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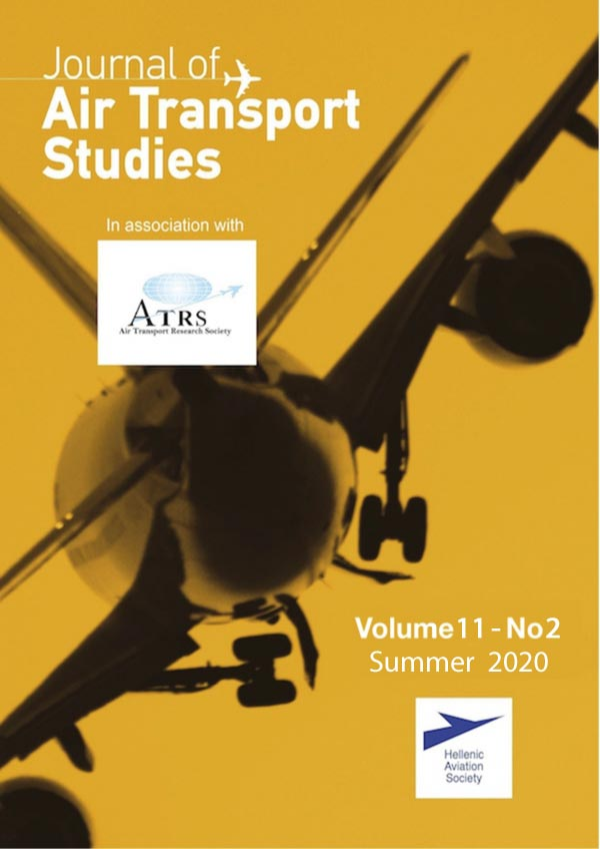

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- Skycontrol (2007) *easyJet welcomes European Commission's decision to limit PSO abuse in Italy*. 23rd April. Available from: http://www.skycontrol.net/airlines/easyjet-welcomes-european-commissions-decision-to-limit-pso-abuse-in-italy/ (accessed on 22/08/2008).

Industry Perspectives are usually shorter than full research papers and should provide a practitioner's point of view on contemporary developments in the air transport industry. Contributors should explicitly specify whether their views are espoused by their organization or not.

Conference Reports should be between 1,000 and 1,500 words. They should provide factual information (e.g. conference venue, details of the conference organizers), present the various programme sessions and summarize the key research findings.

Book Reviews should be between 1,000 and 1,500 words. They should provide factual information (e.g. book publisher, number of pages and ISBN, price on the publisher's website) and critically discuss the contents of a book mainly in terms of its strengths and weaknesses.

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customers and identified the sufficient role of employees' training and the advantages of diversity management. Simple random sampling method was applied to gather 309 airline employees' questionnaires on their attitudes towards diversity. Descriptive and inductive analyses were used in order to present the obtained data. Principal Component Analysis was conducted to predefine three factors. Pearson correlation coefficient was applied to present the direction of the relationship between extracted factors and employee's occupational status. Authors' findings emphasise that airline employees seek a workplace with a friendly atmosphere that respects the diversity of employees and customers and they in their turn support airlines to operate over the comfort zone in order to achieve organisation's goals and customers' satisfaction. As the world keeps advancing, planning a diversity strategy should be the first step any modern-day organisation should explore prior to embarking anything related to a diverse workplace.

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Transportation has always been closely connected to the development of a region. Technological advancements as well as the increase of the available income have set the fundamentals for more effective ways of transportation. At the same time, tourism flourishes and more people travel around the world. To accommodate this additional demand, airlines introduced several strategies; among others, the Low Cost Carrier (LCC) business model has played a disruptive role. At the same time, road transport operators started to implement several strategies, some of which are inspired from the airline sector. Road transport operations, mainly undertaken by coaches, introduced several strategies to address the evolving demand. This paper presents a wide overview of the Greek road transport sector and its related legal framework. The review aims to identify and discuss the best practices, introduced by the airlines, and fruitfully apply them in the context of the road transport sector.

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This research investigates whether passengers living in a city with a local public airport have an attachment to that airport and tend to use it. Focusing on the greater Kansai area with its three airports and Kobe, which owns one of them, Kobe Airport, as an example, an empirical analysis was conducted using a nested logit model and micro data. The result of the basic model shows that passengers living in Kobe prefer the Kobe Airport when compared to passengers living in other cities. An additional analysis based on a questionnaire survey revealed that a certain percentage of respondents choose Kobe Airport because they love it, meaning that the non-economic factor of attachment influences passengers' decisions. The results of this research suggest that enhancing attachment to an airport might be a possible idea for policy makers of airport cities to increase their passengers.

EDITORIAL

This issue collects five papers focusing on a variety of topics related with the contemporary air transport environment.

In the first paper, **Jin-Long Lu** investigates the spending behaviour of Taiwanese outbound tourists travelling to Japan or Korea and explores the differences between various airline travellers developing a regression model. The results suggest that the impacts of trip characteristics and personal socio-demographics on various levels of travel expenditures vary somewhat across different types of airline users and tourist consumption behaviour at destinations are partially subject to prepaid expenditures.

Daniel Cunha, Michelle Andrade and **Javã Silva**, in the second paper, propose the development of a methodology for risk management in airports for ICAO's State Safety Programmes (SSP) by investigating the nature of the airport safety events occurred in busiest Brazilian airports and proposed a risk index capable to provide the Acceptable Level of Safety Performance (ALoSP) ICAO demands to their signatory States. Upon ranking process, research found a high concentration on risk recurrence among 31 airports.

The attributes of airline employees and their interactions with diverse customers are explored, in the third paper, by **Maria Doumi, Ioannis K. Vellios, Konstantinos M. Mouratidis,** to identify the sufficient role of employees' training and the advantages of diversity management. Research findings illustrate that airline employees seek a workplace with a friendly atmosphere that respects the diversity of employees and customers and they in their turn support airlines to operate over the comfort zone in order to achieve organisation's goals and customers' satisfaction.

The fourth paper presents a wide overview of the Greek road transport sector and its related legal framework. **Emmanouil Christofakis, Theodoros Stavrinoudis, Spyridon Kapitsinas, Andreas Papatheodorou, Dimitrios Pappas, Irini Vlassi** and **Evangelia Proiou**, in their review, aim to identify and discuss the best practices, introduced by the airlines, and fruitfully apply them in the context of the road transport sector, to address the evolving demand driven by the technological advancements as well as the increase of the available income that have set the fundamentals for more effective ways of transportation.

In the fifth and last paper **Yu Morimoto, Takeshi Koide** and **Yuko Sugiura** investigate whether passengers living in a city with a local public airport have an attachment to that airport and tend to use it. The empirical analysis shows that the non-economic factor of attachment influences passengers' decisions. The results of this research suggest that enhancing attachment to an airport might be a possible idea for policy makers of airport cities to increase their passengers.

We would like to extend our thanks to all these authors and all the reviewers for their hard work and contribution to this issue of *Journal of Air Transport Studies*. We believe that these works are providing a valuable contribution to the aviation practitioners as well as encouraging further research on the respective topics!

Dr Ioulia Poulaki
Professor Andreas Papatheodorou

ANALYSING THE SPENDING BEHAVIOUR OF DIFFERENT AIRLINE TRAVELLERS: EVIDENCE FROM TAIWANESE TOURISTS TRAVELLING TO NORTHEAST ASIA

Jin-Long Lu

Department of Shipping and Transportation Management, National Kaohsiung University of Science and Technology, Kaohsiung, Taiwan (R.O.C.)

ABSTRACT

This study investigates the spending behaviours of Taiwanese outbound tourists travelling to Japan and Korea and explores the differences between various airline users. Raw data analysis demonstrates that the budget allocation strategy of tourists using full-service carriers (FSCs) is quite different from that of tourists using low-cost carriers (LCCs). More specifically, the users of low-cost carriers have purchase power at local destinations, which is not weaker than that of the users of full-service carriers. The seemingly unrelated regressions model was further employed. The model results suggest that the impacts of trip characteristics and personal sociodemographic characteristics on various levels of travel expenditures are varied between FSC and LCC users. Moreover, tourists' consumption behaviours at destinations are partially subject to their prepaid expenditures. Finally, according to the results, managerial implications for the aviation and tourism industries are discussed.

KEYWORDS: Travel expenditures, seemingly unrelated regressions, outbound travel, full-service carriers, low-cost carriers, Taiwan

1. INTRODUCTION

According to a report released by the Air Transport Action Group (ATAG) in 2018, aviation accounted for $2.7 trillion of the GDP globally in 2016, one-third of which came from the tourism catalytic effect (ATAG, 2018). In particular, outbound tourism expenditures (OTEs) are calculated as tourism import expenditures for the country of origin and are added to the GDP of the country (Mehran and Olya, 2018). With the development of the airline industry, tourists can now choose from a variety of airlines, especially low-cost carriers (LCCs), for outbound travel. Among them, low-cost carriers (LCCs) have attracted an increasing number of passengers. Not only do LCCs offer budget outbound travel, but they may also enable travellers to spend more at destinations by enabling them to reallocate their travel expenditures (Dayour et al., 2016; Eugenio-Martin and Inchausti-Sintes, 2016; Ferrer-Rosell et al., 2015).

A tourist's travel expenditures normally include spending on transportation, accommodation, and local food and products (Ferrer-Rosell et al., 2015; Mok and Iverson, 2000). Some expenditures are incurred prior to travel; some spending is incurred while individuals are at their destinations. Hence, tourists' strategies for allocating travel expenditures under a planned travel budget might be influenced by economic constraints, travel characteristics, and the types of airlines they use (Dayour et al., 2016; Thrane, 2016; Jang et al., 2004; Ferrer-Rosell and Coenders, 2017; Mehran and Olya, 2019).

However, even though there have been several studies investigating the differences between various types of airline tourists, such as the studies of Desai et al. (2014), Lu (2017), Lin and Huang (2015), O'Connell and Williams (2005), and Kuljanin and Kalić (2015), travellers using LCCs compared to those using full-service carriers (FSCs) were mostly young and price-sensitive, and the studies by Desai et al. (2014) and Martinez-Garcia et al. (2012) found evidence that business or high-income travellers had begun considering LCCs as an option for air travel. A small number of studies have empirically studied the diversity of travel expenditures among different types of airline users.

Therefore, this study explores the spending behaviour of different airline travellers. Specifically, this study aims to answer the following questions. What are the factors that influence the spending behaviours of different types of airline users? Does any interaction exist between passengers' expenditures incurred prior to the trip and paid during the trip

(i.e., at the destination)? Are expenditure allocation strategies different between FSC and LCC users? Taiwanese outbound tourists travelling to Northeast Asia, Japan and Korea and their decisions regarding travel expenditures were chosen as a research context.

The remainder of this paper is organized as follows. The next section is a literature review, which is followed by the research design including descriptions of the survey design, implementation of data collection and introduction of the analysed model—the seemingly unrelated regressions (SUR) model. The third section presents the empirical analysis. The analysis and insights from the raw survey data are presented first, and then, the SUR model is estimated to analyse the interactions between the different types of expenditures. The resulting insights into the significant determinants and the relationship between prepaid and locally paid expenses are discussed. Finally, some concluding comments are provided.

2. LITERATURE REVIEW

According to past studies, the factors influencing a tourist's decision regarding travel expenditures include economic constraints (e.g., personal or family income), socioeconomic characteristics (e.g., age and gender), trip characteristics (e.g., length of trip, travel accompanies, and type of tour), and psychology variables (e.g., motivation and perception) (Dayour et al., 2016; Thrane, 2016; Marrocu et al., 2015; Abbruzzo et al., 2014; Brida and Scuderi, 2013).

However, only a few studies have examined the impact of the type of airline (i.e., FSC or LCC) that passengers use on their travel expenditures. A study by Ferrer-Rosell and Coenders (2017) provides an example; their study used official statistics microdata collected every other year from 2006 to 2014 in Spain to compare the relative importance of various budget components (i.e., total budget and at-destination budget) between FSC and LCC tourists. Evidence was found that the distribution of the differences between FSC and LCC tourists' trip budgets across four biennial years converged regarding both the ratio of transportation expenses to at-destination expenses and the ratio of accommodation expenditures to expenditures on local activities and shopping; however, the distribution of the difference in total travel expenditures between the two types of airline tourists presented a divergent trend. The study of Ferrer-Rosell and Coenders (2017) offered information regarding the tourist spending behaviours of different types of

airline users; however, some control variables were omitted in the study due to the constraint of data resources.

Almeida and Garrod (2017) used quantile regression to estimate the relationships between tourist travel expenditures and some potential determinants, including the airline type used. In their models, whether a tourist used an LCC was set as a dummy variable, and the outcomes presented negative impacts on travel expenditures, indicating that LCC users would spend less at destinations. In addition, length of stay, gender, income, and travel in a family were also identified as having a significant effect on travel expenditure decisions. However, the study of Almeida and Garrod (2017) did not further categorize the source of travel expenditures, and their arguments, particularly regarding LCC tourist spending behaviour, might need more examination. Moreover, in the study of Qiu et al. (2017), they concluded that LCC users spent less at the destinations; however, their overall spending increased along with an increasing length of stay.

Hentschel and Klingenberg (2017) found that LCC passengers' spending behaviour at airports varied across generations. Therefore, they suggested that segmentation is needed to identify various LCC passengers' needs and expectations. Lima et al. (2012) and Nickson and Garu (2015) also indicated that segmenting tourists by travel expenditure enables related organizations to better review marketing strategies and policy decisions to maximize the economic benefits of tourism for local destinations.

These abovementioned studies implied that the expenditure allocation strategies of tourists might vary depending on the types of airline they use. However, the conclusions regarding the differences and similarities of the spending behaviours between FSC and LCC tourists are still diverse, and the sources and volumes of the travel expenditures might be the reasons for such varying conclusions. Therefore, segmentation based on tourists' travel expenditures is needed to analyse the spending behaviours of FSC and LCC tourists.

3. METHODOLOGY

3.1 Data Collection

This study selected Taiwanese tourists travelling to Northeast Asia, Japan and Korea as the case for empirical analysis. Japan and Korea shared over one-third of the outbound tourism market in Taiwan. Japan surpassed China to become the favourite destination for

Taiwanese travellers in 2015. In addition, the number of Taiwanese tourists to Korea has been continuously breaking records in the past 5 years, exceeding 1 million trips. The compound annual growth rate (CAGR) from December 2014 to November 2019 was approximately 25% (Taiwan Tourism Bureau, 2019). Moreover, Taiwanese visitors ranked as the fourth-largest market visiting Korea (Korea Tourism Organization, 2019).

The data were collected via an online questionnaire survey assisted by a third-party online survey company in Taiwan. The online survey company has more than 150 thousand registered members around the Taiwan area, and approximately 80% of all the members live in the six major cities in Taiwan. The questions in the survey were mainly categorized into two parts. In the first section of the survey, respondents provided information on their latest experiences of outbound travel, such as the purpose of the trip, final destination, travel type, booking channel, accommodation, length of stay, airline used, spending incurred prior to departure, spending at the destination and, for travellers using LCCs, ancillary services used (bought) while flying. In the second section, data on respondents' sociodemographic characteristics were obtained. These characteristics were gender, age, education background, monthly income, and frequency of travelling abroad. The survey questionnaire was transformed into an online format and emailed to 2,500 registered members randomly selected by the online survey company. Among them, 1,233 members took at least one trip abroad in the past 12 months, which met the criteria for sample selection, and 651 respondents ultimately responded to the survey. After a preliminary check, 16 respondents provided inconsistent answers to the questions, and 10 were under the age of 20 years; hence, 625 respondents were retained. Among these 625 respondents, 432 took outbound trips to Korea or Japan and were selected for analysis.

3.2 Model for Analysis

The main purpose of this study is to determine the factors that influence different airline users' travel expenditures at two stages of travel: prepaid expenditures prior to the trip and local expenditures at the destination. However, these two sources of expenditures might contain each other under the condition of pre-planned travel budgets. In other words, tourists might constrain their spending before the trip and spend more at the destinations, and vice versa; tourists might also not constrain their expenditures regardless of when and where. Hence, the two types of travel expenditures could be

correlated with each other, and thus, modelling any type of expenditures independently would lead to biased outcomes. Therefore, the seemingly unrelated regressions (SUR) model (Washington, et al., 2003) was employed in this study, which enables us to identify whether an interaction relationship between various types of expenditure exists (i.e., prepaid expenditures and local paid expenditures in this study) by means of correlations, controlled across the residuals in the equations for different expenditures. The model also allows us to explore the important determinants of tourists' spending behaviours.

