Journal of Air Transport Management 50 (2016) 53–61

Contents lists available at ScienceDirect

Journal of Air Transport Management

journal homepage: www.elsevier.com/locate/jairtraman

An airline's management strategies in a competitive air transport market

Young Dae Ko

Department of Industrial and Systems Engineering, Korea Advanced Institute of Science and Technology, 291 Daehak-ro (373-1 Guseong-dong), Yuseong-gu, Daejeon, 305-701, South Korea

ARTICLE INFO

Article history:
Received 2 June 2015
Received in revised form
19 September 2015
Accepted 28 October 2015
Available online xxx

Keywords:
Air transport industry
Demand leakage
Full service carrier
Game theory
Low cost carrier

ABSTRACT

Over the last decade, the demand for domestic and international flights in Korea has increased substantially. To meet the strong flight demands, several low cost carriers have begun to offer flight services. In addition, full service carriers have been motivated to establish their own subsidiary low cost carriers to maintain their market share against rival low cost carriers. This paper studies the management strategies of three kinds of airlines - full service carrier, its subsidiary low cost carrier and rival low cost carrier - based on game theory in the competitive air transport market. Each airline is assumed to act as a player and chooses strategies regarding airfare, flight frequency, and the number of operating aircrafts for specific routes while maximizing its own profits. Demand leakages between the airlines are considered in the flight demand function according to the selected strategies of all airlines. Through various game situations reflecting realistic features, this study provides managerial insights that can be applied in the competitive air transport market.

1. Introduction

1.1. The emergence of LCCs

After the declaration of the 1978 Airline Deregulation Act in the United States, the market situation of the air transport industry changed significantly. With the adoption of free competition, airlines tried to improve their customer services. They began flight services in new routes and developed various airfare policies to ensure their survival. Various new airlines, including low cost carriers (LCCs), entered the air transport market to satisfy diverse air transport demands. The concept of LCCs is to offer the flight services with the attractive prices that are much lower than the conventional full service carriers' (FSCs) and even comparable to those of a car or train. By increasing the number of passengers, LCCs can get sufficient profits even though the unit profit per passenger tends to be less than that of FSCs. In addition, LCCs have tried to reduce all kinds of cost-related elements to secure their operating profits. Therefore, even though they cannot provide sophisticated services as compared with FSCs, the demand for LCCs has increased steadily by passengers who want only a basic transportation function.

1.2. The characteristics of LCCs

The fare class structure of LCCs is relatively simple because they only operate one class: Economy and LCCs generally offer two kinds of airfares: Discount fare and regular fare. In addition, they usually provide flight services in point-to-point routes for simple and easy management. LCCs tend to choose lower-tariff airports (Marcus and Anderson, 2008). To get rid of commission payments, LCCs do not use travel agents and adopt the electronic ticketless systems or e-ticket utilizing websites. In addition, they keep a high flight frequency to maximize their utilization and adopt team competitive wages and profit sharing to maintain high productivity and efficiency (Evangelho et al., 2005). Generally, LCCs' airfares are 30–40% lower than FSCs', and LCCs' operating costs are 40–50% compared to FSCs' (Doganis, 2001). Through the emergence of LCCs, various alternatives are given to customers when they are choosing their airline, in terms of preference, airfare, flight frequency, etc. Thus, with the remarkable growth of the customer demand for LCCs, it is difficult for FSCs to ignore the LCC market and focus on the premium market.

E-mail address: ydko@kaist.ac.kr.

http://dx.doi.org/10.1016/j.jairtraman.2015.10.005
0969-6997/

1.3. FSCs' response strategies

In response to the steady growth of LCCs and to keep the market share at certain air transport market, some FSCs have developed certain tactics. Some have: (1) Established their own LCC as an internal unit or subsidiary against rival LCCs. (2) Tried to optimize their present operations by cutting off wasteful expenses while maintaining their current business model. (3) Transformed their business model to similar one of LCCs by reducing their current service levels (Morrell, 2005). Among the alternatives described above, this study has examined the first one, i.e., the FSC strategy of opening a subsidiary LCC against the rival LCC through a three player game situation.

1.4. The current situation of the Korean air transport market

Nowadays, there are five successfully operating LCCs in the Korean air transport market. Among them, Eastar Jet, T'way airline, and Jeju Air were established as pure LCCs, whereas Jin Air and Air Busan were launched as subsidiary LCCs of Korean Air and Asiana Airline, respectively. Both Korean Air and Asiana Airline are regarded as FSCs in the Korean air transport market. At first, LCCs only operated within the domestic air transport market, because several domestic routes such as Gimpo-Jeju and Gimhae-Jeju are highly profitable, regardless of season or day. After they secured the sufficient air transport demands of these domestic routes, they tried to advance the international air transport market by introducing large-size aircrafts such as the Airbus 330 and Boeing 777.

