

# The Impact of Low-Cost Carriers on Inbound Tourism of Thailand

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**Abstract**—Outbound tourism primarily concerns air travel due to the limited options for transportation. Many studies related to aviation and tourism have been conducted. However, most studies are in the US and European context, with only a few cases having been studied in Asia. The purpose of this research is to focus on the development of Low-Cost carriers (LCCs) in major Asian nations. Particularly, it aims to study the influence of LCCs on Thailand's tourism. To investigate if LCCs contribute to an increase in Thailand's tourism demand, multiple regression analysis with key indicators is employed using monthly data from January 2013 to December 2017. The findings reveal that LCCs have a positive impact on Thailand's tourism. Furthermore, LCCs are the main factor in Thailand's tourism demand. It is necessary to consider the future development of LCCs and whether LCCs can play an important role in the tourism supply chain in the future. This research also improves the understanding of how LCCs have developed in Asia and become one of the most significant components of leisure tourism in Thailand.

**Keywords**— LCC, Air Transport, Tourism, Thailand, Multiple Regression Analysis

## 1. Introduction

The low-cost airline business model is different from that of traditional full-service carriers. Southwest Airlines started the low-cost business in North America in 1971 and hence, is viewed as the role model for all low-cost carriers (LCCs). Of late, the international focus in the aviation industry has shifted from North America and Europe to Asia. Since 2003, the aviation industry has witnessed rapid growth in Asia and LCCs have developed dramatically, encouraging new start-ups [1].

Air transportation is significant for Asian nations as many Southeast Asian countries do not have land connectivity with each other [2]. Rail and road infrastructure is often in poor condition between land-connected nations, leading to obstructions in the development of regional economies. Member states of the Association of Southeast Asian Nations (ASEAN) have taken several measures to

accelerate the growth of the aviation industry to revitalize the regional economy. To this end, the ASEAN Single Aviation Market (ASAM) was formed, and more joint-venture carriers were established. For instance, the AirAsia group and Lion Air have successfully deployed the so-called “branchizing” strategy, a method of expansion for LCCs [3]. This method has now resulted in the emergence of many joint-venture low-cost airlines, such as Thai AirAsia, Indonesia AirAsia, Philippines AirAsia, Thai Lion Air, Jetstar Asia, and so on. As the fastest-growing nation in Northeast Asia, China has four state-owned airline groups: Air China, China Southern, China Eastern, and Hainan Airlines, which dominated the domestic market with a market share of 90% in 2016. Chinese LCCs are in a nascent stage and these LCCs are the subsidiaries of full-service carriers (except Spring Airlines and Juneyao Airlines). The market penetration rate of Chinese LCCs is low. Contrast this with the Southeast Asian nations where LCCs are becoming major airlines believe that Southeast Asia has a mature market for low-cost carriers, compared with Northeast Asia [2].

The aviation industry has undergone tremendous changes after liberalization. For example, liberalization and “open sky” policies have led to intense competition among airlines, an increase in leisure tourism, reduction in ticket prices, and so on [4], [5].

Traveling has become cheaper now because LCCs have been given rights to operate on international routes. More people can now travel internationally because of affordable fares, easier ticket booking, and more international flights to many countries. In many developing countries, tourism has emerged as the driving force of economic growth [6].

The tourism industry not only provides job opportunities for individuals and families, but also drives growth in related industries such as transportation and commercial service. As the second-largest industry, tourism has played an important role in Thailand's economy. Thailand has relatively superior opportunities for development than

other ASEAN nations in terms of geographical location, tourism resources, and cultural background [7]. In recent years, Thailand's tourism industry has achieved many milestones. Thailand ranked 11th in international tourist arrivals. It is the second-most popular tourism destination in the Asia-Pacific region and sixth in the world with USD 45 billion in tourism receipts [8]. Travel and tourism contributed USD 42.2 billion (9.4%) to the Thai GDP in 2017 and is expected to increase by 7.8% in 2018 [9]. Malaysia, Singapore, and Vietnam are key competitors of Thai tourism. They possess mature tourism industries and can become international tourist destinations.

