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Market opportunity analysis and evaluation of the expansion of air transport services across the Taiwan Strait

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ABSTRACT

Air transport services across the Taiwan Strait are rapidly developing. Taiwanese airlines are therefore facing a critical decision as to whether to expand their scheduled services beyond saturated markets. The Taiwanese government is also concerned regarding airline operators' willingness to enter new markets for next-round negotiations concerning traffic rights. This study proposes an Analytic Hierarchy Process (AHP) framework for Taiwanese airlines based on a market opportunity analysis (MOA) to evaluate the determinants of potential service expansion. A novel rank pair-wise comparison (RPC) is used to measure the relative weights among determinants. It is found that service provision for Taiwanese merchants is the most vital factor. Flight quotas and allowed time slots also affect airlines' willingness to expand operations. Other determinants depend on the individual airlines' development background and operating size. This study also evaluates twelve airports in mainland China using grey relational analysis (GRA) to rank the entrant priorities for additional scheduled services.

1. Introduction

The number of air transport passengers between mainland China and Taiwan has rapidly increased, particularly after the signing of the Economic Cooperation Framework Agreement (ECFA) on June 29, 2010. These markets reveal thriving progress (cf. Chang et al., 2011). According to statistics from the Taiwanese Civil Aeronautics Administration (CAA) (http://www.caa.gov.tw/), the number of flights increased to 4500 flights per month in April 2012, which is 1.15 times the number recorded in September 2009. Over the same time period, all airlines provided 968,115 seats, representing an increase of 3%, and flew 810,254 passengers, representing a 1.61-fold increase, with an 83.69% load factor, which was higher than the 65.04% load factor recorded in 2009.

Current cross-strait routes include 53 airports in mainland China and five airports in Taiwan, which service both scheduled and charter services. This number of airports is less than the number allowed by the two governments. Thirteen airlines, including five Taiwanese and eight Chinese airlines, are allowed to operate. The scheduled flights into the first-level cities in China are almost saturated. The main markets, such as Beijing, Shanghai and Guangzhou, have been fully utilized by the majority of companies, but the secondary and/or newly opened airports have few scheduled or charter flights or are not currently served. Taiwanese airlines are facing a critical decision as to whether to expand their scheduled services. Meanwhile, the Taiwanese government is monitoring the development of service provisions and the operators' willingness to penetrate new markets for next-round negotiations of traffic rights. Therefore, understanding the determinants affecting airlines to evaluate and assess potential cities in mainland China for new operations is a timely and vital issue.

The purpose of this study is to clarify the key factors affecting an airline's decision to expand services or open new scheduled flights on the cross-strait routes. The results evaluated from all Taiwanese operators can also assist the government in understanding the intentions of operators in the next round of negotiations. We construct an Analytic Hierarchy Process (AHP) framework using the principle of market opportunity analysis (MOA) to explore the key factors affecting the decision to extend services or to open scheduled flights to new cities. This framework consists of four criteria, i.e., customers, competition, suppliers and market potential, as well as seventeen sub-criteria. Because of the small number of experts that accepted our questionnaire, this study developed a rank pair-wise comparison (RPC) method to analyze their opinions. This novel approach can overcome the possible inconsistency with the traditional pair-wise comparison. Our results indicate that the

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focus of all of the studied airlines is providing service for Taiwanese merchants. Flight quotas and allowed time slots are another important concern. However, other determinants are different for individual airlines depending on their development background and operating size. This study also attempts to evaluate twelve mainland cities that have the potential for additional scheduled flights. The detailed results from a grey relational analysis (GRA) performed to rank market penetration priorities are presented. The evaluation process can also provide airlines with a valuable reference for developing future service strategies.

2. Methodology

Before a decision can be made regarding the expansion of scheduled services, airlines must determine the feasibility of such an undertaking. Of course, the first priority to examine is the volume of passenger demand. However, it is useful to have demand forecasts based on market segmentation details of passengers. In particular, many qualification conditions belonging to different operational perspectives need to be simultaneously surveyed in operating air transport services. Specifically, decision makers must identify service groups of passengers and operational conditions of candidate airports. An MOA that provides survey guidelines is used to determine the feasibility of entering or expanding operations for specific markets. This study combined the MOA and another structural analysis tool, the AHP, to completely elucidate the necessary survey directions and to systemically and easily clarify the critical factors affecting airlines' decisions. The main concepts for the applied methodologies and our research design are introduced in the following sections.

