Market Potential Study for Standing Cabin Concept for Domestic Low-Cost Commercial Airlines in Malaysia

Fairuz I. Romli, Norhafizah Dasuki and Mohammad Yazdi Harmin
Department of Aerospace Engineering, Faculty of Engineering, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia

Abstract. An affordable air transportation has become the operational aim of many airlines these days. This is to cater the growing air travel demands from people of different social and economic status. One of the revolutionary proposals to reduce the operational costs, hence the flight ticket price, is by introducing the so-called standing cabin concept. This concept involves transporting passengers during the entire flight in their standing position with a proper support of a vertical seat. As can be expected with many new inventions, despite its clear advantages, the concept has been met with mixed reactions from the public. This study intends to establish whether the standing cabin concept has a market potential to be implemented for domestic flights in Malaysia. The public perception is determined from collected data through a survey done at two major local low-cost airport terminals. It can be concluded from the results that the concept has a good market potential for application on flights with duration of less than two hours.

1. Introduction

Today, there is a significant rise in the need for people with different social and economic background to travel from one point to another in a shorter time duration, sometimes on a daily basis. Due to this situation, air transportation has transformed itself into an essential travel means and no longer caters only for luxury trips like it mostly did in the past. Accordingly, to cater for passengers market that is now extended across different social and economic classes, the operational paradigm of many airlines is shifting towards providing more affordable flight services to their customers. This means having a cheaper flight operation to enable competitive reduction in their offered ticket prices. This changing operational paradigm, and its significant success, is evident by the large numbers of profitable low-cost carriers that are serving the worldwide market these days.

As the air transportation industry continues to grow, the market competition is also becoming more competitive. For most low-cost airlines, to remain operationally profitable, their operation has a high break-even load factor that could be lifted even higher by market factors such as increasing fuel prices [1]. This situation leads them to look for alternative ways to keep their low operational costs in order to still be able to offer low ticket fares to their passengers. A low-cost airline in China, Spring Airlines has started to look at the possibility of having standing-only passenger cabin on their aircraft fleet back in 2009. It is projected that such cabin design can increase the passengers cabin capacity by about 40% than that of the conventional cabin design and reduce the cost by as much as 20% [2]. Later in 2012, a major low-cost airline in Europe, Ryanair has further picked up on the idea and conducted a series of
test flights with modified section of passenger cabin on their aircraft as standing-only section [3]. This development can be taken as a good indication that the standing cabin idea is growing in acceptance by the public and airlines, though there are still several issues that need to be addressed and resolved before the concept can be implemented in commercial flights. In terms of regulations, standing cabin concept is principally legal by current standards of several governing aviation authorities. The Federal Aviation Authority (FAA) does not specify that passengers have to be in their sitting position during takeoff and landing while the Air Transport Association (ATA) does not enforce any specific standard for seat comfort or seating configuration onboard the cabin [4]. According to current aviation rules, it is adequate if it can be proven that passengers have been properly secured by a certified mechanism, even if they are standing during takeoffs and landings.

The concept is highly suitable for the Malaysia domestic air transportation market because most of its flights are within two hours duration, which has been suggested as a good duration for the standing cabin concept application [5]. This limitation of flight duration is mainly proposed to avoid any health issues or fatigue to passengers. Similar to other worldwide markets today, domestic flights in Malaysia are progressively dominated by the local low-cost carrier, AirAsia. In just four years after its market introduction, AirAsia has managed to secure 30% market shares of the local domestic market [6]. The low-cost operational paradigm of AirAsia can be seen to revolutionize the domestic air transportation sector in Malaysia, opening up the market to many new customer segments who never use flights for domestic travel due to comparatively high ticket prices prior to its service entry. This can be seen from the increase in recorded number of flying passengers after AirAsia came into service, which highlights high demands for low-cost air transportation services in Malaysia. However, despite the considerably low ticket fare, there are many people in Malaysia who still choose cheaper domestic transportation options such as buses and trains. Hence there is still a potential market to be explored if the airlines can further reduce their operational cost and subsequently their offered flight ticket prices to become more competitive against other transportation options. A study conducted for the domestic Malaysian flight markets indicates that the flight ticket prices can be reduced by as much as 26% when using the standing cabin concept [7]. Further discussion on how on the standing cabin implementation can help improve the competitiveness of low-cost airlines can be found in Ref. [8]. This can be the competitive solution for the airlines to make domestic air transportation more affordable for people in Malaysia.

