



Segmentation of passengers using full-service and low-cost carriers – Evidence from Taiwan



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ABSTRACT

Low-cost carriers in Taiwan have rapidly drawn a large number of passengers away from full-service carriers in recent years. However, many passengers still stick with traditional airlines as their primary air carriers. These two groups of passengers should differ in terms of their personal and trip characteristics, valuations of factors in determining an airline, and perceptions of need for ancillary services. The present paper compares the profiles of passengers using different types of air services in Taiwan using data collected from an online survey and assesses the potential of principal component analysis with biplot technique to define different passengers based on their preferences of services and valuations of the importance of factors. Our study shows that passengers of full-service and low-cost carriers have different trip characteristics; principal component analysis is applicable for this context of passenger profile segmentations.

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1. Introduction

Low-cost carriers (LCCs) in Taiwan have very recently rapidly drawn a certain number of passengers from full-service carriers (FSCs). The market share of LCCs in Taiwan has climbed to 10% of total air traffic in 2015, up from 2% in 2011 (CAA, 2015). It is expected that there will be more intensive competition between these two models of airlines in the foreseeable future in Taiwan. Therefore, identifying passengers' expectations/needs and their trip and socio-demographic characteristics is essential for both airlines to provide the desired services. Several studies have continuously investigated such fundamental issues to understand the factors that drive air travellers in choosing their airlines. Some have concluded that plenty of passengers using LCCs are price-sensitive (Lin and Huang, 2015; O'Connell and Williams, 2005; Kuljanin and Kalić, 2015; Martínez-García and Royo-Vela, 2010); some have found that a number of business passengers consider LCCs as an option for their business air travel (Neal and Kassens-Noor, 2011; Fourie and Lubbe, 2006; Huse and Evangelho, 2007; Desai et al., 2014; Martínez-García et al., 2012). Some have observed that the profiles of passengers using FSCs and LCCs substantially differ in terms of their socio-demographics and trip characteristics

(Kuljanin and Kalić, 2015; Desai et al., 2014; O'Connell and Williams, 2005).

Furthermore, some studies have utilized cluster analysis or similar techniques to further explore heterogeneity among FSC and/or LCC passengers. For example, Kuljanin and Kalić (2015) performed a two-step cluster analysis using variables such as travel purpose, travel frequency, travel decision made by whom, place of residence, level of education, and ticket prices to identify meaningful groups of passengers using FSCs and LCCs. The results indicated that two segments exist among FSC passengers that are primarily based upon trip purposes and that there are four segments among LCC passengers that are primarily dictated by place of residence. Roy-Vela and Martínez-García (2010) also applied same technique to segment budget air travellers and identified four clusters with different valuations of fare, flight quality, flight duration, trip or destination quality, and closeness of the airport to destination. However, the profiles of the segments were partly overlapped so that the resulting segments might not be useful for passenger management.

Another study by Huse and Evangelho (2007) utilized factor analysis with biplot technique to identify two very distinct types of business travellers, as follows: "luxury-loving passengers" and "no-frills passengers". Their study found that the "luxury-loving" travellers highly value the attributes commonly offered by FSCs, such as mileage programs, business lounges, and high-quality in-flight

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services, while “no-frills” passengers only value red-eye flights, which tend to be cheaper for them. However, these two types of passengers both highly value attributes such as frequency, punctuality, ticket emission, check-in easiness, etc. Moreover, [Wen and Chen \(2011\)](#) applied multiple correspondence analysis (MCA) to cluster airlines based on passengers' perceptions of service quality. Although their study primarily focused on discovering the market positioning of full-service airlines operating on the Taipei-Tokyo and Taipei-Osaka routes, distinctive preferences of passengers and profiles were also identified. Their analysis suggested that three groups of airlines compete on particular service attributes and are chosen by different characteristics of passengers. [Diana and Pronello \(2010\)](#) also utilized MCA to segment travellers regarding their stated mode choices. Their study demonstrated that nominal variables such as opinions, choices, and social backgrounds of travellers can be considered for segmentation but they also suggested that psychological constructs could be taken into consideration in the future study.

Those aforementioned studies all implied that there is a heterogeneity among passengers with FSCs and/or LCCs regarding the valuations of service attributes offered by airlines and that using segment analysis is a good way to explore the heterogeneity. However, those studies were mostly based on the EU or US marketplace in which LCCs are well-developed and have reach maturity in product life cycle ([Kim, 2015](#)). To our knowledge, there is little evidence about the profiles of Asian air travellers using FSCs as well as LCCs. LCCs in some Asian countries are in the growth stage of the product life cycle, including Taiwan, and using traditional segmentation logic no longer responds to the growing complexity and heterogeneity choices made by passengers in today's airline environment ([Fourie and Lubbe, 2006](#); [Teichert et al., 2008](#)). Meanwhile, a major feature of the business model of LCCs is that the ticket price is no longer inclusive of all services. Passengers using LCCs can additionally buy the ancillary services they need such as baggage allowance, in-flight meals, etc. Nevertheless, few studies have investigated passengers' needs for ancillary services, especially from the perceptions of both airline passengers. Therefore, there is a need to re-evaluate the segmentation strategy other than traditional logic and additionally considering the perception of needs for the ancillary services from the perspectives of both FSCs and LCCs passengers.