Fig. 1 depicts the LCC market share between 2010 and 2014, while the values of the 2014 year are forecasted. At present, the market share of LCCs is expected to be more than half of the entire domestic air transport market. In addition, the market share of LCCs in the international air transport market tends to increase continuously. Thus, the FSCs choose response strategies to deal with the increasing market share of rival LCCs, such as competing directly by launching subsidiary LCCs.

1.5. The aim of this study

This study dealt with the airline's optimal response strategies in the competitive air transport market by assuming operation situations both under a single route and multiple routes. According to the business purpose and the competing environment, four kinds of game theoretic situations are defined. For each, this study tries to find optimal values for the airfares, the operating flight frequencies and the number of operating aircrafts of all airlines to maximize their profits. In addition, the demands of all airlines are regarded as a function of both the airfares and their operating flight frequencies.

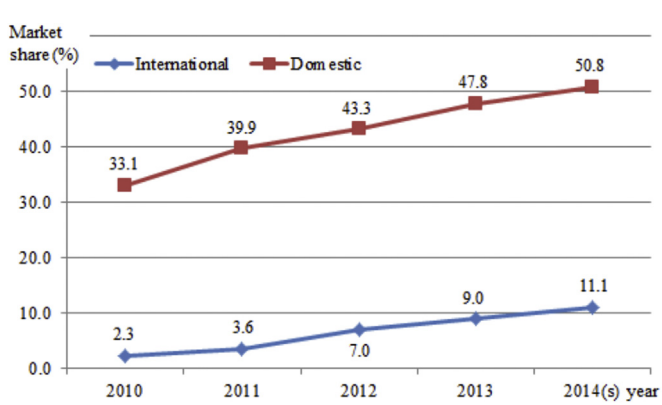

Fig. 1. The market share of LCCs at Korea air transport market between 2010 and 2014.

2. Previous study

After the US Airline Deregulation Act in 1978, many low cost airlines emerged, expanded, and disappeared over 35 years in the US, Europe, and Asia. Market competition in the air transport industry has increased due to the establishment of LCCs, and many researchers have investigated the characteristics of LCCs. Button and Ison (2008) mentioned the general characteristics of LCCs in terms of economics. Mason (2000) performed a preference (SP) survey against European business travelers to evaluate the propensity of business travelers who use the short haul services of low cost carriers. They used evaluation elements such as price, airline reward schemes, flight frequency, and in-flight comfort service attributes in their determination. Reynolds-Feighan (2001) examined the traffic distribution patterns of both FSCs and LCCs. He insisted that LCCs tend to concentrate their traffic flows around a limited number of key nodes. Further, many researchers focused on specific factors of LCCs such as their service quality, airport, network construction, etc. (Jiang, 2013; Graham, 2013; Müller et al., 2012).

Several research studies investigated the airfare pricing, scheduling and the features of airlines in the competitive air transport market. Strassmann (1990) described all airfares tended to decrease when new airlines emerged in the US domestic market. Meanwhile, when a LCC stops operating in a certain route, the airfare of that route has tended to increase (Morrison and Winston, 1995). Whinston and Collins (1992) presented that the average airfare of 15 routes were reduced by 34% due to the operation of a new LCC, People Express, based on data from 1980 to 1984. Brueckner and Zhang (2001) presented a comprehensive economic analysis of scheduling decisions in airline networks. They mentioned that flight frequency increased in a hub-and-spoke network than in a fully-connected network while charging a higher fare to local passengers. In addition, Brueckner and Flores-Fillol (2007) provided a simple model of airline schedule competition between two duopoly carriers considering the combinations of fare and expected schedule delay. Givoni and Rietveld (2009) investigated the phenomenon that airlines increase their flight frequencies rather than aircraft size to cope with customer demand at the competitive environment. Brueckner (2010) proposed a simple model of schedule competition where transport providers choose service frequency and fares while passengers were influenced by average schedule delay and brand loyalty to particular carriers.

Recently, Brueckner et al. (2013) introduced the fare impacts of LCCs in competitive situations with FSCs. They addressed that the average fares of FSCs have weak effects, while the average fares of LCCs have dramatic impacts, whether occurring on an airport-pair, at adjacent airports, or as a potential competitor. Hernandez and Wiggins (2014) evaluated the effects of competitive conditions on nonlinear pricing strategies in the airline industry. In addition, Obermeyer et al. (2013) tested the effects of competition on price dispersion in European airline markets. They proved that efficient airlines have a more dominant position, which allows them to differentiate their fares more than their less efficient counterparts. Kawamori and Lin (2013) presented airline mergers as the response strategy of FSCs against rival LCCs. They calculated merged airlines' profits from both hub carrier's operating costs and connecting passengers' hub-through additional time costs.