The model can be briefly described as follows (Lu, 2014; Washington et al., 2003):

$$\begin{aligned} y_1 &= \alpha_1 + \beta_{1i} x_i + \gamma_{1i} Z_i + \varepsilon_1 \\ y_2 &= \alpha_2 + \beta_{2i} x_i + \gamma_{2i} Z_i + \varepsilon_2 \end{aligned} \quad (1)$$

where y_1 and y_2 are the prepaid and locally paid expenditures, respectively. x_i represents the factors related to tourists' trip characteristics, and Z_i represents the variables associated with the personal backgrounds of the tourists. α, β, and γ are the estimated parameters. ε_1 and ε_2 are the residuals for the y_1 and y_2 equations, respectively. If $\rho(\varepsilon_1, \varepsilon_2)$ is estimated to be significantly different from zero using Breusch-Pagan χ^2 test, then an interaction relationship between y_1 and y_2 exists. Without considering the potential interaction relationship between the two expenditure equations, the estimates of the determinants would be biased.

4. EMPIRICAL ANALYSIS

4.1 Sample Description

A total of 195 of 432 respondents used FSCs, while 237 used LCCs. Table 1 presents the sociodemographic characteristics profiles of respondents who used FSCs and LCCs.

To investigate whether there was a significant relationship between the two categorical variables (the sociodemographic characteristics of the respondents and the types of airlines used), the Chi-square test of independence was applied. The null hypothesis of the test is that the frequency of each categorical variable of a specific sociodemographic characteristic has no association with the airlines (i.e., FSCs or LCCs) used by respondents. That is, gender, monthly income, or the frequency of travelling abroad is irrelevant to the types of airline at the α-level of 0.1. In contrast, respondents' age or education background had a significant association with airlines (α=0.01). These findings reveal that approximately 41% of respondents who used LCCs were young adults (aged between 21

and 30 years), compared with 25% of FSC respondents (i.e., a 15% difference). In contrast, 25% of respondents who used FSCs were older adults (aged over 40 years) compared with 16% of LCC respondents. This significant difference provides adequate evidence that by offering low prices and simple services, LCCs are able to attract younger passengers, while FSCs retain the market share of older passengers. The proportion of LCC respondents who held a graduate degree was also higher than those of the corresponding respondents who used FSCs. This finding implies that highly educated passengers might be more aware of the business model of LCCs.

Table 1 - Description of Sociodemographic Characteristics

	FSC sample (n_1=195)		LCC sample (n_2=237)	
Variables	Freq.	%	Freq.	%
Gender (Chi-square=0.314; p=0.575)				
Male	90	46.2	103	43.5
Female	105	53.8	134	56.5
Age (Chi-square=12.843; p=0.002***)				
21-30 years	49	25.1	96	40.5
31-40 years	97	49.7	103	43.5
41 years and above	49	25.2	38	16.0
Monthly income (NT $) (Chi-square=0.148; p=0.985)				
Low: less than 30K (1K=1,000)	66	33.9	83	34.5
Medium-low: 30-50K	75	38.5	91	38.4
Medium-high: 50-70K	34	17.4	41	17.4
High: more than 70K	20	10.2	22	9.7
Education (Chi-square=11.731; p=0.003***)				
High school	25	12.8	20	8.4
University	149	76.4	163	68.8
Graduate school	21	10.8	54	22.8
Frequency of travelling abroad (Chi-square=3.036; p=0.219)				
Less than 1	112	57.4	138	58.2
2-3	55	28.2	77	32.5
4 or above	28	14.4	22	9.3

***: p<0.01

Regarding the trip characteristics of the two groups of airline users, Table 2 demonstrates that only the trip purpose did not significantly differ across types of airline users. This indicates that the profiles of the Taiwanese tourists using FSCs or LCCs were divergent in terms of most trip characteristics. For illustration purposes, a higher percentage of tourists who travelled alone were more likely to use LCCs. Compared to FSC users, more than 70% of LCC respondents were free independent travellers (FITs). More than 60% of LCC respondents stayed at business hotels, hostels, and bed-and-breakfast facilities (B&Bs), while 50% of FSC users chose to stay at 3- or 4-star hotels or even 5-star hotels (i.e.,

22%). Finally, approximately 90% of LCC users paid travel expenditures by themselves; in contrast, the travel expenditures of a substantial number of FSC respondents, i.e., over 20%, were paid by their parents, family members, or employers.

Table 2 - Description of Trip Characteristics

	FSC sample (n_1=195)		LCC sample (n_2=237)	
Variables	Freq.	%	Freq.	%
Trip Purpose (Chi-square=0.824; p=0.364)				
Tourism	187	94.4	228	96.2
Non-tourism	11	5.6	9	3.8
Travel Group (Chi-square=10.525; p=0.005***)				
Travelling alone	15	7.7	33	13.9
Travelling with friends/colleagues	91	46.7	129	54.4
Travelling with family	89	45.6	75	31.7
Travel Type (Chi-square=96.635; p=0.000***)				
Free individual tour	54	27.7	170	71.6
Package tour	69	35.4	52	21.9
All-inclusive group tour	72	36.9	15	6.3
Accommodation (Chi-square=59.558; p=0.000***)				
5-star hotel/resort	43	22.1	18	7.6
3- or 4-star hotel	99	50.7	68	28.7
Business hotel or others	53	27.2	151	63.7
Paid by (Chi-square=13.687; p=0.001***)				
Oneself	152	78.0	214	90.2
Parents or other family members	24	12.3	16	6.8
Employers or others	19	9.7	7	3.0

***: p<0.01

Because of the constraint of the length of the survey, only two categories of travel expenditures were anchored. One category was the spending incurred prior to the outbound trip, which mostly comprised the airfare and a small down payment for local accommodations; the other category was the expenditures on local transportation, accommodations, activities, food, and shopping. Table 3 further summarizes the travel expenditures of Taiwanese tourists to Korea or Japan. Note that US$1 was approximately equal to NT$30 at the time of the survey. The prepaid expenditure of FSC users was more than double the associated expenditure of LCC users, while the locally paid expenditures did not show much difference between airline types. This is because most of the prepaid expenditures are for airfare. There is no doubt that on average, a ticket for FSCs costs much more than a ticket for LCCs. However, after further review of the distribution of expenditure data, the range of the locally paid expenses (i.e., the difference between the maximum and minimum) of LCC tourists was close to that of FSC tourists; hence, the

respondents can probably be grouped in terms of travel expenditures to reflect their different spending behaviours or budget allocation strategies. Therefore, the sample was clustered into three segments based on respondents' total expenditures using the 33rd and 67th percentiles as boundaries: light spenders, medium spenders, and heavy spenders (Mok and Iverson, 2000).

Table 3 - Market Segment by Expenditure

		Segment				
Expenditures[a]	All	Light	Medium	Heavy	*F*-stat.[c]	*p*-value
Full-service Carrier Travellers	*N*=195	*N*=64	*N*=67	*N*=64		
M. Total expenses[b]	55,437.2	29,903.1	48,422.5	88,314.7	119.435	0.000
M. Prepaid expenses (1)	27,618.4	17,829.7	27,561.0	37,467.3	46.301	0.000
M. Local paid expenses (2)	27,818.7	12,073.4	20,861.5	50,847.4	59.618	0.000
Ratio: (1)/Total	0.50	0.60	0.57	0.42		
Ratio: (1)/(2)	0.99	1.48	1.32	0.74		
Low-cost Carrier Travellers	*N*=237	*N*=79	*N*=79	*N*=79		
M. Total expenses	37,173.9	19,085.2	32,616.0	59,820.5	225.452	0.000
M. Prepaid expenses (3)	12,524.4	8,263.3	13,090.6	16,219.2	24.460	0.000
M. Local paid expenses (4)	24,649.5	10,821.9	19,525.4	43,601.3	108.336	0.000
Ratio: (3)/Total	0.34	0.43	0.40	0.27		
Ratio: (3)/(4)	0.51	0.76	0.67	0.37		
Significance of H_0: (3) ≤ (1)[d]	0.000	0.000	0.000	0.000		
Significance of H_0: (4) ≤ (2)	0.080	0.106	0.150	0.072		

[a]: The unit for expenditure is NT$. US$1 is approximately equal to NT$30.
[b]: M. represents the mean value.
[c]: One-way ANOVA *F*-statistics and *p*-value.
[d]: T-test for two-group mean comparison.

As shown in Table 3, the means of the various expenditures across the three segments were all significantly different when examined by the ANOVA *F*-test at the α-level of 0.05. Checking with the ratio of prepaid expenses to total expenses, it is to see that FSC tourists, in average, spend half on airfare and half on local consumption. Only heavy FSC spenders allocate budget for prepaid expenses less than 50% of total expenses. This indicates that FSC tourists allocate almost the same budgets before the trip and at-destination. As for LCC tourists, they obviously allocate less budget share on prepaid expenses to total expenses.

Besides, the ratio of prepaid expenses to local paid expenses demonstrated that light and medium FSC spenders both allocate budgets before the trip higher than at-destination. However, LCC tourists allocate the budget to local expenses, in average, twice as prepaid

expenses. For each segment of LCC tourists, they spent less before the trip and more at-destination. This implies that LCC tourists intend to allocate more budget to local consumptions. To summarize, FSC tourists generally constrain their local paid expenses, as they have paid higher expenses prior to the trip. However, LCC users generally allocate less of their budget to air tickets and spend more on local tourism.

4.2 Model Analysis

The SUR model results for the three segments of spenders with FSCs or LCCs are shown in Tables 4, 5, and 6. Note that the correlation coefficients of the residuals in all models are highly significant using Breusch-Pagan χ^2 test (p<0.01) and demonstrate negative directions, denoting that the prepaid and locally paid expenditures have a negative interaction relationship among the two types of expenditures. The models further identify that several trip-related characteristics and sociodemographic characteristics have various impacts on tourist spending behaviours across airline types, even though only a few factors are estimated to be significant at the α-level of 0.1; however, the t-values of most estimates are still greater than 1.0.

An overview of the model results shows that budget allocation strategies vary among passengers with different socioeconomic backgrounds and different types of airline users. To illustrate, if FSC light spenders (Table 4) are highly frequent travellers (i.e., travelling abroad more than 3 times a year) or have a monthly income less than NT$30,000, then they will spend more money prior to the trip but less at local destinations. However, if FSC users travel alone or with friends, then they will save prepaid expenditures for local consumption. LCC light spenders who stay at business hotels, who travel abroad 1 to 3 times a year, or who are female or young adults will allocate more of their budget to prepaid expenses and reduce their expenses at their destinations. In contrast, if LCC light spenders travel alone, then they will spend less on prepaid expenses and, although insignificant, on locally paid expenditures.

Table 4 - Seemingly Unrelated Regressions Model Results: Light Spenders

	FSC (64)		LCC (79)	
Variables	y_1[a]	y_2	y_1	y_2
Intercept	10.226***	8.554***	7.755***	9.951
	(24.256)	(11.422)	(10.509)	(14.122)
Staying at 3- to 4-star hotels	0.243	-0.022	0.172	-0.520*
	(1.351)	(-0.070)	(0.520)	(-1.646)
Staying at business hotels	0.303	-0.154	0.585*	-0.607**
	(1.582)	(-0.453)	(1.812)	(-1.966)
Package tour	-0.007	-0.259	0.078	-0.138
	(-0.056)	(-1.138)	(0.428)	(-0.792)
All-inclusive tour	0.186	-0.138	0.256	-0.010
	(1.578)	(-0.661)	(0.725)	(-0.030)
Fees paid by oneself	-0.046	0.548**	-0.298	-0.374
	(-0.332)	(2.232)	(-0.847)	(-1.114)
Fees paid by family members	-0.079	0.701*	-0.272	-0.163
	(-0.384)	(1.909)	(-0.509)	(-0.319)
Travel abroad 1-3 times a year	-0.126	0.092	0.336**	-0.089
	(-1.234)	(0.508)	(2.232)	(-0.619)
Travel abroad more than 3 times a year	0.484***	-0.776**	0.114	0.175
	(2.665)	(-2.404)	(0.402)	(0.649)
Travel alone	-0.362**	0.600**	-0.624***	-0.270
	(-2.379)	(2.220)	(-2.758)	(-1.250)
Travel with friends/colleagues	-0.154	0.422**	-0.243	-0.147
	(-1.600)	(2.467)	(-1.475)	(-0.935)
Number of nights	-0.246*	0.121	0.263*	0.032
	(-1.711)	(0.474)	(1.704)	(0.216)
(Number of nights)^2	0.013	-0.006	-0.016	-0.006
	(1.068)	(-0.285)	(-1.320)	(-0.508)
Female	-0.139	0.164	0.320**	-0.050
	(-1.446)	(0.960)	(1.957)	(-0.322)
20-30 years old	-0.142	0.227	-0.329	0.380*
	(-1.252)	(1.130)	(-1.532)	(1.854)
30-40 years old	0.170	-0.070	-0.165	0.202
	(1.536)	(-0.357)	(-0.866)	(1.107)
Monthly income less than NT$30,000	0.277**	-0.585**	0.270	0.144
	(2.112)	(-2.515)	(1.342)	(0.749)
Monthly income NT$30,000-50,000	0.123	-0.490**	0.203	0.059
	(1.063)	(-2.375)	(1.117)	(0.340)
R^2	0.465	0.379	0.316	0.145
χ^2-value	55.671***	38.984***	36.463***	13.368
Correlation of residuals	-0.523***		-0.534***	
Breusch-Pagan test χ^2-value	17.522***		22.514***	

Note: value in parentheses is the estimated t-statistic.

[a]: y_1: prepaid expenditures; y_2: locally paid expenditures.

*: p-value <0.1; **: p-value < 0.05; ***: p-value < 0.01

Table 5 - Seemingly Unrelated Regressions Model Results: Medium Spenders

	FSC (67)		LCC (79)	
Variables	y_1[a]	y_2	y_1	y_2
Intercept	9.248***	10.450***	8.993***	9.893***
	(20.372)	(17.619)	(25.643)	(33.125))
Staying at 3- to 4-star hotels	-0.124	0.075	0.039	-0.086
	(-1.309)	(0.609)	(0.235)	(-0.619)
Staying at business hotels	-0.260**	0.159	-0.067	-0.019
	(-2.124)	(0.991)	(-0.437)	(-0.146)
Package tour	0.256	-0.190	0.099	-0.215**
	(0.248)	(-1.404)	(0.782)	(-2.005)
All-inclusive tour	0.342***	-0.386***	0.463***	-0.449***
	(3.255)	(-2.808)	(2.890)	(-3.289)
Fees paid by oneself	-0.137	0.441**	0.320 **	-0.356***
	(-0.927)	(2.291)	(2.109)	(-2.757)
Fees paid by family members	0.041	0.252	–	–
	(0.234)	(1.090)		
Travel abroad 1-3 times a year	-0.133	0.008	-0.186*	0.137
	(-1.426)	(0.065)	(-1.714)	(1.486)
Travel abroad more than 3 times a year	0.008	0.042	0.063	-0.083
	(0.059)	(0.251)	(0.334)	(-0.517)
Travel alone	0.061	0.006	-0.034	0.416***
	(0.383)	(0.030)	(-0.192)	(2.751)
Travel with friends/colleagues	0.015	-0.070	-0.094	0.131
	(0.186)	(-0.663)	(-0.840)	(1.367)
Number of nights	0.409**	-0.322	-0.008	0.125
	(2.510)	(-1.510)	(-0.077)	(1.425)
(Number of nights)^2	-0.037***	0.026	-0.002	-0.006
	(-2.601)	(1.386)	(-0.301)	(-0.960)
Female	0.133*	-0.125	0.029	0.033
	(1.691)	(-1.223)	(0.297)	(0.402)
20-30 years old	-0.100	0.249*	0.076	-0.257*
	(-0.877)	(1.667)	(1.475)	(-1.902)
30-40 years old	-0.055	0.107	0.240*	-0.216**
	(-0.671)	(0.997)	(1.862)	(-1.968)
Monthly income less than NT$30,000	-0.181*	-0.060	0.291*	-0.105
	(-1.712)	(-0.438)	(1.913)	(-0.807)
Monthly income NT$30,000-50,000	-0.140	0.152	0.104	-0.075
	(-1.502)	(1.246)	(0.784)	(-0.660)
R^2	0.457	0.396	0.372	0.428
χ^2-value	56.295***	43.983***	46.708***	59.060***
Correlation of residuals	-0.687***		-0.615***	
Breusch-Pagan test χ^2-value	31.583***		29.852***	

Note: value in parentheses is the estimated t-statistic.

[a]: y_1: prepaid expenditures; y_2: locally paid expenditures.