Therefore, it can be assumed that the expansion of LCCs and the tourism boom are related. This research aims to investigate this relationship between air transport and leisure tourism, namely, to examine if LCCs contribute to the increase in Thailand's tourism demand. This research can be a reference to policymakers and authorities for drafting effective strategies to promote growth in aviation and the tourism industry. The framework of this research is as follows. Section 2 contains the literature review, focusing on the deregulation process in air transport. The existing circumstances in major Asian countries is also described. In addition, the relationship between air transport (including LCCs) and tourism development is covered, with some related case studies. Section 3 presents the methodology used to examine the correlation between low-cost carriers and Thailand's tourism demand including hypothesis, analysis model, and data collection and description. Section 4 presents the results of multiple regression analysis. The trend of international tourists from 2013 to 2017 and the origin country of international tourist arrivals to Thailand are analyzed in this part. The final section is the discussion about future development of LCCs, with a summary of important findings besides an overall conclusion.

## 2. Literature Review

### 2.1 The liberalization of the aviation industry in major Asian nations

Before liberalization, air travel was not common between nations and regions because air transport was highly regulated. These regulations obstructed the growth of the tourism industry and influenced spatial patterns because of the limited range of routes [10]. However, numerous studies have acknowledged that liberalization leads to expansion of air service, rapid growth in tourism, reduction in fares, development of the air market network, and so on [4], [5]. To alleviate the negative impacts of regulation, open-sky polices were implemented more than three decades ago by many Asian countries to varying degrees.

A series of reforms were implemented to develop the aviation industry. ASAM was established at the end of 2015 to improve air services and increase connectivity between Southeast Asian nations. ASAM has promoted the growth of LCCs. Being able to operate on international routes is one of the most effective policies for LCCs. Although the air market in ASEAN is more liberalized now, it is not fully liberalized. ASAM can only

enforce the third, fourth, and fifth freedom of traffic rights, but the European Union Open Aviation Area allows the seventh freedom of traffic [11]. Foreign airlines enter into the "joint-venture" model (JV model) to commence operations in the domestic markets of member states. The JV model has proven successful under a regulation regime. Table 1 shows the existing JV airlines in Southeast Asia as of April 2018; there are 11 cross-border JV airlines based in six Southeast Asian countries (except Myanmar). Myanmar does not own a cross-border joint-venture airline because it has a relatively small domestic market. Passenger traffic was less than three million in 2017 in Myanmar, which is not big enough to support a joint-venture airline.

The process for establishing cross-border JV airlines is not always smooth. Malaysia's AirAsia group failed twice in its negotiations with the Vietnam government. In 2017, AirAsia made its third attempt to negotiate with the Vietnam government to form a new airline in 2018. However, it is still uncertain if AirAsia's goal can be achieved, as domestic passenger growth in Vietnam has slowed since 2016. It seems that there is limited room for another start-up in Vietnam [12].

**Table 1.** Joint-venture airlines in Southeast Asia

Airline	Country	Launch date	Overseas partner	Partner country	Fleet size: as of 23-Apr-2018
Thai AirAsia	Thailand	2004	AirAsia	Malaysia	59
Jetstar Asia (Singapore)	Singapore	2004	Jetstar/Qantas	Australia	18
Indonesia AirAsia	Indonesia	2005*	AirAsia	Malaysia	23
Jetstar Pacific	Vietnam	2008*	Jetstar/Qantas	Australia	17
Philippines AirAsia	Philippines	2012	AirAsia	Malaysia	21
Tigerair Philippines*	Philippines	2012	Tiger Airways	Singapore	N/A
Tigerair Mandala*	Indonesia	2012	Tiger Airways	Singapore	N/A
Malindo Air	Malaysia	2013	Lion Air	Indonesia	46
Thai Lion Air	Thailand	2013	Lion Air	Indonesia	31
Thai AirAsia X	Thailand	2014	AirAsia X	Malaysia	7
Thai VietJet Air	Thailand	2014	VietJet Air	Vietnam	4
Indonesia AirAsia X	Indonesia	2015	AirAsia X	Malaysia	2
NokScoot	Thailand	2015	Scoot	Singapore	4

Source: [12]

China has been conservative in its aviation industry liberalization and it has been quite difficult for private airlines to serve international destinations [13], which could explain the low penetration rate of LCCs. Although many aspects of the aviation industry are regulated by the Civil Aviation Administration of China (CAAC) such as market entry, route entry, fare levels, aircraft purchase, and so on [14], further developments are needed for airline consolidation, opening up of the domestic aviation market, and the adoption of a more liberal international aviation policy [13]. When it comes to LCCs in China, it is necessary to discuss Spring Airlines and Juneyao Group. The two leading LCCs are both based in Shanghai, China's largest commercial city. They were both launched in 2005 after the CAAC allowed private investment in the civil aviation industry.