Acknowledging that the success of future standing cabin implementation also heavily depends on the public acceptance of the concept, the objective of this study is to analyze the public perception and establish whether there is a market potential for the concept to be implemented.

2. Standing Cabin Concept for Domestic Flights
Standing cabin is a concept of passenger cabin design arrangement where the passengers are primarily transported in their standing position throughout the flight. A graphical depiction of this cabin concept, which is considered for this study is illustrated in Figure 1. In addition to enabling the airlines to fit in more passengers onboard their aircraft fleet, it is also expected that the vertical seats used in the cabin concept are thinner and lighter than the current cabin seats. This helps to improve flight performance and also operational costs in the long run through potential savings of fuel.

The primary element of the standing cabin concept is the vertical passenger seat design. To date, no full-standing vertical passenger seat design has been approved for use in commercial transport aircraft. The closest available seat design that resembles full-standing seat considered in this study is the one proposed by Aviointeriors Company, one of the leading aircraft seat and interiors manufacturers in the world. The seat is called SkyRider, which is designed as ultra-high density seat to allow the possibility of reducing ticket prices while maintaining sound profits for low-cost airlines. It has been advertised that, even with reduced seat pitch, adequate passengers’ comfort level can be expected with SkyRider since the seating position is just like “riding a tourist motor-scooter”. This seat design was unveiled at Aircraft Interiors Expo Americas 2010 in Long Beach, California and back then, it was said to be in its final testing stage.
The idea of vertical passenger seat for aircraft cabin has been around since back in 2006, which has been visualized to be comprised of a vertical bench with shoulder harnesses and arm rests [9]. Airbus, one of the world’s leading aircraft manufacturers, have seriously considered the idea for their aircraft at one point and patterned their proposed design concept [10]. Unfortunately, not much detail has been available regarding the design of that vertical seat. In fact, no published formal study on a vertical seat design has been found in public domain during this study apart from the authors’ work in Ref. [5] and Ref. [11]. The lack of published studies in public domain regarding the feasibility and viability of its implementation into commercial aircraft design makes its realization to become overlooked.

Apart from safety concern, another big issue that seems to bother many potential passengers with this standing cabin concept is its perceived low comfort level, mainly because they are expected to be standing instead of sitting throughout the entire flight duration. An ergonomics study on the standing cabin concept, however, has argued that such standing posture will not notably pose higher health risk to the passengers in comparison with that of current sitting posture for short range flights [5]. In fact, the standing posture might even be more comfortable for passengers than current seating arrangement, especially when many airlines continue to reduce the seat’s pitch and width to the minimum regulated measures in order to increase their cabin capacity.

3. Data Analysis and Discussions
The survey was conducted at two major low-cost airport terminals in Malaysia: SkyPark Terminal at Sultan Abdul Aziz Shah Airport and Kuala Lumpur International Airport 2 (KLIA 2). Both terminals are primarily used as the main hub by local low-cost airlines for domestic flight operation in Malaysia. The study has been conducted both in weekends and weekdays, and in peak hours and off-peak hours. The peak hours here is assumed to be between 10am to 6pm, when the departures and arrivals of most flights are scheduled at the terminals. The target participants for this survey are people who frequently use flights as their means of travel. All in all, 1000 respondents have been surveyed for this study and the results are tabulated in Table 1.