*: p-value <0.1; **: p-value < 0.05; ***: p-value < 0.01

Table 6 - Seemingly Unrelated Regressions Model Results: Heavy Spenders

	FSC (N=64)		LCC (N=79)	
Variables	y_1[a]	y_2	y_1	y_2
Intercept	9.974***	10.811***	8.099***	10.780***
	(17.070)	(14.158)	(10.833)	(24.037)
Staying at 3- to 4-star hotel	0.245**	-0.090	0.219	-0.186
	(2.314)	(-0.653)	(0.694)	(-0.984)
Staying at business hotel	-0.092	-0.033	-0.133	-0.032
	(-0.605)	(-0.166)	(-0.441)	(-0.177)
Package tour	-0.088	-0.416**	-0.089	0.028
	(-0.577)	(-2.089)	(-0.541)	(0.240)
All-inclusive tour	0.249	-0.641***	-0.456	0.290
	(1.543)	(-3.041)	(-1.147)	(1.216)
Fees paid by oneself	0.156	-0.274	1.900***	-0.398*
	(0.986)	(-1.324)	(5.045)	(-1.761)
Fees paid by family members	0.418*	-0.449	1.616***	-0.054
	(1.871)	(-1.540)	(3.619)	(-0.200)
Travel abroad 1-3 times a year	0.138	0.192	-0.578***	0.338***
	(1.168)	(1.241)	(-2.847)	(2.776)
Travel abroad more than 3 times a year	0.252*	-0.433**	-0.362	0.396**
	(1.882)	(-2.475)	(-1.355)	(2.473)
Travel alone	-0.188	-0.271	0.138	0.196
	(-0.892)	(-0.985)	(0.480)	(1.134)
Travel with friends/colleagues	0.038	-0.212*	0.119	-0.023
	(0.411)	(-1.753)	(0.677)	(-0.215)
Number of nights	0.027	0.236	0.013	-0.137
	(0.117)	(0.770)	(0.072)	(-1.306)
(Number of nights)^2	0.001	-0.017	-0.007	0.018*
	(0.036)	(-0.512)	(-0.473)	(1.926)
Female	-0.452***	0.448***	0.027	0.011
	(-4.449)	(3.379)	(0.138)	(0.093)
20-30 years old	0.095	-0.600***	-0.608**	0.347**
	(0.570)	(-2.753)	(-2.240)	(2.132)
30-40 years old	0.028	-0.025	-0.463*	0.406***
	(0.231)	(-0.158)	(-1.910)	(2.792)
Monthly income less than NT$30,000	0.232	-0.009	0.623**	-0.307**
	(1.582)	(-0.046)	(2.484)	(-2.041)
Monthly income NT$30,000-50,000	0.102	-0.136	0.151	0.079
	(0.862)	(-0.883)	(0.706)	(0.641)
R^2	0.482	0.512	0.382	0.427
χ^2-value	59.471***	67.117***	48.792***	58.774***
Correlation of residuals	-0.356***		-0.544***	
Breusch-Pagan test χ^2-value	8.114***		23.412***	

Note: value in parentheses is the estimated t-statistic.
[a]: y_1: prepaid expenditures; y_2: locally paid expenditures.
*: p-value <0.1; **: p-value < 0.05; ***: p-value < 0.01

For medium spenders, Table 5 shows that both FSC and LCC tourists participating in all-inclusive tours have similar strategies for budget allocation: allocate more to prepaid

expenditures but less to locally paid expenditures. Furthermore, FSC users who stay at business hotels or have monthly income less than NT$30,000 are more likely to constrain their prepaid expenditures; however, if an FSC user is female, then she would significantly spend more prior to the trip. For FSC users who paid travel fees by themselves, they would control their prepaid expenses but pay more at the destination; however, for LCC travellers who also afford their own travel fees, they would spend more prior to the trip but turn to constraining their expenditures on local tourism. If an LCC tourist travels alone, then his/her local expenses would be significantly higher. Finally, LCC users who participate in package tours or are aged from 31 to 40 years spend significantly less on local tourism (but might spend more prior to the trip).

With respect to heavy spenders (Table 6), FSC tourists who stay at 3- or 4-star hotels, travel abroad frequently, or do not need to pay their own travel fees (paid by family members) would significantly allocate more of their budget to prepaid expenditures. For FSC tourists who join package tours or all-inclusive tours, travel abroad frequently, travel with friends and/or colleagues, or are aged between 20 and 30 years, they would significantly control their local paid expenses. Female FSC users would be more likely to control their prepaid expenses but to spend more at local destinations. However, the results for LCC tourists are slightly different, indicating that LCC tourists who travel less (1 to 3 times a year) or who are young or middle-aged adults (21 to 40 years old) would significantly allocate less of their budget to prepaid expenditures but more to expenses at their destinations. For low-monthly-income LCC users or for LCC users whose travel fees are paid by themselves or family members, they would significantly allocate a higher budget to prepaid expenditures but reduce their local expenses.

It is noted that the variable "number of nights" is considered to have a nonlinear effect on tourist spending behaviours; however, the results vary. For light spenders, more nights staying at destinations will reduce FSC users' expenditures prior to the trip; however, if staying for more than 9 nights, FSC users will increase their prepaid expenditures. While more nights staying at destinations will encourage LCC tourists to increase their prepaid budget, such expenses will be reduced if they are staying for more than 8 nights. In contrast, FSC medium spenders will allocate more of their budget before the trip, along with a higher number of nights stayed, but will decrease such expenses if they are staying for more than 5 nights at destinations. Although the variable "number of nights" only has

limited impacts on the locally paid decisions of LCC heavy spenders (i.e., only the squared term of the variable is estimated to be significant at the α-level of 0.05), it shows that LCC heavy spenders will reduce their locally paid expenditures with more nights stayed, while such expenses will be sharply increased if they stay at destinations for longer than 3 nights.

5. DISCUSSION

This study investigates the differences in travel spending behaviour between tourists using FSCs and LCCs. We first demonstrate that the customers of LCCs in Taiwan mainly consist of younger passengers, while FSCs retain older passengers, which reflects the findings of Desai et al. (2014) and Kulijanin and Kalić (2015). This also implies that LCCs have altered Taiwanese young adults' choices of airlines by offering affordable prices for air travel. In addition, more highly educated people are more likely to use LCCs, as they might be more aware of the business model of LCCs. Moreover, a substantial number of FSC users travel with their colleagues or friends, while there is a higher proportion of LCC users who travel alone and comparatively less with their family. More than 70% of LCC tourists take free individual tours; in contrast, FSC tourists show high participation in all-inclusive or package tours. With respect to accommodations, half of FSC users choose to stay at 3- or 4-star hotels when travelling to Korea or Japan, but up to 65% of tourists using LCCs stay at business hotels or B&Bs. No more than 10% of LCC tourists stay at luxury hotels.

Travel expenditure analysis demonstrates that FSC tourists generally allocate a relatively larger amount of their budget to prepaid expenses than to locally paid expenditures, except for FSC heavy spenders. This finding partially reflects the findings from Ferrer-Rosell and Coenders (2017), concluding that FSC users continue to devote a somewhat greater share of their budget to transportation (compared to the expenses incurred at destinations). However, LCC tourists are more likely to reduce expenditures prior to travel to save more of their budget for locally paid expenditures. Accordingly, LCC tourists have purchasing power in terms of the volume of locally paid expenditures that is no weaker than that of FSC tourists, which is in contrast to the findings from Almeida and Garrod (2017) and Hentschel and Klingenberg (2017), both suggesting that LCC users spend less. Our analysis provides some implications for destination airports because some airport terminals specialized for LCCs only deploy small and simple commercial areas (i.e., budget terminals). If such arrangements are due to the anticipation that LCC users will not only

save money on airfare (i.e., the reason why these tourists choose LCCs) but also control their consumption, then this is a misunderstanding. Choi et al. (2020) found that LCC passengers actually have comparable or even higher purchasing power than that of FSC passengers in consuming duty-free goods at airports and suggested that budget terminal design may damage concession revenue from certain LCC passengers with high purchasing power.

Through model analysis, the seemingly unrelated regressions model successfully identifies a negative indirect interaction relationship between prepaid and locally paid travel expenditures under pre-planned travel budgets. The impacts of the significant variables, including trip characteristics, sociodemographic characteristics, and economic constraints, are generally in accordance with the findings from past studies. The model also reveals that tourist spending behaviours at destinations are partially subject to prepaid expenditures. Finally, the impact of the "number of nights" on travel expenditures was non-linear, in contrast to the results of Almeida and Garrod (2017) and Qiu et al. (2017), denoting that tourists' travel spending would not be constantly increasing or decreasing along with the increasing length of stay; instead, it would decrease or increase after staying a certain number of nights at destinations.

6. CONCLUSIONS

Destination marketing is not only an important issue for attracting visitors but also makes visitors spend money on tourism products at destinations, and destination airports are no exception. Our empirical evidence first identifies that some trip-related characteristics, sociodemographic characteristics, and personal economic constraints significantly influence tourists' travel spending behaviours. Second, a negative interaction relationship exists between prepaid and locally paid expenditures, and the SUR model further demonstrates that tourists' consumption behaviour at the destination is somewhat subject to their expenditures incurred prior to the trip. That is, in contrast to FSC users, LCC tourists spending less on air tickets have more in their budget for local tourism. Finally, our analysis also found that the budget allocation strategies to prepaid and locally paid expenditures are not similar between different types of airline users. LCC tourists do not always spend less than FSC tourists; some of them have comparable purchasing power to FSC users. Accordingly, we recommend that although the types of airline used can be a factor in discriminating tourists' travel expenditures, wrongly misunderstanding LCC

tourists' purchasing power could damage the potential benefits for local tourism. Furthermore, destination marketing managers should consider effective marketing promotions, particularly to FSC passengers, as their local expenses are partially subject to higher prepaid expenditures.

Segmenting tourists based on expenditures and identifying their profiles could provide valuable information for destination management, which may limit the sample size in each segment and, as a result, limit the goodness-of-fit of the model analysis and explanation abilities of the variables. More samples are necessary to empirically investigate different airline passengers' spending behaviours in the future.

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AIRPORT ALoSP AND INTEGRATED RISK APPROACH FOR SSPs

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ABSTRACT

The paper proposes the development of a methodology regarding the risk management in airports for ICAO's State Safety Programmes (SSP). To achieve that, researchers investigated the nature of the airport safety events occurred in busiest Brazilian airports and proposed a risk index capable to provide the Acceptable Level of Safety Performance (ALoSP) ICAO demands to their signatory States. This approach allowed researchers to rank several airports per their risk in relation to the calculated ALoSP calculated and proposed State optimized regulatory actions to address accordingly where the risk observed. The research found the high concentration on risk recurrence among 31 airports. Only 4 concentrated 30% out of all the recurrence of risk, 8 were responsible for 50% and 17 represented approximately 80% of the total risk load in Brazilian airport operations. Five groups of airports are proposed as per their safety performance (Safety+2, Safety+1, Neutral, Safety-1 and Safety-2). The measurement of their performance results presented several statistically significant differences. Safety+1 group presented a safety performance of 1.49 times better than the standard ALoSP as well as 3.52 times better than the worst group of airports (Safety-2). The Safety+2 group was 3.76 times safer than ALoSP and 8.88 times safer than Safety-2 group. Safety-1 group presented a risk level of 1.51 times higher than ALoSP and Safety-2 performed 2.35 times riskier than the ALoSP. This proposed matrix, woks as a tool for airports to identify their safety weaknesses and promote efficiency and rationality to the SSP's by amplifying their effectiveness.

KEYWORDS

Acceptable Level of Safety Performance (ALOSP). Airport. Risk. Risk Assessment. Risk Management. State Safety Programme (SSP).

1. INTRODUCTION

1.1 Background

Annex 19 - Safety Management (2016), DOC 9734 "State Safety Programme - SSP" (2006) and DOC 9859 - Safety Management Manual (2018) are the main documents orienting the implementation of an efficient and effective safety oversight system among all signatory States of the International Civil Aviation Convention.

They guide the States to perform their oversight functions by systematically dealing with the air transport risks keeping it in an ALARP (As Low As Reasonably Possible) level.

In this line, they specify that each SSP should establish for each aviation activity (*i.e.* aerodrome operations) the called Acceptable Level of Safety Performance (ALoSP). This monitoring should be done through safety indicators and targets.

The Brazilian Civil Aviation SSP (ANAC, 2019), in line with these guidelines, commands that civil aviation activities shall be subject to a performance monitoring process based on acceptable indicators, targets and acceptable levels of safety performance.

However, to regulate and control risk it is necessary to be able to identify it (Ashford *et al.*, 1997; ICAO, 2019). This activity can be based on two forms of evaluation that Sage & White (1980) called "social risk": the reactive model and the predictive model.

The first refers to the real or statistical risk, which would occur through the monitoring of the statistical recurrence of significant data of unwanted events. The second would be the estimation of risk based on the perception of individuals or on predictions via structured models for the analysis of latent conditions in a given system before the actual realization of the risk (Janic, 2000; ICAO, 2016).

Despite of the fact that predictive models present a better cost-benefit relationship, they require a more sophisticated data acquisition and a more complex knowledge on the system managed.

Thus, due to the fact that because reactive approach is simpler to implement, despite of being highly dependent on the availability and quality of data, this approach has been the main source of evolution of aviation safety, (Das & Dey, 2016; Ayhan & Tokdemir, 2020).

OACI (2019), IATA (2020), Braithwaite (2001), Eddowes *et al.* (2001), Wagner & Barker (2013), Boyd (2015), Roelen & Blom, (2013) and Iwadare & Oyama (2015) are examples of the use of this approach.

1.2 Efficient regulation

Statistically, almost 80% of aviation accidents occur at airports (Feng & Chung, 2013). Boeing (2019) records to commercial jet fleet worldwide that 40% of all fatal accidents occur in airport procedures (parking, taxi, take-off, landing), despite of only 2% of flight time are spent in this environment.

Most of them occur on or near runways. The total costs of runway events from 2015 to 2018 are estimated at $500 Million per month. In this period were recorded around 2.100 events worldwide (Eekeren *et al.*, 2018).

Flight Safety Foundation (FSF, 2020) estimates that 27,000 ramp accidents and incidents (one per 1,000 departures) occur worldwide every year. About 243,000 people are injured each year in these accidents and incidents (9 per 1,000 departures). Apron accidents cost major airlines worldwide at least US$10 billion a year.

Risk regulation has been inefficient, according to Gowda (1999), and could be improved (Ketbadari *et al.*, 2018) with the use methodologically validated techniques (Florig *et al.*, 2001).

A significant number of studies tried to set predictively or reactively, the importance for airport safety events. However, the practical result of the lack of an efficient regulation on airport safety oversight lies on the fact that, there are currently no risk rankings of airports in public statistics combining two or more "not miscible" unwanted operational events. The former statement summarizes the main focus of this work.

As State does not map the risks involved in the operations under its supervision in a broad way, it becomes impossible to adopt risk mitigation strategies to ensure its best operational performance (FAA, 2000; ICAO, 2018; ACRP, 2015).

As a result, the need to advance in the quality of airport safety monitoring implemented by the SSP's is vital. This work aims to propose the development of a methodology for the risk management in airports for the SSP in a broad way.

The research intends to investigate the nature of the airport safety events occurred in busiest Brazilian airports, proposing the combined use of the recurrence of such events and their relative severities, generating a dimensionless risk index capable of compare and rank them.

This work also proposes the identification of an ALoSP for airports in Brazilian SSP, so State can have a reference point of performance to better direct resources on market risk management.

In order to achieve that, the research proposes a methodology which combines the Abbreviated Injury Scale (AIS) proposed by Eurocontrol (2018) and ICAO ADREP taxonomy. Using the former template, the risk analysis-based approach, demanded by ICAO, can be fully implemented at first in Brazil as well as can suit as a trial for future expansion.

The initial section introduces the subject and the problem posed. Section 2 presents the theoretical framework about the integrated risk model for the monitoring purposed in this work. The construction of the model is brought in section 3, and section 4 shows a sensitivity analysis applied to the real case of the main Brazilian airports. The paper concludes in section 5, with the main outcomes.

2. LITERATURE REVIEW

2.1 Risk

Currently the concept of risk penetrates virtually all human activities, and there is no consensus as to its formal definition (Čokorilo *et al.*, 2010, Makowski, 2005). However, there is a common sense towards the concept of risk as being the quantification of the consequences of an unwanted danger or event, expressed in terms of probability and severity (Reason, 1997; NASA, 2007; INCOSE, 2010; Stolzer *et al.*, 2012; ICAO, 2018; FAA, 2014; ACRP, 2015; Lopez-Lago, *et al.*, 2017).

Severity is the risk parameter that informs the potential for damage that an event can cause in a given system. It refers to the intensity, size, extent, scope, and other potential measures of magnitude of an event. Losses and gains, for example, expressed by money or the number of fatalities, are ways of defining the severity of the consequences (Aven & Renn, 2009).

There are many possible consequences in the operational mix of an airport due to the great complexity of this environment. It can be used as severity parameter ground operation accident costs, life injuries or losses, potential reduction on profit caused by a disrupted runway, image losses, insurance values increase, etc. (ACRP, 2011; 2015).

It is also used in airport risk monitoring as severity parameter the classification of undesired events that aims to control, based on the typical occurrences verified in historical data of operation (Distefano *et. al.*, 2013).

ICAO (2018) recommend generically that an operator or State may adapt their severity parameter selection to better serve their monitoring models.