The emergence of LCCs is relatively recent in Japan and Korea. The domestic aviation sector in Japan was liberalized in 1997. [14] observed limited expansion of LCCs in Japan after domestic liberalization because the high-speed rail is a strong competitor to LCCs. So, the

LCCs in Japan did not make much profit. Skymark Airlines only made profits in 2004, while both Air Do and Skynet Asia Airways operate at a loss [15].

The Deregulation Act in South Korea was implemented in May 2008. Restrictions on aircraft size were removed and there was no regulation on fleet age among non-scheduled airlines. It also allowed LCCs to operate jet aircrafts with more than 80 seats [16]. Before deregulation, two legacy carriers, Korean Air and Asiana Airlines had dominated the domestic air market. However, the airline deregulation and liberalization in Korea and the government's willingness to invest, paved the way for the emergence of LCCs in Korea [17]. To compete with the new LCCs and to ensure their survival in the aviation sector, the two legacy carriers established their own subsidiary LCCs—Jin Air and Air Busan. This strategy is similar to that used by the Chinese legacy carriers. By forming subsidiary LCCs, the legacy carriers are able to seize the market share and earn profits.

The liberalization of air transport has led to many changes—the so-called “chain reaction” phenomenon in the aviation industry. LCCs emerged due to liberalization, while medium and small airports grew because of LCCs. Some primary airports invest in “low-cost terminals” to attract low-cost carriers (e.g., an LCC terminal is expected to open in 2019 in the Nagoya Chubu airport in Japan; the Clark International airport in Philippines will also have a new LCC terminal in 2019) because LCCs carry higher passenger traffic [18]. Some Asian nations are now expanding their airport network (e.g., China is constructing a new airport—Daxing International Airport—in Beijing; South Korea has completed construction of a second terminal at the Incheon International Airport). Although secondary airports for LCCs in Asia are fewer than those in North America and Europe, China, and Korea show a growth in secondary airports in [12]. Highly regulated domestic markets, scarcity of open-sky agreements, and lack of secondary airports are the main reasons Asian LCCs lag behind their European counterparts [2]. The High Speed Rail (HSR) is becoming popular in many Asian nations such as China, Japan, and South Korea (e.g., the Shinkansen high-speed train in Japan and the KTX high-speed train in Korea), so it cannot avoid regarding the HSR as a potential important factor when it comes to the future direction of LCCs.

## 2.2 The relationship between air travel and tourism

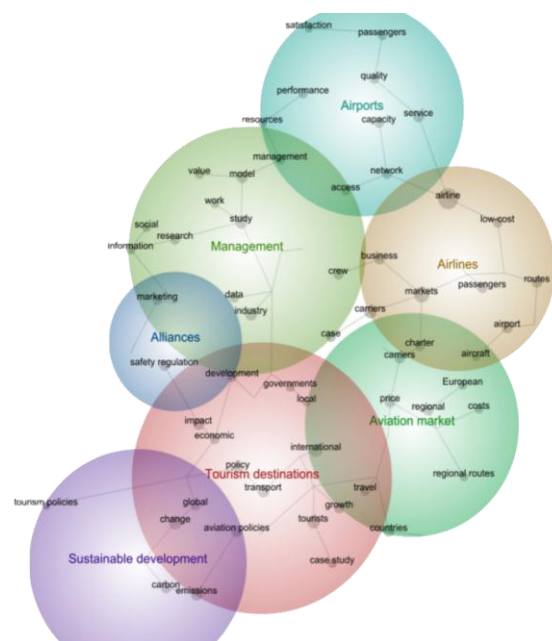
The relationship between air travel and tourism has been researched in recent times [19] because air travel is the primary mode of transport for international leisure tourism. It is believed that LCCs can generate new tourists and improve the local economy and “a number of destinations have issued marketing incentives to attract LCCs on the notion that their tourism problems will be alleviated” [20]. The approach taken by the Maltese authorities to attract low-cost carriers was different, because there was some skepticism about the effectiveness of LCCs. However, [21] demonstrates that LCCs contributed to an increase in tourists to Malta, and

that “LCCs have brought a younger, more affluent, and more independent tourist”.