2.1. MOA

The importance of understanding customers and markets for corporate decision-making is readily apparent. The MOA can help decision makers assess each factor and thus offer guidelines for developing a practical approach to evaluate market opportunities. Woodruf (1976) suggests a systemic approach for conducting market opportunity analyses. Three major determinants of market opportunities include the size of markets, marketing program requirements to satisfy market wants, and the quality of services provided by other firms. These determinants are related to five activities, i.e., segmentation analysis, demand analysis, channel analysis, industry analysis and competition analysis.

Woodruf and Gardial (1996) further propose an MOA framework, as shown in Fig. 1, to describe the analysis process of a customer-value-oriented system. The first phase of this framework is to indicate how market opportunities are being shaped by economic, cultural, social, technological, governmental and natural forces. The second phase identifies markets and customers with specific opportunities. The third phase aims to distinguish the nature and dynamics of the interactions between key participants in markets. This phase consists of end-user value analysis, channel customer value analysis, competition analysis and supplier analysis. The final phase concentrates on demand forecasting to evaluate the opportunities of entering identified markets.

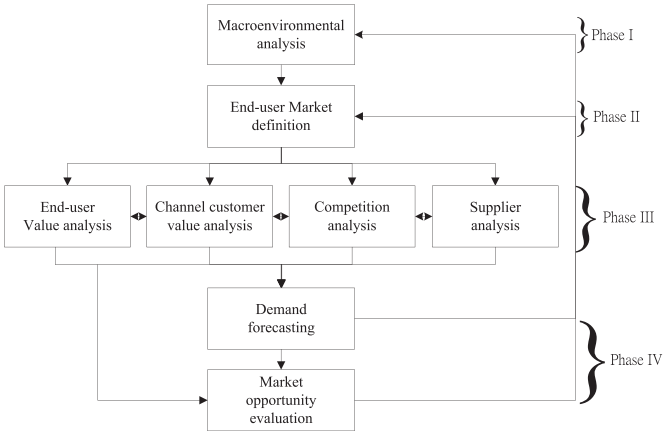

Fig. 1. The MOA framework in Woodruf and Gardial (1996).
Source: Woodruf and Gardial (1996)

Every industry can be evaluated using MOA. For example, Brownlie (1994) employed the MOA processes to develop a DIY approach for small tourism enterprises. Golicic et al. (2003) modified the MOA structure of Woodruf and Gardial (1996) to survey the opportunities for small and mid-sized airports to enter or expand their operations in domestic air cargo markets. Channel customer value analysis is deleted and end-user value analysis is replaced by customer analysis.

The cross-strait air transport services have been identified based on the market environment and the specific opportunities for airlines and passengers. An evaluation framework based on the MOA structure can assist Taiwanese airlines in understanding the market opportunities in these services.

2.2. RPC and GRA for AHP

The purpose of an AHP is to distinguish between the determinants among many factors and then to evaluate the possible alternatives for a specifically complicated topic. An AHP can assist decision-makers who are facing a complex problem with multiple conflicting and subjective criteria. The AHP is one of the popular multi-criteria decision-making methods and has been successfully applied to different fields (Kumar and Vaidya, 2006; Ho, 2008; Liberatore and Nydick, 2008). Conducting an AHP consists of four steps: problem modeling, weight valuation, weight aggregation and sensitivity (Ishizaka and Labib, 2009). In problem modeling, AHP permits decision-makers to construct a hierarchical structure composed of goal, criteria, sub-criteria and alternatives. This process will better allocate the relative weights of specific criteria and sub-criteria. The aim of the weight valuation is to assess the relative weights among criteria and their associated sub-criteria via a pair-wise comparison matrix. For the theory and operation processes of the traditional AHP, please consult the relevant papers of Saaty (1977, 1980).

The AHP must construct a systematic and decisive framework. Most research follows Saaty's suggestion to use a pair-wise comparison matrix in the valuation of the relative weights of elements at the same hierarchy. However, having too many comparative elements generally makes the questionnaire respondents unable to discriminate between the relative weights that are necessary to reach the acceptably consistent level. In particular, when respondents encounter elements with closer perceived relationships, inconsistency in responses possibly takes place. The reason for this phenomenon might be that respondents do not rank their priorities in advance. If the experts are so important that their opinions cannot be ignored, one has to ask them to adjust their responses to reach a minimum consistency level. In this case, the processes are repeated and so complicated that the experts' original intention might be distorted.

This study proposes an RPC approach that asks respondents to express the priorities of involved elements and subsequently to assess the relative weights for two consecutive rankings. Using multiples of relative weights and the reciprocal principle, we obtain a pair-wise comparison matrix. The operation process of the RPC can be found in Appendix A1. We also illustrate an example in