The process of controlling risks also involves assessing the probability of the occurrence of unwanted events. It is possible to identify in the literature criteria ranging from merely subjective approaches to objective approaches with probabilistic calculations where possible (ACRP, 2015).

For this parameter ICAO also recommend users to adopt criteria that best fit their operational realities, with the aim of better managing their safety environment. Yilmaz (2019) states that two types of approaches in predictive risk analysis are used for this: quantitative and qualitative methods.

In the qualitative method, the author argues that its subjectivity is better applied in techniques that seek to capture the perception of those involved regarding a specific risk in an environment with scarce data. There are many qualitative techniques widely used in risk management processes: What-if, HAZOP, FMEA, FTA, BowTie, Event Tree, etc.

With some variations, they all go through the essential risk management process that identifies hazards and present barriers, estimates the magnitude of the initial risk, implements mitigation solutions and monitors the results. These are descriptive techniques that seek to study the logic of the occurrence of a given risk, with use more applicable to the day-to-day operations in an organization.

The quantitative method also contains the fundamental phases of the risk management process, however the risk level is objectively measured. It is more used when there is enough information to allow the decision maker to more assertively choose the best path. This technique dates back to the mid-17th century with mathematicians Blaise Pascal and Pierre de Fermat and there is a large amount of material published in this line (BERNSTEIN, 1997).

Janic (2000) suggests that the management of safety in transportation is a practical problem, with many ways of acting, all of which going necessarily through the statistical evaluation of the probability of an event and its consequences, with the use of recurrence time for cases where raw data is needed.

The author argues that the more adequate approach to use in state policies is the use of the so-called "statistical risk", which is nothing more than the analysis of the actual frequencies of occurrences of different severities from real data. ICAO also supports this approach in the state's regulatory balance analysis as the safest form of action (ICAO, 2018).

Knowing, therefore, the current statistical safety environment through recurrence analysis of an unwanted event is basic input for the planning of a quality regulation.

2.2 Integrated risk analysis approach

Risk integration for SSP's is a practice brought, as cutting edge, in the update of the SMM (OACI, 2018). Integrated risk analysis (IRA) aims to address this problem (NASA, 2014).

It consists of assessing the risks of the system. Rather than focusing on a set of separate analyses, IRA can fill gaps that remain after the compartmentalized study, and that influence the final performance of a system.

In this regard, as Wong *et al*. (2009) states, an integrated approach to risk management at airports crosses existing regulatory boundaries because it reflects the conceptually continuous nature of risk. It facilitates more efficient global policies rather than current fragmented and compartmentalized risk control measures.

Fischhoff (1994) argues that risks are never perceived in an absolute sense, but always when contextualized in relation to other risks. For Slovic (1987) this concept is named "perspective risk".

In addition to comparing risk values with each other, a good practice is to relativize them in front of previously established performance levels (Curtis & Carry, 2012; Slovic & Peters, 2006), measuring their distances to reach acceptable levels for a given system.

Risk ranking is also considered an effective way for analysis and communication on risk management (Johnson, 2004; NAS, 2017).

Knowing the value of the total risk of the system and its composition, prioritizing its main elements, is an important step to direct the optimized application of resources in the formulation of regulatory policies (Watson, 2005; Wong *et al.*, 2009; Yilmaz, 2019), as is the case of the SSP.

Finally, this integrated and compared analysis will allow a systemic address of the major risks across the airports and at the same time identify the critical airports that need an increased oversight (Baldwin *et al.*, 2012).

3. METHOD

The purposed methodology is based on previous knowledge acquisition on the main subjects approached: quantitative risk assessment as is theorized and integrated risk monitoring.

Then is brought the airport integrated risk model for SSP's. After that is necessary to define scope matters, such as the group of airports selected to test the model (which must be representative so the model can be validated), the nature of the safety events and the period data will be collected.

After that are applied the severity and probability weighting for the risk model, and finally, it is done a sensitivity analysis on data returned and presented conclusions and remarks.

Thus, this work uses an analytical approach when investigates the scenario where the research is, and an inductive approach to adapt the revised risk models and, based on the integrated data, seek the solution of the proposed problem (Gil, 1999).

3.1 Phasing

The work is divided in 6 phases and 10 steps as follows (Figure 1) so it can be checked, challenged and replicated in other transportation systems, which have fundamentally the same characteristics.

Phase 1	Theoretical review			Step 1
Phase 2	Airport integrated risk model	$r_j = \sum_{i=1}^{N} \frac{a_i \cdot S_{AISi}}{A_t}$	$R_t = \sum_{j=1}^{K} r_j$	Step 2
Phase 3	Scope definitions	*Airports selected*		Step 3
		Safety event data	*Nature*	Step 4
			Period	Step 5
Phase 4	Weighting	*Event severity*	*EUROCONTROL approach*	Step 6
		Probability	*Event recurrence*	Step 7
			Event relative frequencies	Step 8
Phase 5	Sensivity analysis			Step 9
Phase 6	Conclusions and Remarks			Step 10

FIGURE 1: Study phasing

3.2 Scope

Airports and period of study

The data collected for this work refer to the group of the busiest 31 aerodromes, among the 116 with regular flights currently in Brazil, accounting for 1.89 billion passengers transported in the country from 2010 to 2019 in 94% of the total commercial ATM's on the period.

This sampling took into consideration the regulatory balance between the cost of acquisition of data *versus* the marginal benefit of adding more airports to the group on result of the model (Kirkpatrick *et al.*, 2003).

Catchment of the model

Although it is known that every safety event is given by a multiplicity of factors resulting from many different sources (Feng & Chung, 2013), and many of them can be attributed to pilot performance for example, the model is developed to measure the risk occurred in airport ground operations. The objective is to capture, measure and map those risks, so State can direct more efficiently its efforts to control these issues (Figure 2).

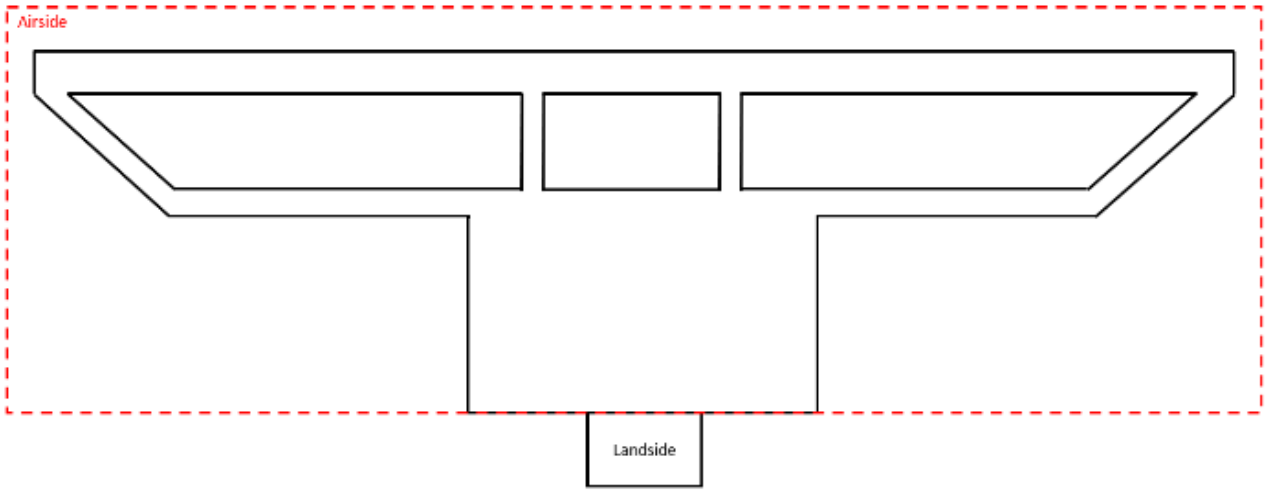

FIGURE 2: Catchment of the model

3.3 Safety data

Safety data collection refers to the period of study. It has been provided by CENIPA (Brazilian accident investigation bureau), which concentrates the safety reports on civil aviation. In this period, as well as for the number of the selected airports for this study, a total of 1.278 safety events were registered. They were classified, categorized and counted accordingly.

Classification

Data from safety events are reported by airports, and CENIPA performs a quality analysis, filtering and classifying according to ICAO ADREP standardized taxonomy. Those safety event classes were correlated to the (AIS) Abbreviated Injury Scale (Eurocontrol, 2018) in order to be determined its actual numerical significance in terms of contribution of risk to the system (Figure 3).

AIS scale (Eurcontrol, 2018)			ICAO Occurrence ADREP Classification*
AIS Level	Severity	Fraction of VSL	
AIS 6	Fatal	1	Accident - Fatal (AF)
AIS 5	Critical	0,593	Accident - Non-fatal (AN)
AIS 4	Severe	0,266	Serious Incident (SI)
AIS 3	Serious	0,105	Incident - Major (IM)
AIS 2	Moderate	0,047	Incident - Significant (IS)
AIS 1	Minor	0,003	Occurence without safety effect (OW)

* Acronyms AF, NA, SI, IM, IS, OW defined in this research

FIGURE 3: Correlation between Eurocontrol AIS scale and ICAO ADREP classification

This methodology is a tool used by Eurocontrol and by the European Union for regulatory impact studies. The AIS scale refers to the degree of injury of an accident victim, where injuries are classified into six categories, from AIS 6 for fatal injuries to AIS 1 for minor injuries. The assessment of each level of injury is related to loss of quality and amount of life resulting from an injury typical of that level. This loss is expressed as a fraction of a fatality, or fraction of the Value of Statistical Life - VSL (Day, 1999; Viscusi & Aldy, 2003).

Categorization

After classification, occurrences were categorized and given an acronym as per ICAO ADREP methodology. Figure 4 brings the events that can occur in airport movement area.

ICAO ADREP Acronym	Definition
ADRM	Aerodrome (aerodrome design, service, or functionality issues are evident)
ARC	Abnormal runway contact (any landing or takeoff involving abnormal runway or landing surface contact)
ATM/CNS	Air traffic management (ATM) or communications/navigation/surveillance (CNS) service issues are evident
BIRD	Occurrences involving collisions / near collisions with bird(s); A collision / near collision with or ingestion of one or several birds.
CFIT	Controlled flight into or toward terrain (in-flight collision or near collision with terrain, water, or obstacle without indication of loss of control)
F-NI	Fire/smoke (nonimpact) (fire or smoke in or on the aircraft, in flight, or on the ground, which is not the result of impact)
F-POST	Fire/Smoke resulting from impact
FUEL	Fuel related occurrence
GCOL	Ground collision (collision while taxiing to or from a runway)
ICE	Icing (accumulation of snow, ice, or frost on aircraft surfaces that adversely affects aircraft control or performance)
LOC-G	Loss of aircraft control while the aircraft is on the ground
OTHR	Other events
RAMP	Ground handling (occurrences during or from ground handling operations)
RE	Runway excursion (a veer off or overrun off the runway surface)
RI-A	Runway incursion-animal (collision with, risk of collision, or evasive action taken by an aircraft to avoid an animal on a runway in use)
RI-VAP	Runway incursion-vehicle, a/c or person (any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle or person on the protected area of a surface designated for the landing and takeoff of aircraft)
SCF-NP	System/component failure or malfunction (non-powerplant)
SCF-PP	Powerplant failure or malfunction
UNK	Unknown or undetermined
USOS	Undershoot/overshoot (a touchdown off the runway surface)
WILD	Occurrences involving collisions / near collisions with wildlife; A collision / near collision with or ingestion of one or several animals.

FIGURE 4: Airport safety events as per ICAO ADREP taxonomy

Quantification

The recurrence of all safety events occurred in selected airports were computed following the classification and categorization proposed. For data protection and feasibility purposes of the study, randomized codes were inserted in the ICAO airport identifier in a way that their identification was hidden.

Finally, these data were used in the risk model of this work, which distributes the risk values of each airport per passenger handled (V_{pax}).

3.4 Reactive ALoSP in airports for SSP

Errors and faults will occur in any system projected or operated by humans, so current thinking on aviation safety stands that an absolute safe system, although desirable, is impossible to be reached (ICAO, 2018).

Because of this fact, aviation safety is given as a relative notion where risks are tolerated at a certain acceptable level, and safety must be managed so continuous improvement is achieved in the whole aviation system. This level is called Acceptable Level of Safety Performance (ALoSP) (ACRP, 2015; OACI, 2016).

In this research this reference level is obtained by the average risk measured of the airports. In this sense, airports are individually relativized from this reference value and aggregated according to their performance in safety categories events.

Continuous improvement encouraged by ICAO is reached by using Baldwin's positive incentive regulation (Baldwin *et al.*, 2012), providing incentives for the top safety ranked airports.

It is believed that all the airports will tend to look for better performance in persecution for those benefits. This behaviour tends to increase the average safety level of the market, reaching the so-called safety continuous improvement.

Another way to improve the ALoSP using this technique is the implementation by the State of thematic programs on the issues that are mapped as the largest source of risk, *e.g.* financial help for RSA obstacle removal, correction in runway signs deficiencies, pavement grip corrections, etc.

3.5 Airport integrated risk model

This research proposes an integrated risk model for SSP's based on a reactive approach. Thus, adapting the general risk model concept to the purposes of this research, the result is the reactive value of the risk represented by the airport infrastructure for the SSP.

Basically, the probability to encounter an event that occurred in certain airport is the number of events that happened in the airport divided by the total the occurrences of that category according to ICAO ADREP taxonomy (Figure 4). As a result, the risk of that category of occurrence in that airport is its probability multiplied by its relative severity (Figure 3).

Considering that the events are mutually exclusive, the total "Risk index" of a specific airport can be assumed as (Equation 1):

$$r_j = \sum_{i=1}^{N} \frac{a_i . S_{AISi}}{A_i} \quad [1]$$

Where:

r_j: is the total risk of a specific airport.

N: is the total number of AIS levels of severity.

a_i: is the total number of occurrences of certain AIS level in the airport.

A_i: is the total number of occurrences of the system.

S_{AISi}: is severity weighting given by the correlation of Brazilian regulations and AIS Eurocontrol severity scale for that ICAO ADREP occurrence category.

Numerator: is the "Risk recurrence".

Then, the total risk of the system R_t with K airports is found by the sum of the risk performances of each airport, which is:

$$R_t = \sum_{j=1}^{K} r_j \quad [2]$$

3.6 Data quality

Data provided were evaluated according to their consistency to enable the execution of calculations and risk mapping accurately. This assessment should, whenever possible, be carried out considering the seven principles of data quality provided for in ICAO (2018): validity, fullness, consistency, accessibility, temporality, safety and accuracy.

4. RESULTS AND DISCUSSION

4.1 Previous description of safety events and risk recurrence

A total of 1.278 safety events were reported in the 31 airports selected from 2010 to 2019. After the classification, categorization and quantification they were distributed in (Figure 5).

		ICAO ADREP Classification + AIS Severity scale						Total
		OW AIS 1 0,003	IS AIS 2 0,047	IM AIS 3 0,105	SI AIS 4 0,266	AN AIS 5 0,593	AF AIS 6 1	
ICAO ADREP Taxonomy	SCF-NP	0	544	6	45	15	0	610
	OTHR	0	198	5	10	2	0	215
	SCF-PP	0	112	3	6	3	3	127
	BIRD	0	115	6	0	1	0	122
	LOC-G	0	30	1	14	9	1	55
	GCOL	0	28	3	2	2	0	35
	ARC	0	10	2	10	6	0	28
	RE	0	6	0	11	10	0	27
	F-NI	0	23	0	2	0	0	25
	RI	0	8	0	2	0	0	10
	FUEL	0	4	0	4	1	0	9
	UNK	0	4	0	0	0	1	5
	WILD	0	2	0	0	1	0	3
	ATM/CNS	0	1	0	1	0	0	2
	USOS	0	0	0	1	1	0	2
	ICE	0	0	0	1	0	0	1
	RAMP	0	1	0	0	0	0	1
	CFIT	0	0	0	1	0	0	1
	Total	0	1086	26	110	51	5	1278

FIGURE 5: Safety event recurrence per classification and categorization

Brazilian official reports do not record OW events. Since they have an extreme low severity significance, they pollute the samples and increase costs of information acquisition without returning equivalent values in risk.

In this sense these numbers could be acquired for the objective of this research, but they would have a high granularity and a low level of standardization in their capture.

Many previous considerations and assessments can be made only by using initially equation [1]. When attributed the AIS relative severity values to those occurrences it is possible to rank them in risk recurrence (Figure 6).