Similarly, in Korea, LCCs were helpful in stimulating new tourism demand for Jeju Island [22]. [23] argued that LCCs attract more international tourists to Spain and have a positive impact on reducing seasonality. During 2003–2007 in Norway, LCCs were one of the most important factors driving the air demand increase [24]. As per [25], tourism development in the Pacific Island countries has been facilitated by the emergence of LCCs. Even so, the effect of LCC services on tourism is not always certain [22].

[26] has discussed that the emergence of LCCs has produced favorable conditions for the development of local and regional economies especially by increasing regional tourism demand. For countries like Thailand, which regard tourism as their major source of income [28], air transportation (including LCCs) plays a significant role. There are different perspectives to the question of whether low-cost carriers can mitigate tourism seasonality. At Brindisi and Alghero airports in Italy, seasonal traffic fluctuation decreased by 18% during 2006 to 2010 because of the entry of LCCs [26]. By contrast, seasonal fluctuation has hardly reduced in Jeju Island [22].

Considering the benefits of LCCs, the penetration of LCCs is not as high as expected. Conversely, the entry of LCCs in encountered difficulties in many cases. Several nations were unwilling to liberalize and deregulate their aviation sectors. The deregulation process in different countries has been reviewed before. The main reasons for regulation have been explained by [28]. Many governments protect their national airlines and do not allow foreign airlines to compete, as competition could lead to a loss in profit and market share. A typical example is the delayed development of low-cost airlines in China. [29] noted that there are few studies on Chinese air travel because of data unavailability. [30] claimed “there is an urgent need for the government to remove the barriers and take actions to facilitate the growth of this new type of business”. The authors claim that “whether the antitrust laws can be effectively enforced in the airline market to ensure a fair competition environment is key to the future development of Spring Airlines and other private carriers.” Finally, in 2014, the Civil Aviation Administration of China published the official policies that aimed to encourage and support the growth of LCCs. Many governments have now realized the significant effect of aviation liberalization on tourism. For example, Saudi Arabia has recently taken initiatives to change its aviation environment and policy, and has also started to reduce restrictions on market entry, while carrying out phased liberalization of its aviation market [32].



**Figure 1.** Relationship between tourism and aviation  
Source: [19]

### 3. Methodology

#### 3.1 Hypothesis Development

Past studies have noted that some nations have the tendency that LCCs lead to the increase of international tourist. Popular tourist destinations can attract more airlines to provide air services. Thus, LCCs and tourism industry have a mutual relationship. With the development of LCCs and the boom in tourism in Thailand, it is possible to connect LCCs and tourism. In addition, it is reasonable to assume that LCCs have stimulated the increase in international tourist arrivals to Thailand. The hypothesis is presented as follows.

H1: LCCs have a positive impact on Thailand's tourism demand.

There can be several factors affecting international tourist arrivals to Thailand. But for this research, the most important factor is the performance of LCCs. The selection of the analysis model and variables mentioned below is based on this hypothesis.

#### 3.2 Analysis model

Many econometric models, such as the gravity model, the multivariate model, and the seasonal autoregressive integrated moving average model have been applied to estimate the relationships between international tourism and air transport.

Generally, the objective in any data analysis is to examine if there is a statistical relationship between a response variable  $Y$  (the "dependent" or "outcome" variable) and explanatory variable  $X_i$  (the "independent" or "predictor" variable), by employing regression analysis.

There are different kinds of regression models, such as

linear regression, logistics regression, log-linear, and so on. The type of the distribution of  $Y$  determines the model to be used. The dependent variable  $Y$  in this research is international tourist arrivals to Thailand, the distribution of  $Y$  (international tourist arrivals to Thailand) is continuous and approximately normal, so a linear regression model is employed.