This paper uses Taiwan as a case study to investigate the characteristics of current passengers of both types of airlines and explore passengers' expectations/needs when choosing an airline. The findings demonstrate that the trip characteristics of Taiwanese passengers do differ significantly between the two types of airlines. This study also utilises principal component analysis (PCA) with biplot technique to further cluster passengers using different airlines into a few meaningful groups and identify their distinctive profiles with various preferences of services and valuations of the importance of factors to determine an airline. Particularly from the findings of the segmentation analysis corresponding to passengers' perceptions of need for ancillary services, we offer useful suggestions for both businesses of airlines to design potential service products to meet different segments' needs and enhance their travel experiences.

2. Air transport market in Taiwan

The trend in Taiwanese outbound air travel has been continuously upward since 1987, the year of implementing the open sky policy in Taiwan. In 2015, the number of Taiwanese outbound travellers reached a record high of 13.2 million people, accounting 27% of total international traffic of Taiwan. The compound annual growth rate of outbound travel is approximately 5% from 2005

([Tourism Bureau, 2005, 2015](#)). Although the trend is highly correlated with the growth of national income per person, continuous increasing of air carriers in Taiwan, particularly the LCCs, also make outbound air travel easier than before and, therefore, pushes the trend increase.

The very first low-cost carrier flying into Taiwan is Jetstar Asia. They started their first flight from Singapore to Taipei at the end of 2004. Cebu Pacific Air followed Jetstar Asia and operated the first flight from Manila to Taipei in early 2007. However, the passenger traffic of LCCs accounted no more than 1% of total traffic by the end of 2009. The market of LCC in Taiwan began to boost after AirAsia (IATA code: AK) started to offer their flight services in 2010. Afterwards, several LCCs such as Air Busan, Eastar Jet, Scoot, Peach Aviation, Jeju Air, Spring Airlines, Juneyao Airlines, HK Express, and so on successively launched their flight services in Taiwan. [Table 1](#) lists all the LCCs currently operate in Taiwan by 2015. In 2014, Taiwan had its own low-cost carriers, Tigerair Taiwan and V Air (V Air has terminated operation since October of 2016), and the market share of LCC traffic came to 7.7%. The market share of LCC was 10.1% in the consecutive year and soon climbed to 14.0% by November 2016 ([CAA, 2016](#)). It is estimated that the total passengers with LCCs in Taiwan will be more than 9 million in 2016, more than 10 times of the LCC traffic in 2005. As indicated in [Fig. 1](#), the total number of international passengers in Taiwan have constantly increased from 2000 to 2015, particularly after 2009, the trend climbs upward along with the increasing share of LCC.

There are 59 airlines currently operating scheduled flights in Taiwan by the end of 2016, and 21 of them are low-cost carriers ([CAA, 2016](#)). Most of them use Taiwan Taoyuan International Airport (IATA code: TPE) as the main gateway airport. TPE is the primary international airport in Taiwan, with more than 42 million international passengers in 2016. There are three other international airports: Taipei Songshan International Airport (TSA), Taichung International Airport (TXG), and Kaohsiung International Airport (KHH). TSA is located in the Taipei metropolitan area and has flights to cities in China, Korea, and Japan. The total number of inbound and outbound passengers at TSA were approximately 6 million in 2016. TXG is located in central Taiwan, with flights mostly to Hong Kong and Macau, some to cities in Japan and China. The annual passengers of TXG were 2.4 million in 2016. KHH is the southern hub of Taiwan, with flights connecting to most cities in Asia. The annual traffic at KHH was approximately 6.4 million passengers in 2016. If the trend in air transport in Taiwan remains stable and upward, it is expected that the total air passengers will be more than 60 million soon and the share of LCC traffic will reach 20% in a near future. Hence, more intensive competitiveness between traditional airlines and low-cost carriers in Taiwan is expected. Since airlines cannot solely focus on the performance of operation when facing competitiveness, investing in differentiation based upon passengers' needs and offering the desired products should also be valued ([Thomas and Nevin, 2016](#)).

3. Data

Data were obtained from an online survey conducted from the end of February to the end of March in 2016 in Taiwan. Due to security concerns, the face-to-face survey is not allowed in the security area in most international airports in Taiwan. It, therefore, limits passengers' willingness to partake in the survey, as most of them, outside the security area (i.e., departure or arrival lounge), are in the line for check-in or security check or meeting with friends or family and easily ignore the interview invitations. Moreover, the passengers at the airport might not all have prior experiences in taking air travel also limit their abilities to complete the survey. Even though the online survey has limitations compared with face-

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