		ICAO ADREP Classification + AIS Severity scale						Total		
		OW	IS	IM	SI	AN	AF			
		AIS 1	AIS 2	AIS 3	AIS 4	AIS 5	AIS 6			
		0,003	0,047	0,105	0,266	0,593	1	∑ Risk	% total	Cum. %
Taxonomy ICAO	SCF-NP	0	25,568	0,63	11,97	8,895	0	47,063	39,79%	39,79%
	OTHR	0	9,306	0,525	2,66	1,186	0	13,677	11,56%	51%
	SCF-PP	0	5,264	0,315	1,596	1,779	3	11,954	10,11%	61,46%
	LOC-G	0	1,41	0,105	3,724	5,337	1	11,576	9,79%	71,25%
	RE	0	0,282	0	2,926	5,93	0	9,138	7,73%	78,98%
	ARC	0	0,47	0,21	2,66	3,558	0	6,898	5,83%	85%
	BIRD	0	5,405	0,63	0	0,593	0	6,628	5,60%	90,41%
	GCOL	0	1,316	0,315	0,532	1,186	0	3,349	2,83%	93,24%
	FUEL	0	0,188	0	1,064	0,593	0	1,845	1,56%	94,80%
	F-NI	0	1,081	0	0,532	0	0	1,613	1,36%	96,17%
	UNK	0	0,188	0	0	0	1	1,188	1,00%	97,17%
	RI	0	0,376	0	0,532	0	0	0,908	0,77%	97,94%
	USOS	0	0	0	0,266	0,593	0	0,859	0,73%	98,66%
	WILD	0	0,094	0	0	0,593	0	0,687	0,58%	99,25%
	ATM/CNS	0	0,047	0	0,266	0	0	0,313	0,26%	99,51%
	ICE	0	0	0	0,266	0	0	0,266	0,22%	99,74%
	CFIT	0	0	0	0,266	0	0	0,266	0,22%	99,96%
	RAMP	0	0,047	0	0	0	0	0,047	0,04%	100%
	Total Risk	0	51,042	2,73	29,26	30,243	5	118,28	100%	
	% Total Risk	0%	43,16%	2,31%	24,74%	25,57%	4,23%	100%		

FIGURE 6: Risk recurrence in airports per ICAO ADREP Class and Category

Risk recurrence represents the most direct number to use when dealing with safety assessments in order to mitigate risk.

The initial order sensitivity analysis shows that approximately 50% of the airport safety events are due 2 category of events and only 5, among the 21 possible events in airports, represent almost 80% of the risk recurrence (Figure 7) in an airport.

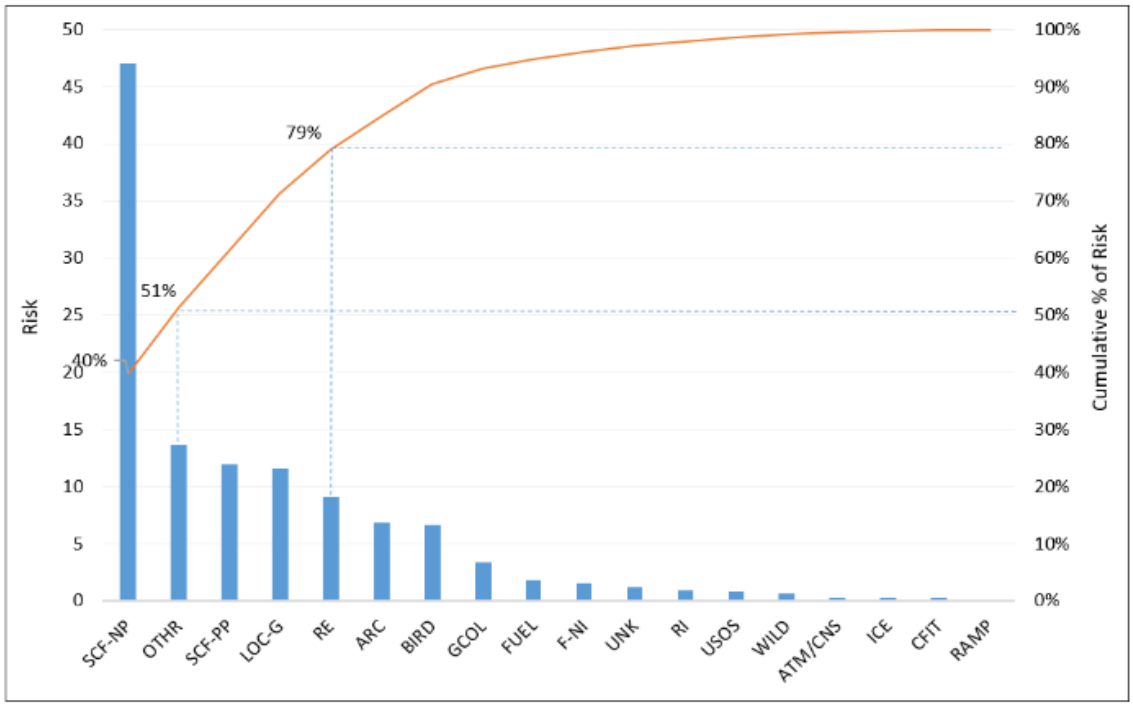

FIGURE 7: Risk recurrence by ICAO Taxonomy - order sensitivity analysis

Another possible initial assessment is to point out in a generic airport, represented by the sum of all 31 airports studied, where the risk recurrence is spatially positioned (Figure 8). Brazilian safety numbers showed a worldwide-like pattern, concentrating the majority of the airport risk recurrence on runway areas and adjacencies.

	ICAO ADREP Classification + AIS Severity scale						
	OW	IS	IM	SI	AN	AF	
	AIS 1	AIS 2	AIS 3	AIS 4	AIS 5	AIS 6	
	0,003	0,047	0,105	0,266	0,593	1	∑ Risk
Apron	0	73	2	2	3	0	80
Risk recurrence	0	3,431	0,21	0,532	1,779	0	5,952
Apron %	0%	6,72%	7,69%	1,82%	5,88%	0%	5,03%
Runway	0	858	18	102	48	5	1031
Risk recurrence	0	40,326	1,89	27,132	28,464	5	102,812
Runway %	0%	79,01%	69,23%	92,73%	94,12%	100%	86,93%
Taxiway	0	155	6	6	0	0	167
Risk recurrence	0	7,285	0,63	1,596	0	0	9,511
Taxiway %	0%	14,27%	23,08%	5,45%	0%	0%	8,04%
Total Risk recurrence	0	51,042	2,73	29,26	30,243	5	118,275
% Total Risk recurrence	0%	100%	100%	100%	100%	100%	100%

FIGURE 8: Spatial distribution on airport risk recurrence

Given the fact that 86.93% of the risk recurrence is concentrated in runways, it helps the State to direct resources more efficiently in order to face more severe events on riskier airports.Thus, the proposed model amplifies the SSP effectiveness.

4.2 Risk index and airport performance

By using equation [2] it is possible to establish the proposed relativization among airports by knowing their 10-year risk index (Figure 9).

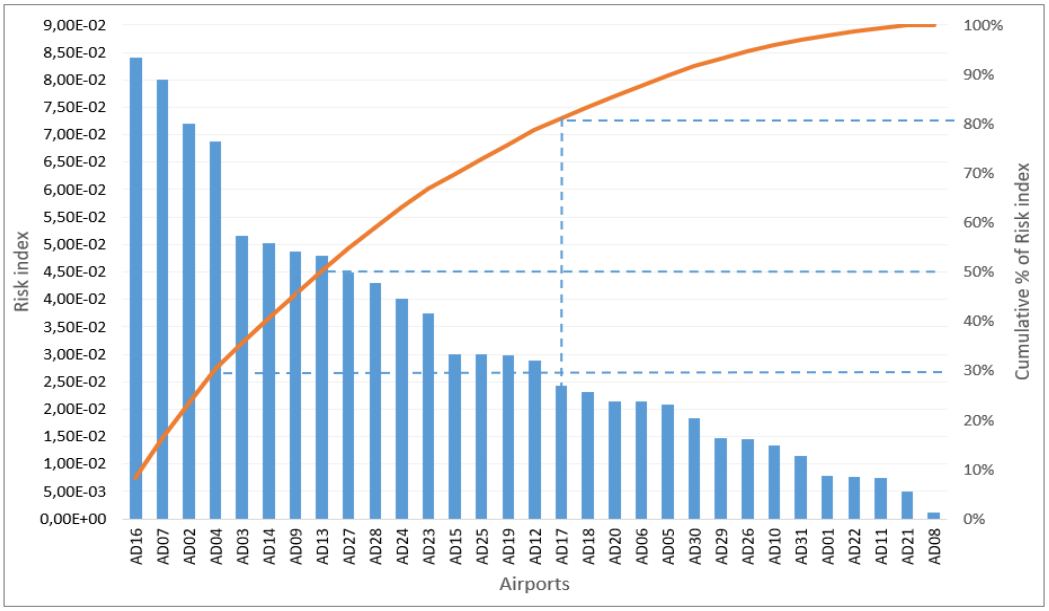

FIGURE 9: Airport 10-year risk index and ALoSP

Among 31 airports, only 4 concentrate 30% of all the risk, 8 are responsible for 50% and 17 represent approximately 80% of the total risk load in Brazilian airport operations.

The mean risk for the 31 airports, studied during 10-year period time, was in 3.23 x 10^{-2}. As proposed before, this number can be assumed as the initial ALoSP for airports in Brazilian SSP in 2020 (Figure 10). The baseline safety performance (ICAO, 2018).

Since this number is known, and it represents the performance of 10 years of airport safety in Brazil, it can be assumed as a trusted number, be tracked in the future, reassessed yearly and be used as the airport market safety reference.

From this new reference, other risk sensitivity analysis can be made in order to better direct SSP resources and effort. Figure 9 still shows initially 19 airports performing better than the market average and 12 worst. Although it is possible to identify safer and riskier airports from the reference point, a more statistically safe approach is needed so SSP can be handled more effectively.

Since the main objectives of SSP's are (1) reduce risk to ALARP and (2) set a safety continuous improvement environment, is necessary to be certain on which airports are statistically performing different from ALoSP.

In order to fulfil those two objectives five groups of airports are proposed as per their risk index performance (Safety+2, Safety+1, Neutral, Safety-1 and Safety-2).

Despite the attention on selecting only reliable source of data, many imprecisions can be imbedded in the process, since the report is yet in airport grounds to the ICAO ADREP categorization and classification.

Assuming that those imprecisions could corrupt somehow the data, Neutral group is proposed. It represents a "judgement cushion" where 20% of airports who presented a safety performance around ALoSP are in this group

The other 4 where set by trying to divide equally better and worst performant groups. This criterion reduces misjudgement caused by possible inaccuracies in data collection, while ensuring that there are always airports in the other 4 regions, stimulating competitiveness and consequent evolution in ALOSP over time (Figure 10).

Group	Airport	Risk index (10y)	Group average risk index (10y)	Group risk relative to ALOSP	Group risk relative to Safety -2 Group
Safety +2	AD08	1,19E-03	8,57E-03	3.76 times safer than ALoSP	8.88 times safer than Safety -2 Group
	AD21	5,03E-03			
	AD11	7,40E-03			
	AD22	7,68E-03			
	AD01	7,89E-03			
	AD31	1,15E-02			
	AD10	1,33E-02			
	AD26	1,46E-02			
Safety +1	AD29	1,48E-02	2,16E-02	1.49 times safer than ALoSP	3.52 times safer than Safety -2 Group
	AD30	1,84E-02			
	AD05	2,08E-02			
	AD06	2,14E-02			
	AD20	2,14E-02			
	AD18	2,31E-02			
	AD17	2,42E-02			
	AD12	2,88E-02			
Neutral	AD19	2,99E-02	3,51E-02	1	2.17 times safer than Safety -2 Group
	AD25	3,00E-02			
	AD15	3,01E-02			
	ALOSP	3,23E-02			
	AD23	3,75E-02			
	AD24	4,01E-02			
	AD28	4,30E-02			
Safety -1	AD27	4,49E-02	4,87E-02	1.51 times riskier than ALoSP	1.56 times safer than Safety -2 Group
	AD13	4,80E-02			
	AD09	4,87E-02			
	AD14	5,02E-02			
	AD03	5,15E-02			
Safety -2	AD04	6,87E-02	7,61E-02	2.35 times riskier than ALoSP	1
	AD02	7,19E-02			
	AD07	8,00E-02			
	AD16	8,40E-02			

FIGURE 10: Airport safety performance groups

In research point of view, the precise knowledge regarding airports' effectiveness on safety (Safety-1 and Safety-2) or risk (Safety-1 and Safety-2) issues adds a layer of convenience. Safety+1 group presented a safety performance 1.49 times better than ALoSP and 3.52 times better than the worst group of airports (Safety-2). The Safety+2 group is 3.76 times safer than ALoSP and 8.88 times safer than Safety-2 group. Safety-1 group presented a risk level 1.51 times higher than ALoSP and Safety-2 performed 2.35 times riskier than the ALoSP.

4.3 Effective SSP action plan

Setting the ALoSP and the statistical difference of safety performance from airport groups contain the initiation for SSP to establish clearer approach, focusing on those which actually require guidance.

Firstly, the most intuitive movement would be the investigation of which events are more significant on Safety-1 and Safety-2 groups (Figure 11).

		ICAO ADREP Classification + AIS Severity scale						Total	
		OW AIS 1	IS AIS 2	IM AIS 3	SI AIS 4	AN AIS 5	AF AIS 6	Risk recurrence	% risk recurrence
		0,003	0,047	0,105	0,266	0,593	1		
Apron	F-NI	0	0,141	0	0	0	0	0,141	0,1%
	GCOL	0	0,188	0,105	0	0,593	0	0,886	0,7%
	OTHR	0	0,564	0	0	0	0	0,564	0,5%
	RAMP	0	0,047	0	0	0	0	0,047	0,0%
	SCF-NP	0	0,376	0	0	0,593	0	0,969	0,8%
	SCF-PP	0	0,047	0	0	0	0	0,047	0,0%
	Total	**0**	**1,363**	**0,105**	**0**	**1,186**	**0**	**2,654**	**2,2%**
Runway	ARC	0	0,141	0	0,798	1,779	0	2,718	2,3%
	ATM/CNS	0	0	0	0,266	0	0	0,266	0,2%
	BIRD	0	2,256	0,525	0	0	0	2,781	2,4%
	CFIT	0	0	0	0,266	0	0	0,266	0,2%
	F-NI	0	0,282	0	0,266	0	0	0,548	0,5%
	FUEL	0	0,188	0	0	0,593	0	0,781	0,7%
	GCOL	0	0,141	0	0	0	0	0,141	0,1%
	LOC-G	0	0,799	0	1,33	3,558	1	6,687	5,7%
	OTHR	0	3,055	0,315	2,394	0,593	0	6,357	5,4%
	RE	0	0,188	0	1,596	4,151	0	5,935	5,0%
	RI	0	0,047	0	0,532	0	0	0,579	0,5%
	SCF-NP	0	10,387	0,105	6,118	5,337	0	21,947	18,6%
	SCF-PP	0	2,115	0,105	1,33	1,779	1	6,329	5,4%
	UNK	0	0,141	0	0	0	0	0,141	0,1%
	USOS	0	0	0	0,266	0,593	0	0,859	0,7%
	WILD	0	0,047	0	0	0,593	0	0,64	0,5%
	Total	**0**	**19,787**	**1,05**	**15,162**	**18,976**	**2**	**56,975**	**48,2%**
Taxiway	ATM/CNS	0	0,047	0	0	0	0	0,047	0,0%
	BIRD	0	0,047	0	0	0	0	0,047	0,0%
	GCOL	0	0,329	0,21	0	0	0	0,539	0,5%
	LOC-G	0	0,047	0,105	0	0	0	0,152	0,1%
	OTHR	0	0,705	0	0	0	0	0,705	0,6%
	RI	0	0,047	0	0	0	0	0,047	0,0%
	SCF-NP	0	2,961	0,315	0,266	0	0	3,542	3,0%
	SCF-PP	0	0,094	0	0	0	0	0,094	0,1%
	Total	**0**	**4,277**	**0,63**	**0,266**	**0**	**0**	**5,173**	**4,4%**
Risk recurrence		**0**	**25,427**	**1,785**	**15,428**	**20,162**	**2**	**64,802**	
% Risk recurrence		**-**	**49,8%**	**65,4%**	**52,7%**	**66,7%**	**40,0%**	**54,8%**	

FIGURE 11: Risk investigation on Safety-1 and Safety-2 groups

Having the risk matrix, it becomes easier to highlight where and how an airport in both groups performed. For example, having as reference the risk recurrence measured in the 10-year period time for the 31 airports, together both groups represent 54,8% of the total risk recurrence, of which 18,6% are given by SCF-NP events in runways.

Many lines of action have been discussed in literature on how manage market performance and stimulate behaviour on economic agents, such as direct interventions, penalties, liberalization, etc.

Positive incentive regulation as proposed by Baldwin has been identified as the most appropriate in this work.

First, regarding safety issues it is known that punitive actions hinder voluntarily safety report, which may initially mask the recurrence of lower severity events that may result in more severe events over time.

Secondly, because safety equals essentially to financial spent. The lower the risk and further away from ALoSP, the higher is the expense of a given airport. This effort needs to be rewarded, otherwise this benefit will be socialized. Any uncompensated financial or safety effort could be seen as a waste since (1) only the minimum is required and (2) there is no difference in dealing with agent's different performances. In this scenario, better performant airports could ease their safety actions resulting in a general drop of ALoSP, movement opposite to the desired.