If a linear regression model is used, the following assumptions should be met: independence, linearity, normality, and homoscedasticity. Independence means all observations should be independent. Linearity means the relationship between the dependent variable and the independent variables should be linear. Normality means that for each value of the independent variable, the distribution of the dependent variable must be normal. Homoscedasticity means the variance of the distribution of the dependent variable should be constant for all values of the independent variable. The most commonly used method to check model assumptions are the standardized residuals ( $ZRESID$ ) and the standardized predicted values ( $ZPRED$ ). In this paper,  $ZRESID$  and  $ZPRED$  are used to check the model assumptions.

The sample linear regression equation can be written as follows:

$$Y_i = a + bX_i + sd, \quad (1)$$

where,  $a$  is the intercept, and often has no direct practical meaning.  $b$  is the slope, or the average increase of outcome per unit increase of predictor.  $sd$  denotes the residual standard deviation.

The sample linear regression cannot satisfy the need because there are usually more than two or three independent variables and even more in a real-world situation. So, for resolving the more complex and practical situations, multiple linear regression analysis is commonly used if there are several variables. In the multiple linear regression,  $Y$  has normal distribution with mean.

$$Y = \beta_0 + \beta_1 X_1 + \dots + \beta_p X_p + \sigma(Y), \quad sd(Y) = \sigma \quad (2)$$

(independent of X's)

$\beta_0$  = intercept

$\beta_1 \dots \beta_p$  = regression coefficients

$\sigma$  = residual standard deviation

Multiple regression analysis has better prediction power and can avoid dependence on a single predictor. It can also avoid non-optimal combinations of predictors. Hence, this research uses this method for data analysis.

#### 3.3 Data collection and description

The dependent variable in this research is the monthly international tourist arrivals to Thailand. Millions of international tourists travel to Thailand for leisure, business, or Visit friends and relatives (VFR). We use the time-series data of monthly international tourist arrivals to

Thailand from January 2003 to December 2017 for analysis. Since the number of international tourist arrivals is the most frequently used measure in tourism demand research, the number of monthly international tourist arrivals to Thailand is taken as the dependent variable.

There are four independent variables in this research: international LCC passengers flying to Thailand, Consumer Price Index (CPI), government expenditure, and exchange rate (between US dollars and Thai baht). The majority of the international visitors arrive and depart from Thailand by air. The international LCC passenger data is an important measure of capacity and growth of airlines. Therefore, the number of monthly international LCC passengers flying to Thailand is a measurement of the performance of the LCCs. The international LCC passenger number is taken for six major airports in Thailand: BKK (Suvarnabhumi Airport), DMK (Don Mueang International Airport), CNX (Chiang Mai International Airport), CEI (Mae Fah Luang Chiang Rai International Airport), HDY (Hat Yai International Airport), and HKT (Phuket International Airport). The international LCC passenger data is the most significant independent variable that can reflect the impact of LCC on Thailand's tourism demand.

CPI is one of the most important economic variables, because price is expected to have a negative influence on tourism demand [33]. The CPI of a country is often used to reflect the prices of tourism goods and services that are normally purchased by international tourists [34], so the monthly CPI is selected as an independent variable.

Governments expenditure refers to the purchase of goods and services, which includes public consumption and public investment, and transfer payments consisting of income transfers and capital transfers. Total government expenditure is important for a nation's welfare and economic activity, so the monthly government expenditure of Thailand is considered an independent variable that could have a positive effect on tourism demand.

Before traveling to a foreign country, the exchange rate is one of the most important things people pay attention to. The goods purchased by international visitors are related to the exchange rate because the expense of a foreign holiday is expenditure at the holiday locations [35]. So, the monthly exchange rate is also selected as an independent variable.

Table 2 provides the descriptive statistics for all the variables used in this research. The average monthly international tourist arrivals to Thailand is about 2.47 million with a standard deviation (SD) of 0.42 million. The mean monthly consumer price index (CPI) is 100.2 with an SD of 0.8. The average monthly government expenditure is 222.4 billion baht with an SD of 67.12 billion Baht. The mean monthly exchange rate is 33.33 with an SD of 1.83. The mean monthly international LCC passenger is 62301.13 with an SD of 198075.22.

