visitor arrivals, visitor to resident ratio and maximum visitor accommodation to Hawaii by the year 2000. The empirical results showed a high degree of similarities between different groups of experts who were working as panels in this research including local experts as tourist receivers and overseas tourist senders (Stephen et al., 2003).

Yong et al. (1989) used the Delphi technique to predict the future of Singapore’s tourism industry. They used two panels, one comprising people from the local tourist industry and the other including international suppliers in the tourism field. The conclusions highlighted (a)
positive future trends that include: 1. increased purchasing power for leisure and travel services for individuals from developed countries, 2. better access to travel information, 3. fewer constraints for cross-border travel movements, and 4. higher pressure for regional collaboration in tourism-related activities; and (b) negative trends which includes the imposition of more stringent exit taxes and a decrease in business travellers.

In 1984, Kaynak and Macaulay tried to predict the future trends of tourism in Nova Scotia, Canada up to the year 2000. They engaged the Delphi technique in gathering data to strengthen a database in regional level to use as an effective tool in planning and management problems in leisure activities. Kaynak et al. (1994) noted that the process expertise selection should be done very carefully and experts are supposed to have a myopic look on the issues, and subjects. In other words, project from different aspects and experts should represent different perspectives on the issue.

### Table 1: Some tourism research examples of the delphi survey and their accuracy

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Year</th>
<th>Predicted situation</th>
<th>Accuracy explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>English and Kearnan</td>
<td>1976</td>
<td>Demand of air travel to the year 2000</td>
<td>The forecasting results were totally inaccurate as the result were proper until 1990</td>
</tr>
<tr>
<td>Seely et al.</td>
<td>1980</td>
<td>Future trends in international tourism</td>
<td>As this research had a comprehensive look on the tourism phenomenon the accuracy level was higher than other examples</td>
</tr>
<tr>
<td>1984 Kaynak and Macaulay</td>
<td>1984</td>
<td>Future trends of tourism in Nova Scotia, Canada to the year 2000</td>
<td>Experts closeness was not considered and attrition rate was high</td>
</tr>
<tr>
<td>Liu</td>
<td>1988</td>
<td>Forecast tourism arrivals to Hawaii by the year 2000</td>
<td>Results show few significant differences in responses among the groups, and confirmed expectations about convergence and consistency of managerial responses with statistical projections and existing trends</td>
</tr>
<tr>
<td>Yong et al.</td>
<td>1989</td>
<td>Project the future of Singapore's tourism industry to the year 2000 and beyond</td>
<td>The annual reports of the Singapore Tourism Centre shows that the empirical results are highly similar to forecasted once</td>
</tr>
<tr>
<td>Kaynak And Marandu</td>
<td>2006</td>
<td>Explores what would be the most probable scenario for the tourism industry in Botswana by the year 2020</td>
<td>N/A as the empirical results are not available in the period of doing this research</td>
</tr>
</tbody>
</table>

### 3. CONCLUSION:

The results show that there are many factors that affect the accuracy level of a Delphi survey forecasting such as:

(1) attrition rate: authors such as Kaynak and Macauley, 1984; Weber and Ladkin, 2003; and Briedenhann and Butts, 2006 all emphasized attrition rates that are withdrawals between the
rounds is one of the most challenging problems in the Delphi technique operation. Mayaka M and B. King could not represent a successful Delphi survey as the rate of panelist attrition experienced as the survey progresses was high. According to Butts (2006), the attrition rate in tourism research is approximately between 20 to 25 percent. The literature shows that in cases which the attrition rate exceeds 50 percent the continuing of the project will cause inaccurate results. It should also be considered the experts replacement cannot be a mitigation panacea (Donohoe and Needham, 2009). In this light, Murray (1979) concedes high damages the ‘very core of the Delphi procedure’ and the results are not useful any more.

(2) Experts’ closeness to the topic: O’Connor and Frew (2004) engaged 600 individuals to invite in a Delphi survey of hotel electronic commerce. Among them 42 experts were selected to join to the Delphi panel. The most important criteria in the selection process was the participant’s closeness, empirical experience in the given topic and interest. In addition, Weber and Ladkin (2003) noted: “Delphi offers the freedom to select tourism experts based on their closeness to or experience with the problem at hand without being limited by geography or narrow expert definitions”. Needham and de Loë (1990) noted that experts’ panel can be identified according to their closeness to the problem or issue and Donohoe and Needham, (2009) developed a conceptual framework to understanding the experts closeness according to Needham and de Loë (Figure 1).

![Figure 1: Expert continuum](image)

(3) Acceptance rate in initial phases: Hurd, McLean, (2004) and Day et al. (2005) announced that the acceptance rate in the participatory phase is between 12 to 75 percent and in each phase the response rate will be in the range of 8 percent, unacceptable to continue, and 100 percent, excellent.

(4) Panel size: The efficiency, validity and reliability of a Delphi survey are highly dependent on the expert group size (Donohoe and Needham, 2009). But little literature is available that describes the relationship between group size and final results. Linstone in 1978 also noted that the lower number of experts will deteriorate the accuracy and vice-versa. The literature in tourism studies shows that different authors have used different sizes of panels.

4. REFERENCES


JTB letter (1993), Personal communication with Japan Travel Bureau concerning the situation of Japanese outbound travels in 1991.