Third, the strategy of fitting airports in groups stimulate them to compete one each other to be in better performant group. This behaviour results in positive feedback of the system, when it increases the average performance of the market, resulting in an even more demanding ALoSP, which in turn requires more safety efforts of the participant to remain in the best-positioned groups.

Many actions can be proposed, depending on the State's reality and regulatory framework. In Brazil for example it is possible to propose some, always proportional to verified performances.

Safety prizes in recognition to better performant airports in order to get returns in market image. Safer organizations acting in complex risky systems are seen as "role models" of behaviour. They can act as compliance reference and amplify their market power and relevance by capitalizing on these image gains.

Once safer airports have proven to be fulfilling the overall objective or regulation, which is to be safe when offering public services, State can reduce oversight frequency in those two groups. This results into lower regulatory costs to airports and to State itself.

Provide better follow up actions in worst performant airports, investigating what are their safety problems and offering means to cope with them.

Total absence of punishment in any possible ways to lower performant airports in order to stimulate the just culture and a healthy safety reports system.

Nevertheless, there is one threat for the proposed methodology, which is the safety data evasion. Since airports can be benefited in many ways by being safe, it can encourage them to not report safety events properly. Events could be hidden or reclassified to less representative categories. In such cases it is recommended to apply severe punitive measures, so the system can work in its better fit.

5. CONCLUSIONS

This work aimed to develop a methodology for risk management in airports for the SSP in a broad way. In order to achieve that, researchers investigated the nature of the airport safety events occurred in busiest Brazilian airports.

Then was proposed the combined use of the recurrence of safety events and their relative severities to generate a dimensionless risk index capable of compare and rank airports.

Research also presented the ALoSP for airports in Brazilian SSP, so State can have a reference point of performance to better direct resources on market risk management.

The inquiry resulted that, both airports and State already do not consider extreme low severity events in their actual risk monitoring system, given that they only raise safety expenses and do not return benefits in the same amount.

The proposed methodology made possible to present a picture of the safety situation (or a risk map) in Brazilian airport system. The sensitivity analysis showed that among 21 possible airport safety events, approximately 50% of the total risk is due to 2 categories of events and only 5 represent almost 80% of the measured risk.

It was found too that Brazilian safety numbers showed a worldwide-like pattern, concentrating the majority of the airport risk on runway areas and adjacencies.

Research also found the high concentration on risk recurrence among 31 airports. Only 4 concentrated 30% of all the recurrence of risk, 8 were responsible for 50% and 17 represented approximately 80% of the total risk load in Brazilian airport operations.

The mean risk for the 31 airports studied during 10-year period time was in 3.23×10^{-2}. This number can be assumed as the baseline safety performance initial and reliable ALoSP for airports in Brazilian SSP, since it represents the performance of 94% of all the airport movement in Brazilian system.

From this new reference point it was possible to find safer and riskier airports so SSP resources can be handled more effectively.

Five groups of airports are proposed as per their safety performance (Safety+2, Safety+1, Neutral, Safety-1 and Safety-2).

Their measured performance showed statistically significant differences. Safety+1 group presented a safety performance of 1.49 times better than ALoSP and 3.52 times better than worst group of airports (Safety-2).

The Safety+2 group presented as 3.76 times safer than ALoSP and 8.88 times safer than Safety-2 group. Safety-1 group presented a risk level 1.51 times higher than ALoSP and Safety-2 performed 2.35 times riskier than the ALoSP.

By knowing ALoSP and the statistical difference of safety performance from airport groups, it became possible to focus efforts on dealing with more severe events on riskier airports

Together, both worst performant groups represented 54,8% of the total risk recurrence of the system. Most sensitive event in these airports is SCF-NP and 18,6% of the risk are given by SCF-NP events in runways.

This proposed matrix, woks as a tool for airports to identify their safety weaknesses and promote efficiency and rationality to the SSP's by amplifying their effectiveness. Research also found that not only reducing risks to ALARP is needed to an SSP, but also is imperative to create a safety continuous improvement environment.

This work also proposed a positive incentive regulation approach, in line to a less interventionist model. In this line was proposed some actions to stimulate airports on compete among themselves in exchange for market reputational gains and its intrinsic financial benefits.

Finally, it was found that state oversight in a proactive approach should be used for the worst performant airports in pursuit for a just culture environment. Severe enforcement was recommended only to those airports who might evade information in order to appear safer than real.

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PERCEPTIONS AND ATTITUDES OF AIRLINE EMPLOYEES TOWARDS DIVERSITY. A QUANTITATIVE ANALYSIS

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ABSTRACT

As the world tourism market is continuously changing, travel by air is considered the most widespread mode of mass international tourism. Considering new ways of management that airlines need to adopt in order to have a well trained and qualified management team, this survey explored the attributes of airline employees and their interactions with diverse customers and identified the sufficient role of employees' training and the advantages of diversity management. Simple random sampling method was applied to gather 309 airline employees' questionnaires on their attitudes towards diversity. Descriptive and inductive analyses were used to present the obtained data. Principal Component Analysis was conducted to predefine three factors. Pearson correlation coefficient was applied to present the direction of the relationship between extracted factors and employee's occupational status. Authors' findings emphasise that airline employees seek a workplace with a friendly atmosphere that respects the diversity of employees and customers and they in their turn support airlines to operate over the comfort zone to achieve organisation's goals and customers' satisfaction. As the world keeps advancing, planning a diversity strategy should be the first step any modern-day organisation should explore prior to embarking anything related to a diverse workplace.

KEYWORDS

Airlines, Diversity, Employees, Training, Multicultural Working Environment

1. INTRODUCTION

The airline industry is considered integral part of tourism development, while air travel contributes to the phenomenon of mass international tourism (Holloway & Humphreys, 2016). Nowadays, travel by air is the most widespread mode for international tourism and airlines are forming a tourism development within a destination via the tourists they transfer from one place to another. However, over time the upward trend of air travel was interrupted due to the appearance of the pandemic and the negative consequences of the spread of the corona virus. According to ICAO's annual global statistics in 2018, for instance, transportation globally exceeded 4.3 billion passengers only through scheduled flights (6.4 percent higher than the previous year), while the number of departures reached 37.8 million in 2018 (3.5 percent increase). According to IATA (2020), international passenger traffic fell by -91.9% year-on-year in July 2020, and international air travel demand remained broadly sluggish for all regions. Globally, passenger demand for air travels remains slow due to the weak consumer confidence along with the unstable epidemic situation and the negative impacts of the spread of COVID-19, which are expected to reduce passenger revenues from $612 billion in 2019 to $241 billion in 2020 (IATA, 2020). Taking into consideration the aforementioned ever-changing reality, airlines try to become more competitive in the global market and seek for methods and patterns in order to establish international and domestic air travels. In this framework, this paper focusses on the role of diversity in the airline industry and the supportive role of the training among airline employees. In the light of airline employees' perceptions and attitudes towards diversity, this work attempts to explore the diversity as a strategic management tool, the role of training on a diversity agenda and its importance for the maintenance of a positive and supportive working environment.

Diversity refers to different perspectives of personal beliefs and ideas (Esty et al., 1995; Patrick and Kumar, 2012) enhanced by socioeconomic, environmental, and technological factors (Cletus et al., 2018). Considering the new era of globalisation, immigration, and the mass movement of passengers from one place to another, airlines tend to explore management practices and prioritise workplace diversity in order to accommodate employees' and passengers' needs. In the airline industry, according to authors' knowledge, the workforce diversity and the challenges arising from the diverse background of employees and customers have rarely been studied directly. Due to this fact, the research explored the attributes of airline employees and their interactions with customers for airlines to align with the sustainability agenda and understand that advantages of diversity management to accommodate the needs of

both parties. Furthermore, the key contribution of this survey is the strategic directions it provides to airline supervisors and managers so that they can focus their efforts on the development of human resources in areas, such as flexibility, adaptability, and capability.

2. LITERATURE REVIEW

2.1 Diversity and Workplace Diversity

For decades, diversity was considered an operational characteristic, whilst new laws and procedures were adopted to face this matter. At workplace -but not exclusively- the term refers to the characteristics that distinguish and promote the difference of others with respect to age, race, gender, class, ethnicity (Esty et al., 1995), sexual orientation, political and religious beliefs, physical abilities, marital status, socioeconomic status, etc. (Velazquez, 2017). Over time, an extensive literature has developed on workplace diversity and its crucial importance in business and organisational management. Previous studies (Walia and Malik, 2015; Green et al., 2002) have recognised that workplace diversity provides employees with varied capabilities, which ensure effective strategic planning and provide a safe climate for the achievement of organisational goals. A diverse workplace allows an organisation to effectively implement its strategic plans (Kapoor, 2011), provides a competitive advantage for the promotion of facilities and services by employees and allows an effective dealing with stereotypes that some individual employees might have.

2.2 Diversity in the Airline Sector

By definition, airlines promote a multicultural aspect of employment. Employees not only offer services to an international range of passengers but they also work with multicultural colleagues and tend to adapt into new cultures and societies that they come across with on a daily basis. In the airline industry everything is related to safety and security, while passenger services focus on passenger comfort. Taking into consideration the diverse profile of passengers that are carried on an aircraft, airlines are designing their products as per their needs in order to bridge the diversity gap that might arise throughout their experience, while at the same time they become competitive in the aviation market. An airline that has a well trained and qualified management team creates a self-respect feeling within the airline staff community. However, the staff has to create a bond between the team and their passengers as this will differentiate any airline from its competitors, while trust and inclusion are characteristics of an excellent team. A research published at the Department of Transport in the United States shows that in the first 10 months of 2016, non

awareness of diversity towards others recorded an increase of 37% in the airline industry. Several airlines around the world train their employees on being empathetic and using their feelings in order to understand and assist passengers no matter where they come from.

2.3 Diversity as A Strategic Management Tool

As the world tourism market is continuously changing, Diversity Management becomes a process intended to create and maintain a positive work environment, where the similarities or differences of individuals are valued (Patrick and Kumar, 2012). Diversity Management consists of a significant organisational challenge for supervisors intending to maximise the organisation's strategic goals and exceed its targets (Green et al., 2002). In the tourism industry, diversity, sustainability, and business are intrinsically linked, as organisations are required to investigate and exploit employees' and customers' diversity in a critical way for their success. It is observed, that in international carriers, leadership consists of a multicultural profile. Thus, this is equivalent to a diverse hierarchy that adopts all possible leadership scenarios to promote a can-do attitude in both teams and services provided to their audience ((Dipak Prasad Bastola, 2011). The study of Robinson and Dechant (1997) revealed that organisations can increase their attractiveness to present and future employees, partners, and customers by promoting workplace diversity. Therefore, Ozbilgin and Tatli (2008) suggested that a successful diversity management and a resulting improvement in organisational performance are positively correlated. In the light of the reported facts and following a human-centric approach of employees from different backgrounds, this survey addresses the need for the exploration of employees' perceptions towards workplace diversity into the airline industry, which is so far lacking in scientific literature.

2.4 Diversity in Workplace: The Effective Role of Employees' Training

In order for airlines to seek diversity, promote inclusion and enhance the values derived from employees' similarities or differences they need to adapt proper training plans to their employees, as the opposite is expected to have negative consequences for a brand. Hence, employees' training contributes to the awareness of diversity at workplace. Keese (2020) stated that "*mandatory diversity training for managers should be incorporated as part of a developmental learning process to ensure managers can effectively deal with diversity issues*". Thus, airline managements need to decide on which direction the company is focusing as this could be used as a strong tool to achieve a well-known brand. In general, airlines are focused mostly in safety and

security, however a mass number of passengers rely and choose a carrier based on the product delivered. Crew has to be adaptable and flexible in all scenarios. These two definitions can be achieved by using a well- planned educational programme to implement and to promote diversity and situational awareness of team members while at workplace (Yu-Hern Chang, 2013). A company that has highly qualified and well trained staff will contribute to the development of the organisation, At the same time, the managers of such an airline, who understand the importance of cultural diversity, are trained on how to handle conflicts deriving from diverse backgrounds (Keese, 2020). Taking into consideration that the airline industry is very demanding and the turnover of employees is frequent, training programmes for airline employees provide significant opportunities for the sustainability of airline companies. Having an employee training programme means your employees are constantly learning new skills or improving their existing skills that increase productivity, reduce mistakes, build confidence, and create a better workplace (Deans, 2018). Using the right skills of employees to meet market demands, the company can increase productivity, minimise risks, contribute to self development (both for the actual individuals and the company), present a competitive image and offer a pleasant working environment. A training programme allows employees to strengthen the areas and the fields that need improvement (Deans, 2018) while it also promotes the development and growth of the airline and its staff.

3. THEORETICAL AND/OR EMPIRICAL CONTRIBUTION

To explore research objectives, a structured questionnaire was used, which consisted of 15 five-scale as well as close-ended questions referring to the respondents' demographic profile. A simple random sampling method was applied to gather 309 questionnaires on airline employees' attitudes towards diversity. Descriptive and inductive analyses or inferential statistics (correlation coefficient) were used to present the obtained data, which were collected through online surveys (April to June 2019) and were analysed by SPSSv.25. A Principal Component Analysis (PCA) was conducted to classify airline employees' attitudes towards diversity into three components (Table 2), which accordingly contributed to the formulation of research hypotheses (Figure 1). PCA was used mainly in exploratory data analysis as a dimensionality-reduction method that is often used to compute principal components and to reduce the dimensionality of large datasets.

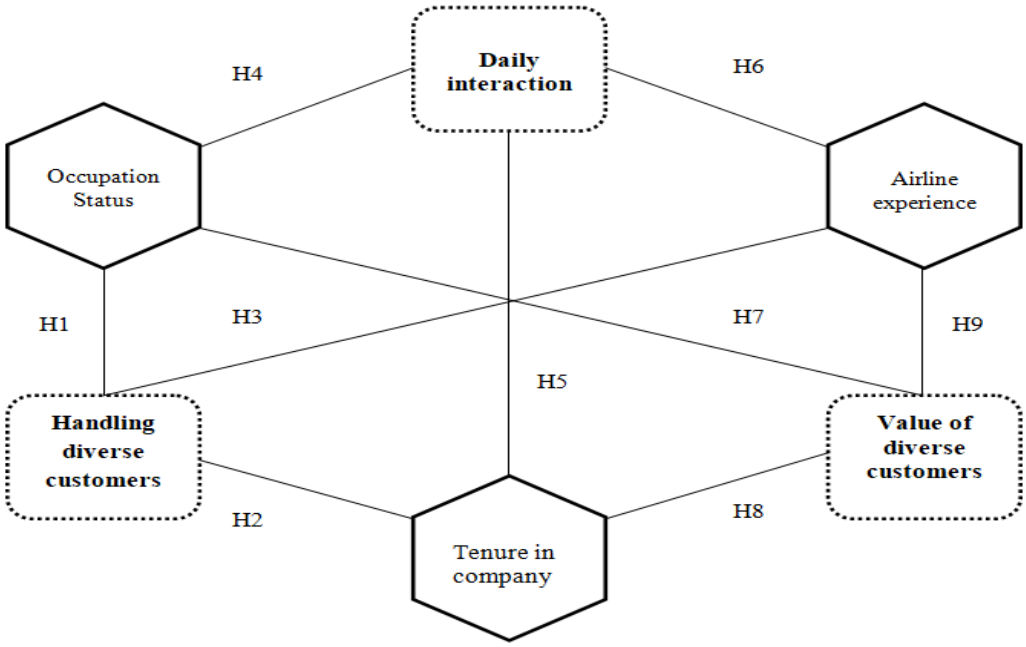

Figure 1. Operating model

4. RESULTS

4.1 Airline Employees' Profile

Most airline employees are female (74.1%), while the respondents aged between 25 and 34 are the largest group (68.9% of the sample size). The respondents aged between 18 and 34 consist of the youngest category of the sample accounting for 76.4% (Table 1).

Table 1. Descriptive Statistics for the Demographic Profile of Airline Employees' (N=309)

		%			%
Gender	Female	74.1	**Flight Mode**	International	90.6
	Male	25.9		Domestic	9.4
Age	18-24	7.4	**Occupational Status**	Full Time	82.5
	25-34	68.9		Part Time	2.6
	35-44	17.5		Causal	0.3
	45+	6.1		Contract	14.6
Education Level	Basic	13.9	**Job Level**	Flight Attendant Cabin Crew or in Training	78.0
	Tertiary	52.8		In-flight Cabin Supervisor	13.6
	Master's degree	33.3		In-flight Cabin Manager	8.4
Airline Experience	<1 year	7.4	**Tenure in airline company**	<1 year	11.7
	1-3	16.8		1-3	21.7
	4-6	32.0		4-6	33.7
	7-9	17.8		7-9	15.9
	10>	25.9		10>	17.2

Regarding the educational level, 52.8% of airline employees have graduated tertiary education, while 33.3% of them have master's degrees. As for their occupational status, 78.0% of the sample worked as flight attendants, mainly full time (82.5%); while nine out of ten were employed in international flights. After summing some group cases, it is observed that 67.0% of the sample respondents have been working with their current airline company for up to six years, while one out of two has worked in the airline industry for over seven years.