The number of monthly international tourist arrivals to

Thailand is sourced from the Ministry of Tourism and Sports. The monthly CPI of Thailand is sourced from the Bureau of Trade and Economics Indices. The monthly government expenditure is sourced from Thailand's Fiscal Policy Office. The monthly exchange rate is sourced from X-Rate. The monthly international LCC passengers flying to Thailand is sourced from the Airports of Thailand (AOT).

**Table 2.** Descriptive statistics for variables

Time series variable	Mean	Std Dev	Max	Min
International tourist arrivals	24699 89.85	422244.44 8	3535594	1491300
Consumer price index (CPI)	100.2	0.8	101.5	98.3
Government expenditure	222.4	67.12	435.4	132.1
Exchange rate	33.33	1.83	36.13	29.07
International LCC passengers	62301.13	198075.22	1014069	329121

#### 4. Multiple regression analysis results

This section presents the data analysis results and empirical findings. All the variables are entered in SPSS.

First, the test for multicollinearity of the independent variables is conducted. The variance inflation factor (VIF) is the criterion for testing multicollinearity of the independent variables. When VIF is more than 0 and less than 10, it means that there is no multicollinearity among the independent variables. The testing results show that the VIF of all independent variables used in this research are more than 0 and less than 10. The VIF of monthly LCC international passenger number is 1.138, the VIF of monthly consumer price index is 1.039, and the VIF of monthly government expenditure is 1.160.

Second, the time-series stationarity test is conducted, and the result of the augmented Dicky-Fuller allows us to reject the null hypothesis that the variables follow a unit-root process at the  $p = 0.01$  or 1% significance level. Table 3 shows two models. Model 1 includes four independent variables and Model 2 includes three independent variables. Table 3 shows the multiple regression analysis results (the variables are standard variables, processed using SPSS).

**Table 3.** Analysis results

Variables	Model 1		Model 2	
	Std Coefficient	Sig	Std Coefficient	Sig
ER	-0.49	0.658		
CPI	-0.283	0.002	-0.289	0.001
GOV	0.242	0.005	0.234	0.005
LCCs	0.838	0.000	0.810	0.000
R	0.810		0.809	
R <sup>2</sup>	0.656		0.655	
Adjusted R <sup>2</sup>	0.631		0.636	

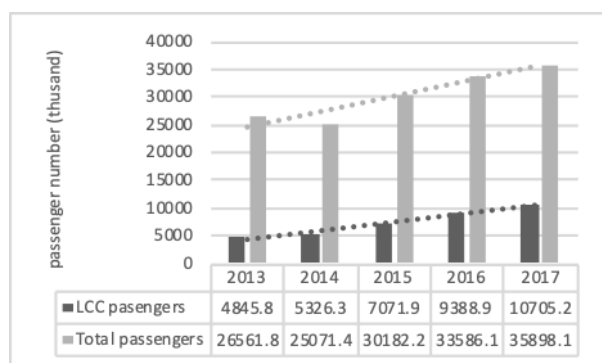
Model 1 shows the full specification using four variables. Model 2 shows the specification with three variables, and drops “exchange rate” as it is not statistically significant (Sig = 0.658 > 0.05) in the model.

The following analysis is based on Model 2. Firstly, the coefficient of the Thai government expenditure equals 0.234, and the coefficient of LCC international passengers flying to Thailand is 0.810. It is worth noting that both are positively related with international tourism arrivals to Thailand. In addition, the coefficient of CPI is -0.289 indicating CPI is negatively related to tourism arrivals. This means the average number of tourism arrivals to Thailand tends to reduce when the Thai consumer price index rises.

Secondly, the coefficient of government expenditure, LCC international passengers, CPI are all statistically significant at  $p = 0.01$  level. In Model 2, the value of R, R-square, and adjusted R-square is reasonably high at 0.809, 0.655, and 0.636 (Model 2).

The results of this model can be concluded as follows: all the independent variables (except “exchange rate”) explain the variation in tourism arrivals in expected directions. In other words, the independent variables including government expenditure, CPI, and LCC international passengers can predict future tourism demand in Thailand.

It is obvious that the market structure of air traffic to Thailand has changed from 2013 to 2017 (see Figure 2). In 2013, the market share of LCCs flying international passengers to Thailand was only 18%; however, in five years, the market share increased to 30% in 2017, which approximately represents one-third of the total international passengers.