In the survey questionnaire, respondents are asked to answer questions regarding several issues or concerns that have been previously established for the implementation of standing cabin on domestic flight operations in Malaysia. They are also asked to give their opinions and suggestions for the design of the standing cabin. For this paper, the collected survey data is analyzed to provide some insights on the market potential of the standing cabin concept. Table 1 gives a simple distributional illustration of respondents based on their response to the implementation of standing cabin concept, either positive or negative. It can be seen that about 47% of the surveyed respondents stated their willingness to try the standing cabin concept provided that the flight ticket price will be reduced. In contrast, about 53% of the respondents are not in favor with the implementation of the standing cabin, even with lower fares. This shows a clearly divided marketability of the cabin design concept but nonetheless, it highlights a possibility that the idea can still be marketed but need to be focused to certain categories of travelers.
Table 1: Statistics of Survey Data Results

| If we introduce a standing cabin in the aircraft and reduce flight ticket price, would you consider to travel by the flight? | YES (47.3%) | NO (52.7%) |
|--------------------------------------------------|------------|------------|
| Average age of respondents                      | 38.9 years | 43.9 years |
| Gender of respondents                            |            |            |
| Male                                             | 51.1 %     | 48.9 %     |
| Female                                           | 41.7 %     | 58.3 %     |
| Average annual income of respondents             |            |            |
| Male                                             | RM 10,120.43 | RM 21,789.81 |
| Female                                           | RM 21,789.81 | RM 10,120.43 |
| Average annual travel frequency                  | 64 times   | 72 times   |
| Common of luggage carrying mode                  | Carry-on 72% | Cargo 21% | Both 7% |
| Ability to stand within two hours                | Yes 74%    | No 26%     | Yes 0%   | No 100%|

From Table 1, it can be observed that the average age of respondents who do not favor the standing cabin is higher than those who are in favor. This is in line with the initial expectation that the concept will appeal more towards the younger travelers. In fact, the mode of age of the supportive respondents is recorded between 23 to 25 years old, indicating a strong inclination towards young travelers. The overall population of the surveyed respondents is about 60% males and 40% females. The results show that, while male respondents are rather even with a slight bias towards favoring the new cabin concept, the female respondents are notably skewed towards non-supportive responses. This is rather expected due to extra physical nature of having to stand inside the cabin as imposed on the passengers by the new concept instead of sitting in current conventional cabin. Furthermore, a big difference is evident in average income of respondents between the two response categories, whereby those who positively welcome the new concept seem to be earning much less than those who are non-supportive of the idea. This highlights that the new concept appeals more towards the travel need for passengers in the lower social and economic classes, who are in fact the majority customers for low-cost airlines in domestic flights in Malaysia.

Among those who support the idea of the standing cabin, majority of them carries their travel items as hand luggage. This fits well into the operational notion of the standing cabin concept, where further operational weight and cost savings can be achieved with a lower cargo payload from the passengers. An overwhelming 72% of travelers who favor the standing cabin commonly travels with only carry-on luggage. Another positive remarks that can be taken from the survey data is the high number of travel frequency of the respondents who in favor of the concept. Close to 90% of people in these group of positive respondents stated that they will consider to choose aircraft as their travel means if the ticket price is similar or just slightly more expensive than the price of other alternative public transportation such as buses or trains. On average, they commonly travel about 64 times per year, indicating the big market potential to be tapped into with the standing cabin concept. Lastly, it should be noted that the standing cabin concept has been proposed to work well for flights within two hours duration due to fatigue concerns that may affect the comfortability of the passengers. As indicated by the survey data results, an overwhelming 74% of the positive respondents said that standing for two hours is okay for them, further supporting the feasibility of the new cabin concept.
4. Conclusion
In general, the distribution of the responses reflects a divided market support for the implementation of the standing cabin concept for domestic flights in Malaysia. It can nevertheless be concluded that the market potential for this new concept does exist and should be capitalized by the airlines. The support for the standing cabin mostly comes from respondents who fit the characteristics of low-cost airlines' target passengers. As can be summarized from analysis of data presented in Table 1, target passengers for the standing cabin concept are frequent travelers who are mostly males, of age below 40 years old, earning in the range of middle economic class or below, and often travel with just carry-on luggage.

