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Using data envelopment analysis to measure hotel managerial efficiency change in Taiwan

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Abstract

In the face of a highly competitive environment, it has long been considered important for a hotel to formulate a marketing competition strategy, strengthen corporate operations and upgrade quality of service. In formulating competition strategies, one must first measure the comparative performance of the entire industry, before one may understand one's advantages and disadvantages. This paper uses data envelopment analysis (DEA), developed by Charnes et al. (*Eur. J. Oper. Res.* 2(6) (1978) 429), and the Malmquist productivity index expressed by Färe et al. (*J. Product Anal.* 3(1) (1992) 85), to measure the managerial performance of 45 hotels in 1998 and the efficiency change of 45 Hotels from 1994 to 1998. The results revealed that there was a significant difference in efficiency change due to difference in sources of customers and management styles. In addition, this paper showed that the managerial efficiency of international tourist hotels in Taiwan is related to the level of internationalization of hotels. Moreover, the entire industry can be partitioned into six clusters based on relative managerial efficiency and efficiency change. Effective management strategies are developed specifically to each of the six clusters of hotel. It was expected this study can provide useful information for future hotel management needs.

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1. Introduction

Since the end of cold war, reconciliation has gradually replaced confrontation. Barriers to international travel have gradually been removed. With the growing popularity of free trade, international exchange has increased tremendously symbolized by a relaxation of visa arrangements around the world. This has prompted the rapid growth of tourism industries. Tourism has not only become one of the largest sources of income for many countries but also has an effective means to stimulate global economic development. Since Taiwan entered the martial law in 1949, the development of international tourism industries in Taiwan has encountered significant limitations. With the lifting of this law in 1985, tourist activities have grown and the number of tourist arrivals increased from 1.3 million in 1985 to 2.41 million in 1998. Revenues from travel and foreign

currencies increased from US\$919 million to US\$3,776 billion in 1998.

With the lifting of martial law in Taiwan, hotels have mushroomed nationwide. International hotel numbers have increased from 44 in 1985 to 54 in 1998. Ordinary hotels have increased from 2973 hotels in 1985 to 3424 in 1998. However, because the rapid expansion of the hotels exceeded market demand, many hotels subsequently closed, partly due to mismanagement. Over the last 5 years, 8 international hotels and 443 ordinary hotels have closed. Facing a highly competitive environment, the formulation of marketing strategy, strengthening corporate operations and upgrading the quality of service has become essential for survival. In formulating competition strategies, one major problem is the measurement of management performance of the entire industry, prior to an assessment of one's advantages and disadvantages. Another problem encountered is to determine the factors which affect managerial efficiency.

This paper adopted data envelopment analysis (DEA), developed by Charnes, Copper, and Rhodes (1978), using multiple inputs and outputs to measure the relative managerial efficiency of 45 international hotels

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in Taiwan. At the same time, the paper used the Malmquist productivity approach expressed by Färe, Grosskopf, Lindrgen and Ross (1992) to measure the managerial efficiency change of 45 international hotels. By comparing annual changes in the managerial efficiency of individual hotels, it is possible to identify general trends in the efficiency of the hotel industry as a whole and to identify individual hotel exhibiting patterns of change in efficiency that differ from the rest of the industry. A further analysis of the results should help managers to understand the factors that determine the managerial efficiency in Taiwanese hotels. Moreover, based on the measurement of managerial efficiency and efficiency change, a management decision matrix was developed to serve as a basis for an assessment of the competition strategy of 45 international hotels in Taiwan.

2. Problem

2.1. Background

Tourist hotels in Taiwan can be divided into international tourist hotels and ordinary tourist hotels. Hotel grading is with a plum mark which is issued by Taiwan Tourism Bureau. International hotels are four or five plums tourist hotels. Ordinary hotels are two or three plums tourist hotels. Currently, there are 52 international hotels in Taiwan. Of these, 45 have been established for more than 5 years, of which 33 are city and 12 are resort hotels. These hotels range from a maximum of 873 rooms to a minimum of 50 rooms. Based on patterns of operation, hotels are classified into two large groups: independent operations and international chain operations. International chain operations are further subdivided into franchise chain, management contract and membership (as shown in Table 1).

Independent operation refers to investors who do not rely on foreign management. They operate hotels on their own and are responsible for their own management decisions. The Grand Hotel and Howard Plaza Hotel are independently operated and managed by themselves. Franchise-chains refer to hotels which have entered into a cooperative management contract with worldwide chain hotel consortiums, which clearly specify their respective rights and responsibilities under the cooperative management contract. The subsidiary company pays a specific amount of royalties to the parent company in exchange for the company's standard operation process and management knowledge. Lai Lai Sheraton Hotel joined US Sheraton, Rebar joined Holiday Inn Crowne becoming a Franchise chain hotel. Management contract refers to hotels wherein investors formulate management contract and entrust interna-

tional chain hotels to manage the hotel on its behalf. Hotel ownership and management are entirely separated. For example, Singapore consortium commissioned the Hyatt Hotel Groups to operate the Grand Hyatt Hotel, the Tuntex Group commissioned the Regent Group to operate Grand Formosa Regent on its behalf. A Hotel joins a reputable world organization as a member after passing a strict qualification evaluation. As a member hotel, it enjoys the prestige of being part of a world's organization as well as sharing and exchange of information with member hotels to ensure operational quality. The Sherwood Hotel is for example, a member of Preferred Hotels system.

Based on its market positioning, each tourist hotel has its unique primary source of customer. Customers of Gloria Hotel are mostly Japanese tourist whereas Grand Hotel caters to Japanese, North American and European tourists.

2.2. Issues

443 ordinary tourist hotels and 8 4-plum international tourist hotels went out of business due to mismanagement in the last five years. The Mirama Hotel Taipei attracted many Japanese customers since its opening in 1978. In recent years, the number of business travelers has decreased and newly operated hotels, such as the Sherwood Hotel and the Westin Taipei, have entered into the market, leading to the excess supply of rooms. Amid fierce competition, the older hotels like the Grand Hotel, Ambassador Hotel, Mandarina Crown Hotel were refurbished to retain and attract new customers. Some independent hotels have joined international franchise-chains to promote their managerial capabilities. For example, the Gloria Prince Hotel joined Meridien and the Imperial Hotel became part of the Inter-continental franchise-chains. Because Mirama Hotel Taipei failed to respond to these changes, it eventually closed down in 1998. The President Hotel and Fortune Hotel followed suit due to their unsatisfactory management. In addition, Asia World Plaza Hotel had a large number of rooms so it required more manpower and operational work than competition but unfortunately its allocation of resources was not very efficient. The 1990 Gulf War and the Asian Financial Crisis resulted in a decline in the number of visiting tourists to Taiwan, which caused the low occupancy rate. Failing to allocate resources in an efficient way and slowly adjusting the management meant that the Asia World Plaza Hotel at one stage suffered from financial difficulties.

Generally speaking, Taiwan's hotels adopt two ways to respond to competition. First, by targeting international travelers and domestic tourists so as to increase the sources of customers. Second, some hotels joined franchise-chains, outsourced management and acquired

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