**Figure 2.** The market share of passengers to Thailand  
Source: AOT (2017)

## 5. Discussion

This research introduces general information on aviation in Asia. Deregulation and liberalization in major Asian nations (ASEAN countries, China, Japan, and South Korea) are described. A highly regulated aviation market, the lack of secondary airports, and HSR are the main reasons for the low penetration rate of LCCs in Asia, compared with Europe and the US.

The JV model is one of the most important factors for the rapid growth of LCCs in Southeast Asia. To expand air services and the aviation network, ASEAN countries launched a scheme to open their skies. However, some ASEAN member states, whose comprehensive strength is relatively low, are afraid of losing benefit during the open sky process. In the following decades, it will be worth considering whether ASEAN countries have been successful in promoting the aviation industry. According to [36], Japan and South Korea are important markets for reasonably long-haul flights because they have ideal bases (e.g., Seoul, Tokyo, and Osaka) for long-haul LCCs. Further, more people are willing to travel by long-haul LCCs in Japan and South Korea after 2016. For China, the opportunity for aviation expansion may lie in the construction of infrastructure. It is necessary to improve aviation infrastructure, such as runways and airport terminals. The reasons for few LCCs in China can be explained as follows. First, the difference in ticket price between LCCs and full-service carriers (FSCs) is not obvious. This implies that even with the same ticket price, people are more willing to select FSCs because they believe FSCs are more safe and reliable. Second, the Chinese are unaccustomed to paying extra for meals and drinks because they assume that the food expense is included in the tickets. Hence, it is significantly challenging for Chinese LCCs to control operation costs and change the consumer mindset.

The relationship between air transport (especially the performance of LCCs) and tourism industry is also reviewed, and it is evident that in most nations, the emergence of LCCs has accelerated tourism demand. Our empirical findings reveal that LCCs contribute to the increase in Thailand’s tourism demand. CPI and government expenditure show that the correlation between international LCCs passengers and international tourism arrivals to Thailand is positive and relatively close. The results also confirm our hypothesis that LCCs stimulate the increase in international tourist arrivals to Thailand.

However, the future growth of LCCs continues to face challenges in several dimensions. First, it is necessary to note that LCCs accounted for one-third of the air market in 2017, indicating that FSCs still dominate the Thai air routes. The competition between LCCs and FSCs is intense on popular air routes. There is still space for the development of LCCs because they are expanding in some Asian nations (e.g., China) at present. Furthermore, LCCs must focus on their future strategy because HSR is a potential competitor in the international market. Domestic LCCs face stiff competition from domestic high-speed rail in many nations. Although transnational high-speed rail (used for outbound tourism) is not common at present, with the development of the Chinese “One Belt One Road” project, transnational high-speed rail could be a potential competitor in the route between Thailand and China. It is, therefore, important to consider the future business strategy of LCCs.

This research uses multiple linear regression analysis to

study whether LCCs are among most important components leading to the increase in Thailand's tourism market. It also describes the chain reaction of liberalization, the emergence of LCCs, the expansion of airports, and the growth in the tourism market. Although there are many studies on tourism and air transport, there are only a few relating to LCCs and the tourism sector in Thailand and this paper provides logical evolvement of every section.

## 6. Conclusion

This research makes some important contributions. There are few studies that combine air travel (especially LCCs) with tourism in Thailand. This research also improves the understanding of how LCCs have developed in Asia and become one of the most significant components of leisure tourism in Thailand. In addition, the issues raised in this research provide a direction for further research, such as the impact of the Chinese "One Belt One Road" project on the aviation industry and competition between LCCs and FSCs on a single air route.

This research also has couple of limitations. Firstly, the monthly international tourist arrivals to Thailand could be for other purposes, such as VFR or business. Therefore, it is worth considering the real purpose of a visitor. It is also meaningful to investigate the competition between FSCs and LCCs on certain air routes, which would provide further understanding of the impact of LCCs. For instance, the Chinese tourist arrivals to Thailand have been increasing since 2013, and the LCC flights on routes between China and Thailand have also been increasing. By using the available seat kilometers (ASKs) of all LCCs flying from China to Thailand, the direct impact of LCCs on the tourism between two nations can be gauged. Further, the competition between LCCs and FSCs on a single air route can be analyzed.

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