Due to a clearly divided acceptance of the concept based on the survey results, the standing cabin is suggested to be implemented as an alternative seating class below current conventional first, business and/or economy classes. This is mainly because it can be expected to be hard for airlines to fill up the entire aircraft cabin with only passengers who are willing to take the standing cabin option. It should be noted that the standing cabin concept will have some operational limitations in terms of the suitable types of passengers for its working mode. For instance, pregnant women, people with health issues or physical disabilities, infants and small children are not suitable to fly using the standing cabin concept. If the cabin is designed only for standing passengers, the airlines may lose more than half of its current passengers according to the projection of the survey result. Hence it is better to give the passengers an option for them to choose which seating class suits their travel preference and need at that moment.

All in all, it can be concluded that the market potential exists for the application of standing cabin concept for domestic flights in Malaysia but further research study needs to be done to ensure that its implementation can provide the utmost benefits to the airlines and also to the passengers. The way that the concept is being implemented on the aircraft cabin and the flight routes to be served with it will be instrumental in securing its market success.

Acknowledgements
The authors acknowledge the financial support for this research study from Universiti Putra Malaysia, Malaysia through research grant GP-IBT/2013/9407100. Moreover, we like to thank the management of Kuala Lumpur International Airport 2 (KLIA 2) and Skypark Terminal at Sultan Abdul Aziz Shah Airport for allowing us to conduct the public survey at their facilities. Lastly, our appreciation goes to Norashikin Othman, Hassan Rashid, Mohammad Rijaluddin Bahiki, Muhammad Faizzuddin Ismail, Khairul Afiq Rahim and Ruhana Omar for their help in conducting the survey.

References
[1] G. Dunn, "Low-Cost Carriers: Growth Expectations", http://www.flightglobal.com [Accessed: January 2014]
[2] P. Pae, "Chinese airline may offer cheaper fares to passengers who stand during short flights," Los Angeles Times, vol. 4, July 2009
[3] S. Kerridge, "Ryanair – Approval for Standing Only Cabin Areas", http://blog.france-airport-guide.com/2012/04/ ryanair-approval-for-standing-only.html [Accessed: December 2013]
[4] C. Elliot, "One Day, That Economy Ticket May Buy You a Place to Stand", http://www.ny-times.com/2006/04/25/business/25seats. html [Accessed: December 2013]
[5] F. I. Romli, A. N. Asmadi and N. Dasuki, "Ergonomics Study of Vertical Seat Design for Standing Cabin Concept in Commercial Transport Aircraft", International Review of Aerospace Engineering, vol 8, no. 3, 2015
[6] O. J. F. Connell and G. Williams, "Passengers' Perceptions of Low Cost Airlines and Full Service Carriers: A Case Study involving Ryanair, Aer Lingus, Air Asia and Malaysia Airlines", Journal of Air Transport Management, vol. 11, no. 4, 2005
[7] F. I. Romli and N. Dasuki, "Preliminary Study of Standing Cabin Concept for Domestic Commercial Flights in Malaysia", Proceeding of 2nd International Conference on Advances in Mechanical and Aeronautical Engineering, Bangkok, Thailand, 2013
[8] F. I. Romli, A. R. Mohammad Noor and N. Dasuki, "A Study on Potential Standing Cabin
Effects in Improving the Competitiveness of Low-Cost Airlines", International Journal of Engineering and Technology, vol. 6, 2014

[9] F. Gillete, "Ryanair’s O’Leary Mulls One-Euro Toilets, Standing Passengers", Bloomberg, 3 September 2010

[10] J. G. Angerani, A. Baatz, S. Hiesener, H. Merensky, Airbus Deutschland GmbH, Hamburg, Patent. No. US 6,467,728 B2, Date of Patent: 22 October 2002

[11] A. R. Mohamad Noor, F. I. Romli, "Conceptual Design of Vertical Passenger Seat for Standing Cabin in Commercial Transport Aircraft", Journal of Advanced Management Science, vol. 1, 2013