4.2 Principal Component Analysis

Principal Component Analysis (PCA) was adapted to divide fifteen diversity items into three principal factors which express airline employees' diversity attitudes (Table 2). The Kaiser-Meyer-Olkin Measure of Sampling Adequacy (.883) and Bartlett's Sphericity test statistic (.000) supported the implementation of the PCA method. A Varimax with Kaiser Normalisation rotation method was conducted to classify each item as a correlate variable with high loading on only one component. Three factors of airline employees' perceptions were recognised, which explain 54.2% of the total variance of those perceptions. The Rotation Sums of Squared Loadings showed that the first factor named: "Handling diverse customers" accounts for 36.1% of Variance, the second factor titled: "Daily Interaction with diverse customers" accounts for 17.8% and the last factor named: "Understanding the value of diverse customers" accounts for 14.9% of Variance. The aforementioned factors have eigenvalues greater than 1.0 which satisfy the requirement of the Parallel Analysis (Pallant, 2007).

Reliability analysis was applied to explore the internal consistency of the overall scale. Cronbach's a (or coefficient alpha) as a measure of scale reliability was used to explore if multiple-question Likert scale surveys are reliable. Nevertheless, a "high" alpha value does not imply that the measure is unidimensional but may mean that the items in the test are highly correlated. In general, a score for dichotomous or Likert scale questions of more than 0.70 is usually acceptable, while many authors suggest values higher than 0.80. Cronbach's alpha statistic presented the reliability of handling diverse customers (.859), daily interaction with diverse customers (.774) and understanding the value of diverse customers (.769) measurement scale. The mean scores and standard deviations of these three factors for both parties are presented in Table 2.

Table 2. Airline Employees' Diversity Components

	Components				
	1	**2**	**3**	**Mean**	**SD**
Handling diverse customers				**3.75**	**.809**
Crew of different background interacts easily with diverse customers	.722			3.86	1.264
Crew discourages discrimination towards customers	.716			3.65	1.317
Estimating that crew leader takes appropriate action in case a diversity gap is noticed among colleagues and customers	.623			3.91	1.259
Crew appreciates customers with different race/ethnicity	.617			3.51	1.260
Treating everyone equally while I am dealing with customers	.558			3.97	1.131
Understanding racial/ethnic background of customers	.468			3.28	1.330
Understanding colleagues' different perspectives towards diverse customers	.454			4.06	1.174
Daily interaction with diverse customers				**3.90**	**.775**
Noting incidents related to colleagues with no respect in diversity		.724		3.83	1.320
Understanding cultural differences of customers		.652		4.06	.920
Meeting daily customers with diverse backgrounds		.642		3.99	.912
Interacting carefully with customers, as those might be aware of my culture		.620		3.33	1.471
Dealing daily with customers with diverse cultural identities		.601		4.09	.937
Believing diversity helps my colleagues understand customers' needs		.514		4.15	1.105
Understanding the value of diverse customers				**3.74**	**1.193**
Understanding the value of diverse customer profiles			.903	3.77	1.296
Understanding the importance of diverse customers			.900	3.72	1.252
KMO	.883	**Bartlett's test of Sphericity**			.000
Eigenvalues	5.422	1.463	1.249		
Variance explained (%) (Total)	36.148	9.754	8.327	(54.229)	
Cronbach's alpha (Total)	.859	.774	.769	(.855)	
* Variables were measured on a 5-point scale where 1 stands for "Strongly Disagree" and 5 stands for "Strongly Agree"					

4.3 Hypotheses Testing

Aiming to test hypotheses proposed in operating model, Pearson correlation coefficient (PCC) was applied to present the direction of a relationship between two continuous

variables (Table 3). Pearsons' r is a statistic measure that explores linear correlation between two variables X and Y, based on the method of covariance. Coefficient values can range between -1 and +1. A value of -1 indicates a total negative linear correlation, 0 shows no linear correlation and +1 indicates a total positive linear correlation. Thus, this part of the analysis presents the results of the nine hypotheses of the current study.

H1: There is a relationship between occupational status and handling diverse customers.

The first Hypothesis, which exposed a relationship between how airline employees handle diverse customers regarding their occupational status (Full/Part time, Causal, Contract), was rejected *(r=0.01, df=307, p=0.801).* This finding confirmed that employees with different professional backgrounds and experiences can have a variety of attitudes in their workplace environment (Cheah, 2013).

H2: There is a relationship between tenure in a company and handling diverse customers.

The second Hypothesis, which proposed a relationship between the way that airline employees handle diverse customers and their tenure in the airline company, was not supported *(r=0.00, df=307, p=0.902).* This aspect demonstrated that diverse employees with problem-solving skills provide alternative solutions to a competitive business environment (Cletus et al., 2018) as well as that organisations with experienced staff and diverse employees are better suited to serve diverse external customers in an increasingly global market (Patrick and Kumar, 2012).

H3: There is a relationship between airline experience and handling diverse customers.

The third Hypothesis, which exposed a relationship between the way that airline employees handle diverse customers and their total airline experience, was rejected *(r=0.00, df=307, p=1.000).* This finding emphasised the need for successful diversity management practices that can be compared between organisations and increase their impacts on employee productivity and job satisfaction (Patrick and Kumar, 2012).

H4: There is a relationship between occupational status and daily interaction.

In the communication field, the fourth Hypothesis, which proposed a relationship between the occupational status of airline employees' and their daily interaction with

diverse customers, was not supported *(r=-0.04, df=307, p=0.395).* This asset did not confirm the ideas of Walia and Malik (2015) who recognised that workplace diversity provides employees with varied capabilities and skills that are essential components for enhanced communication, collaboration, and conflict resolution in a diverse workplace.

H5: There is a relationship between tenure in company and daily interaction. The fifth Hypothesis, which proposed a relationship between the tenure of airline employees in an airline company and their daily interaction with diverse customers was not accepted *(r=-0.09, df=307, p=0.086).* In the light of growing diversity in companies and organisations around the globe, experienced employees tend to promote a safe area and comfortable atmosphere through diversity training programmes from which both parties (employees or managers and customers-passengers) can benefit. Even though H5 was not supported, airline companies should optimistically understand and determine employees' preconceptions in the workplace, as this trend proposed a way for creative and innovative ideas (Cheah, 2013). The last two non-supported hypotheses (H4 and H5) emphasise that in modern-day organisations, skilled human resources interacting in a supportive workplace are usually treated with respect themselves and tend to treat their customers with respect as well (Foma, 2014), while communication maintains cohesion among colleagues and is considered crucial to the attainment of a company's goals, tasks, and management (Cletus et al., 2018).

H6: There is a relationship between airline experience and daily interaction. In contrast, H6 has been supported, as the findings confirm a slight negative linear relationship between airline experience and daily interaction with diverse customers *(r=-0.12, df=307, p=0.032).* This aspect derives mostly from the rights and responsibilities of both parties (experienced employees and customers) in the workplace and holds both groups accountable when dealing with diversity. In this context, Dhuppar (2015) suggested that diversity has the potential to unite and promote the collective strengths and inherent weakness of employees and referred that employees' different skills can be harnessed for better performance and productivity.

H7: There is a relationship between occupational status and value of diverse customers.

The seventh Hypothesis reported an insignificant relationship between values of diverse customers and airline employees' occupational status *(r=-0.03, df=307, p=0.554).* Employees' occupational status does not present a relationship with the values of diverse customers. Thus, it can be noticed that training and professional programmes will equip stakeholders with strategies and practices to address challenges that may arise from the "melting pot" of employees (Green et al., 2002). Despite employees' occupational status, leadership teams, managers, supervisors and staff composition are required to abstain from old habits and daily routines that discriminate people of diverse cultures both among employees of the same organisation and during the interaction of the said employees with their customers.

H8: There is a relationship between tenure in company and value of diverse customers.

The eighth Hypothesis showed an insignificant relationship between the values of diverse customers and the airline employees' tenure in a company *(r=-0.07, df=307, p=0.166).* Hence, it can be assumed that the years that employees have been with their airline company did not reveal a correlation with the values of diverse customers. This aspect revealed that many organisations orientated fresh employees to familiarise themselves with the current operation climate and the existing workplace (Cletus et al., 2018), while diversity initiatives in the workplace should help employees to defend against resistance to change and provide to them a sense of belonging (Podsiadlowski et al., 2013).

H9: There is a relationship between airline experience and value of diverse customers.

The last Hypothesis also displayed an insignificant relationship between values of diverse customers and employees' experience in an airline industry *(r=-0.07, df=307, p=0.164).* As current communication requires to deal with one another on a person-to-person basis, experienced employees with cultural awareness, flexibility and effective communication skills are crucial for customer representatives to properly deal with the expectations and values of customers from different backgrounds. Taking into consideration the last three non-supported hypotheses, this study confirms many studies, which demonstrated that a humanistic approach of long-term benefits derived from diverse customers values assists companies and organisations to promote a safe place for both associates to communicate (Koonce, 2001); provide a better understanding of target groups; maximise the profits of business partners; and

enhance potential employees' and customers' satisfaction (Cletus et al., 2018; Hunt, Layton and Prince, 2015; Green et al., 2002).

Table 3. Hypotheses testing

H		Pearson r	df	p	Results
H1	Occupational Status→Handling diverse customers	-0.01	307	0.801	Rejected
H2	Tenure in a company→Handling diverse customers	0.00	307	0.902	Rejected
H3	Airline experience→Handling diverse customers	0.00	307	1.000	Rejected
H4	Occupational Status→Daily Interaction	-0.04	307	0.395	Rejected
H5	Tenure in a company→Daily Interaction	-0.09	307	0.086	Rejected
H6	Airline experience→Daily Interaction	-0.12*	307	0.032	Accepted
H7	Occupational Status→Value of diverse customers	-0.03	307	0.554	Rejected
H8	Tenure in a company→Value of diverse customers	-0.07	307	0.166	Rejected
H9	Airline experience→Value of diverse customers	-0.07	307	0.164	Rejected

*Correlation is significant at the 0.05 level (2-tailed)

5. SUMMARY AND CONCLUSIONS

Broadly translated authors' findings indicate that airline employees'- regardless of their working status (i.e., occupational status, tenure in company, airline experience)- seek a workplace with a friendly atmosphere that respects the diversity of both employees and customers, to feel more secure, be more effective and communicative with diverse customers and approach their values more successfully. According to the results, such behavioural attitudes highlight the need to consider the workplace as a safe area, which enhances the team spirit among organisation employees' and embraces the communication between employees and customers. Based on the above aspects, the authors emphasise the long-term advantages of diversity in the workplace, hoping that those patterns will be considered by employees, supervisors, and organisations, who are responsible for company success in today's global marketplace. This is achieved by implementing the right training methods both for employees that come from different backgrounds and for new employees in the industry. Education is important for the development of airline employees, as the industry itself is changing quite often. However, diversity executives cite the importance of having open-minded employees, who have a variety of creative, cultural, communicative, and problem-solving skills and operate over the comfort zone to achieve organisation's goals and customers' satisfaction. Hence, planning a diversity strategy should be the first step any modern-

day organisation should explore prior to embarking anything related with a diverse workplace. Aviation jobs must be one of a kind as it requires a flexible approach towards customers and their mentalities. Employees involved in aviation operations come across different cultures within their working shift both with their customers and with their colleagues, as even the staff members working in an aircraft bring their own culture and diversity with them. In international airports, planes land daily transferring many different passenger profiles into an individual country. As the world keeps advancing, future studies are necessary to validate the kinds of conclusions that can be drawn from this investigation and to explore new ways to effectively manage diverse human resources and benefit from the interaction between employees' and diverse customers.

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ROAD TRANSPORT IN TOURISM: IMPLEMENTING SUCCESSFULLY AIR TRANSPORT PRACTICES

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ABSTRACT

Transportation has always been closely connected to the development of a region. Technological advancements as well as the increase of the available income has set the fundamentals for more effective ways of transportation. At the same time, tourism flourishes and more people travel around the world. To accommodate this additional demand, airlines introduced several strategies; among others, the Low Cost Carrier (LCC) business model has played a disruptive role. At the same time, road transport operators started to implement several strategies, some of which are inspired from the airline sector. Road transport operations, mainly undertaken by coaches, introduced several strategies to address the evolving demand. This paper presents a wide overview of the Greek road transport sector and its related legal framework. The review aims to identify and discuss the best practices, introduced by the airlines, and fruitfully apply them in the context of the road transport sector.

KEYWORDS

Air Transport, Road Transport, Tourism, Best Practices

1. INTRODUCTION

Transport and in particular the availability of means and the organization of transport networks, the adequacy of infrastructure, as well as the quality of services provided, play a primary role in the spatial distribution, not only of productive activities, but of overall development. It is a common finding that this role is timeless, as it goes through all the historical periods of the economic evolution.

Following the evolution of the location patterns of productive activities and the spatial distribution of settlements, we can observe their close dependence on the development of modes of transport. More specifically, until the mid of 19th century, before the great inventions and the technological change in transportation, the location pattern of productive activities was characterized by a spatial dispersion. The size and the structure of the settlement network in Central Europe during the thirteenth century is the most obvious example. Most of the settlements had a population of less than 30,000 inhabitants and localized in a range of 6 to 20 kilometers (Benevolo, 1980). Gradually, after 1850, an increase of the mobility in population and economic activities has been observed. The steam navigation (1807) and the railway (1829) at first, as well as the car and the airplane later, formed new conditions in spatial mobility through the rapid transportation of goods, employees, customers, and population in general. Moreover, electricity gave the ability for the location and concentration of economic activities far away from the places where traditional sources of energy were produced, while the invention of telegraph, allowed new developments in the telecommunication sector, serving the contact with distant markets and the decision making from distance (Christofakis, 2014). In general, the gradual evolution of transport technology inevitably leads to a rapid increase in the mobility of people and goods and to a time-space convergence, in the sense that a reduction in travel time is transferred from one area to another and consequently enhances the importance of spatial distance or time distance (Bithas and Nijkamp 1997, Lamprianidis, 2001). Indicatively, it is observed that technological developments in the transport sector have allowed the European citizens to increase the annual number of traveled kilometers by about 3%, since the beginning of the 19th century.

Moreover, factors such as the rapid growth of the service sector and the rise in travel requirements of professionals associated with them, the increase in disposable income, resulting in a more massive market for cars and motorcycles and in combination with this an increase in time for leisure, travel, and vacation, also contribute to enhancing the population mobility. It is estimated that in the next 10 years, until 2030, passenger air traffic will be increasing by an annual rate of 3-6% and at the same time motorized transportation in cities is expected to be doubled between 2015 and 2050 (metaforespress.gr, 2017).

These developments have a direct impact on travel for leisure and tourism in general, which shows a significant increase over time. In the second half of the 20th century the number of tourist arrivals worldwide increased from 25 million in 1952 to 531 million in 1995 to 680 million in 2000 and to 908 million in 2007. Despite the relative slowdown during the two-year period 2008-2009 due to global financial instability, the long-term upward trend in global tourist arrivals continued in the following years and in 2010 global arrivals reached 940 million travelers. This upward trend has continued in recent years. In 2012, for the first time, tourism

exceeded 1 billion in international arrivals, while it is estimated that in 2025 international tourist arrivals will have exceeded 1.80 billion (Karamanakou & Karamountzou, 2014; WTTC, 2015; UNWTO, 2019). As evidenced, by the time course of this evolution, any deceleration or even reversal, due to adverse circumstances (as the recent COVID 19 pandemic), is temporary and does not seem to stop this positive long-term trend.

Tourism, as an economic activity, is characterized by a high demand elasticity. Moreover, as transport costs are significant for international transportation, demand is strongly influenced by this factor. Therefore, transport is a key element within the tourism industry. The strong demand in international, and even national transport means, infrastructure and services requires that people can be transported in an efficient, fast, and inexpensive manner. It requires heavy investments and complex planning (Rodrigue, 2020). Tourism is using all transportation modes. Travelers rely on existing passenger transport systems, from local transit systems to global air transportation. Litman (2020) identifies twelve transportation factors that effect a destination's accessibility. These are: 1. The transportation modes – quality of transportation options, with respect to safety, speed, and comfort, 2. The network connectivity – density of link and path connections, or directness of travel between destinations, 3. The travel cost or the affordability, 4. The mobility – travel speed and distance, capacity, or the travel time, 5. The integration of the links and the modes within the transportation system, 6. The transportation demand, 7. The user information – availability of reliable information on mobility and the accessibility options, 8. The mobility substitutes – telecommunications and delivery service substitutes for physical travel, 9. The transportation management, 10. The land use factors, 11. The prioritization of travel activities, and 12. The value of inaccessibility or isolation.

Consequently, it is widely accepted that transport is one of the main causes which affect tourism growth. Primarily, the improved infrastructure and facilities have incited tourism, but the expansion of tourism has encouraged the development of transport infrastructure and services, as well. Accessibility is the major function behind the basics of tourism transport (Papatheodorou et al, 2019). Tourists have a range of transportation modes that are often used in a sequence, to access popular destinations. The main transportation mode for international tourism is air transport, which normally entails travel over long distances. As already discussed, growth rates of international air traffic are closely correlated with growth rates of international tourism (Rodrigue, 2020).

Over time, successful air transport practices have developed. The aim of this paper is the presentation of the most successful practices in air transport sector and the implementation of such strategies in the context of road transport in tourism using Greece as a case study.

2. TRENDS AND INTERMODALITY BETWEEN AIR TRANSPORTATION AND TOURIST COACH PASSENGER TRANSPORTATION

Despite the problems that have emerged over time concerning air transportation (Williams, 2001; Graham, 2006; Klophaus, et al., 2012; Pearce, 2012; Lohmann & Koo, 2013; Budd, et al., 2014; Papatheodorou& Pappas, 2018; Pappas, 2018) highlighting e.g., the recent bankruptcies of Air Berlin, Primera Air and Germania, it may be argued that the sector of air

transportation has significantly evolved in almost all places around the globe. The fact that major changes have taken place in such an important sector for the economy and tourism development (Alderighi, et al., 2012) must be recognized as a very positive sign, bearing in mind that only the most efficient stakeholders will be able to financially survive and continue to be competitive within the industry. As a result, any negative effects regarding the seize of operations of a variety of companies should be considered as market restructuring.

A crucial role, regarding the changes that have taken place in the air transportation industry, have been strongly influenced by the liberalization of air transportation in USA in 1978 and in Europe (Budd, et al., 2014), with gradual appliance between 1988 and 1997.This mainly legal content procedure significantly favored the rapid development of Low Cost carriers (LCCs). All these practices can play an important role in land transportation and especially in the sector of tourist coaches, which is of major significance in Greece.

2.1 The Institutional Framework of Road Passenger - Tourist Coach Transportation in Greece

At a national level, as well as according to the current legal framework, the road passenger transportation in Greece is distinguished between regular and irregular public road passenger transportation. Regular road passenger transportation is connected to the operation and exploitation of regular transportation in urban lines and long distance lines among cities within the country and is considered a public good. The term *regular road passenger transportation* refers to the passenger road transportation following certain lines with predetermined journeys and frequency, along which passenger can get on- and off- board at predetermined coach stops. This transportation duty has been exclusively assigned by the State to: a) KTEL companies – the Coach Common Collection funds operating one at each Prefecture as far as long distance lines among cities are concerned and b) Urban KTEL companies or municipality transportation companies, as far as urban lines within cities are concerned. The public regular urban and long distance lines are not a popular means of transportation for tourists to visit different cities, sightseeing or islands within Greece. According to the official second degree body of public lines operators (Pan-Hellenic Federation of Motorists for Intercity Transportation - P.F.M.I.T.) only 1-1.5% of annual turnover concerning long distance lines can be attributed to tourism transportation.

On the other hand, the irregular road passenger transportation involves operations of non-tactical or last minute "closed doors" transportation of a predetermined group of people with their luggage connecting two places, having in no case the essence of regular transportation with certain coach stops, which is prohibited. This kind of transportation has been exclusively assigned to tourist coaches (public use vehicles) and contains the transportation of: a) group of people for the needs of organized conferences, exhibitions, seminars, athletic, cultural and social events, b) group of people in organized excursions inside or outside the country, c) group of people from/ to airports, sea ports, railways and border stations, d) group of employees from/ to their working place, e) group of people for sea swimming and f) group of students in organized excursions, as well as from/ to their schools.

Setting a tourist coach in official operation presupposes the existence of:
a) either a travel agency with a Legal Operating Budge granted by the Greek National Tourism Organization, which belongs to the Ministry of Tourism as a supervising authority; or
b) a Tourism Road Transport Company (T.E.O.M.) with its own Legal Operating Budge granted by the Greek National Tourism Organization.
In both cases, co-responsible for the technical standards and the approval of the type of the tourist coach is the Passenger Transportation Directorate of the Ministry of Infrastructure and Transport.

According to the Greek State Law (393/1976, Article 1), the activity and operation of travel agencies is described as: "*Travel agencies are permanently organized companies which undertake the transportation or overnight stay of individuals or group of people, within the borders or outside the Country. Their operations consist of: a) the scheduling and execution of excursions within or outside the country by an owned or rented for this reason transportation vehicle or by any means of sea, air or land transportation, b) the mediation for locating or renting accommodation, finding a place to eat, entertaining and renting other transportation means, c) the issuance of all kind of transportation tickets, d) the organization of conferences of all kinds, e) the receipt and shipment of luggage of domestic or foreign clients, f) the mediation for the issuance of new passports to clients and g) the offering of any other service directly or indirectly related to tourism such as the promotion of tourist companies, as well as the distribution of cultural events' tickets organized by the Greek National Tourism organization or by other bodies*." Likewise, a Tourism Road Transport Company (T.E.O.M.) can be described as a tourism company owning or renting one or more tourist coaches, while at the same time it does not operate as a travel agency (Greek State Law 711/1977). According to the Greek Ministry of Tourism, in Greece there are: a) 5,384 Travel Agencies and annexes of them with Legal Operating Budge, 305 of which have an online only presence, without data concerning the ownership of tourist coaches, and b) 1,571 Tourism Road Transport Companies (T.E.O.M.), 616 of which own 616 tourist coaches in total.

Despite the liberalization of road passenger transportation, the distinction between a travel agency and a T.E.O.M. still remains in practice. However, the extended number of provided services by T.E.O.M. – without the intermediation of travel agencies - remains effective. The only exception between the two operational models is the transportation of passenger and students regarding organized excursions. For such organized excursions T.E.O.M can still lease their tourist coaches to travel agencies - without organizing the excursion - by engaging in a written contract, either for one or more transfers on demand and/or for longer-term cooperation.

According to the Greek State Law (4254/2014, 6th subparagraph of first article, point 14) "*removal of barriers in competition in tourism sector - tourism transportation*" the market of tourist coach licenses became liberalized for all interested parties, old and new stakeholders, removing the entry barriers that until then existed. Any individual interested may now apply for a new license for a tourist coach under the condition that at the same time holds a License for Road Transportation and owns either a travel agency or a T.E.O.M. company. The only applicable restriction is the age of the vehicle which cannot exceed a five-year barrier. Instead, an individual may also buy an existing tourist coach license, through the free market, including the above mentioned conditions and no other restriction.

The representative body of the road passenger transportation in Greece estimates that the number of tourist coaches in operation in Greece operating the regular lines and belonging to KTEL, to be around 4,000 vehicles when at the same time the vehicles owned by travel agencies and TEOMs to be more than 5,800. The fact that no updated record exists concerning the exact number of vehicles in road passenger transportation, with an obvious negative effect on statistical data and the ability to reach useful conclusions, has urged the state to issue an Electronic Budge for all tourist coaches. Responsible for the issuance of this Electronic Budge to owners is the General Pan-Hellenic Federation of Tourism Enterprises (GEPOET), a second degree body of travel agencies' and tourist coaches' owners in Greece.

As it can be discerned, despite the existing legislation and the continuous efforts of tourism entrepreneurs and their representative bodies, the liberalization of the road passenger transportation has not yet been achieved, even though since 2011 it has been recorded as a prerequisite reform for Greece to receive funding from the IMF and the European Union. As a result, KTEL, urban KTEL or municipal passenger transportation companies, which are regular line passenger transportation companies, may also own and operate a travel agency with tourist coaches for irregular transportation, while the opposite is still not allowed. No one apart from the above mentioned companies can operate the regular lines throughout the country. In this context, the liberalization of the regular urban and long-distance line passenger transportation, an activity in which tourist coaches meet all the necessary specifications to participate, remains a challenge of the forthcoming period. After multiple extensions, the current regime of regular line operation should have ended by 31/12/2019. However, it has not been completed yet, even though new, reformed legislation is available to be enforced which determines the exact guidelines, the announcement of international tender proposals for each regular line as well as other provisions. Therefore, the regular passenger transportation is currently performed with tacit extension of the previous regime, which is beyond legal provisions.

The above mentioned reformed legislation enacts the Transport Regulating Authority (R.A.E.M.), which will have a strategic role of setting an international tender for the whole network of regular long distance lines, according to local needs as well as in classifying the regular lines as subsidized, open to free-market competition, etc. Furthermore, according to the Greek State Law 4568/2018, passenger tourist transporters, including coaches, are allowed under certain conditions to engage in urban regular transportation in the areas managed by O.A.S.A S.A. and O.S.E.TH. S.A., which are in Athens and Thessaloniki respectively. This amounts to a legislative provision that is equivalent to a partial liberalization of urban regular passenger transportation with the market entry of private companies. In any case, the full liberalization of urban and long distance regular road passenger lines is not expected to be completed before the end of 2021 under normal conditions. However, it is expected to lead to a severe reduction in the cost of transportation for passengers and accompanied at the same time by services of significantly higher quality.

2.2. *Air Transport Best Practices applied in Land Transportation of Passengers*

Based on the above discussion, it can be argued that regular line passenger transportation companies such as KTEL, have the right to establish and operate tourist coach services

through the establishment and operation of a travel agency; tourism companies - travel agencies do not have the right to operate regular passenger services and individual tourists between cities. Below is a list of trends in the field of land transportation focusing on tourist coaches where aviation practices can be fruitfully applied for the optimal performance of this sector also in the context of intermodality.

As mentioned before, the deregulation/liberalization of air transport in the USA and later in the EU, has led to the rapid growth of the sector and especially to the development of LCCs. These have a 36% market share of seats offered in Europe, which is expected to reach 50% by 2027 (Anna.aero, 2018). The rapid growth of air transport has led to intensified competition, which in turn has reduced air fares. Whilst in Greece the monopoly in the commercial exploitation of urban and long-distance coach connections is still valid, in countries such as the USA, the UK, Sweden and recently, Germany, full liberalization in this sector has been achieved (Knorr & Lueg - Arndt, 2016). In the case of the UK, a market of particular interest, the liberalization and privatization of transport-related organizations has been a reality for several decades. By using the example of Gatwick Airport in London, and analyzing the airport's coach connections, it is evident that passengers are provided with a choice of five different regular coach lines, i.e., Metrobus, Easybus, Megabus, National Express and Oxford Bus, as well as a choice of custom itineraries, after customers' communication or request via Gatwick Flyer. According to GEPOET, the liberalization of intercity transport could reduce ticket prices in Greece by up to 25% on average.

The growth of LCCs, during the second period of aviation developments (early 1990s to mid and late 2000s) highlighted the innovation brought about by LCCs to the nature and characteristics of the passengers traveling with this type of airlines. The emerging and developing LCCs of the time, applied a simplified service model, similar to charter carriers, to passengers who did not belong to an organized group of travelers. This innovation can also be applied in the sector of tourism coaches, to increase revenues and expand their customer base by creating new routes. The implementation of this innovation will be a form of hybridization on land tourist transportation. Besides, the existing legislation allows the transfer of individual passengers by tourist coaches from / to airports and ports if the reservation has been made in advance to create a pre-formed group and the transfers do not have "regular line" characteristics. It is also allowed to sell individual passenger seats on road trips with tourist coaches inside and outside of the country's borders.

Using once again the example of Gatwick Airport, research findings show that coaches' routes operating from the airport concern either certain areas of London, e.g., Chelsea, or cities connected to London by road, such as Bristol, Birmingham, and Cardiff. Thus, any passenger travelling to these cities can board directly, without the need to connect through an intercity coach station or to another stop, i.e., a practice that would result in increased inconvenience and total travel time. In Greece there are two main hub airports with all-year round international air connectivity i.e., the airports of Athens and Thessaloniki. These airports have valid characteristics for the implementation of such policies, as both Athens and Thessaloniki are close to a multitude of cities connected by road with a transfer time of about 1-2 hours. Especially in the case of Thessaloniki, the transfer from the airport to both the railway station and mainly to the intercity coach station, is by bus and especially time consuming during the peak traffic hours of the day. The strategy of making even a small number of routes directly

departing from the airport to some neighboring cities, could substantially reduce total travel time. A fortiori, it should be noted that many of the British cities connected to Gatwick Airport operate their own airports which are connected to several European cities; this is not the case in Greece, as only Athens and Thessaloniki airports offer such air services on an all year round basis (Papatheodorou and Koura, 2012).

The significant decline of tour operators, caused by the increase of individual travelers flying with LCCs as well as the development of e-bookings on the Web, are some of the trends which made tour operators decide and implement the removal or reduction of activities complicating their business model. Among the first interests to be divested where those in airlines, as their high operating costs and the intensification of competition were making vertically integrated tour operations financially challenging. Currently, there is a small number of tour operators that have their own airlines, also selling seat-only tickets on their own websites. Even those large tourist groups that did not decide to divest of their interests in airlines, took measures to significantly reduce costs. As an example of this strategy, TUI Group merged five out of its six airlines around the TUI brand, changing the initial names of the local tour operators and adding the name of the country in which the respective company is based, e.g., TUI Airlines Belgium, TUI Airlines Netherlands etc. Thomas Cook shortly before its bankruptcy in 2019 was considering selling its airline, while Apollo, the largest tour operator in the Nordic countries, has kept its Novair brand with just two aircraft, overwhelmingly carrying out its travel schedule through other companies such as SAS, Widerøe, etc.

Having the above in mind, tour operators can reduce the verticalization of their land transport activities by creating separate companies with tourist coaches as a unique activity. For example, a few years ago, TUI Hellas, a subsidiary of the German tour operator, divested of the ownership of its domestic tourist coach fleet, transferring it to a domestic tourist coach management company. Retaining only the part of transferring and accommodating of its customers, it is now leasing tourist coaches from third parties to transfer its passengers to / from the airports and ports of their destination. This strategy is also recommended for travel agents suffering from financial burdens because of privately owned coaches.

It is also important to note that airlines increase their ancillary revenues by providing a series of out/in-flight services. In this context, tourist coaches may introduce the following services:
• issuance of e-ticket through their own websites as well as through online travel agencies;
• ticket pricing, depending on the booking period;
• baggage charge beyond a certain allowance, e.g., 20kg per passenger;
• Wi-Fi service provision at an extra charge and special charging sockets for mobile devices;
• joint promotion and combined ticket with other transport modes e.g., airlines and trains and discount offering on such joint fares;
• combined ticket offering of urban, intercity travel, nature touring routes via coach or among air travel and touring routes. According to the representatives of the four companies that operate hop-on / off coaches in Athens, most of their customers come from cruise ships calling at Piraeus port. Thus, an agreement between airlines and coaches on the offering of a combined ticket can result into a passenger increase, especially for those city destinations which offer many attractions. Moreover, the dependency of those cities on the cruise sector can be significantly reduced.

Finally, market power concentration and streamlining of operations via the formation of airline alliances, has been used as a strategy followed by Full Service Network Carriers to react against the rising profile of the LCCs. A similar strategy can be adopted by tourist coaches, offering increased economies of scale, cost reduction and strengthening in relation to the competition. On the other hand, it is a strategy which requires an optimal planning and monitoring, as the existence of a heterogeneous fleet of vehicles, may cause increases in operational costs and result in planning errors.

3. SUMMARY AND CONCLUSIONS

Transportation remains a fundamental pillar of spatial and tourism development. The constant increase of global passengers led to a surge of demand of better and more efficient transportation. Closely monitoring the airline sector, road transportation developed and rapidly became a crucial stakeholder of the industry. In Greece, the road transportation industry is divided in two main sectors: the regular and irregular public road passenger transportations. Both sectors are widely affected by the Greek legal framework and due to that fact, their operations are constrained. This paper highlighted some important issues in the Greek legal framework and identified opportunities for the creation for a friendly business environment and the further development of the sector in Greece. At the same time, all stakeholders need to pursue a customer-oriented strategy focusing on individual passengers. The expansion of the existing network as well as the introduction of new companies is thoroughly needed. Finally, and based on the airline sector experience, the offer of bundled services for passengers, the introduction of ancillary revenue strategies and the formulation of allied groupings may prove of essence for the financial sustainability and prosperity of tourist coaches in Greece.

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DO CITIZENS OF A CITY THAT OWNS A LOCAL PUBLIC AIRPORT HAVE ATTACHMENT TO THE AIRPORT AND USE IT?

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ABSTRACT

This research investigates whether passengers living in a city with a local public airport have an attachment to that airport and tend to use it. Focusing on the greater Kansai area with its three airports and Kobe, which owns one of them, Kobe Airport, as an example, an empirical analysis was conducted using a nested logit model and micro data. The result of the basic model shows that passengers living in Kobe prefer the Kobe Airport when compared to passengers living in other cities in the Greater Kansai Area. An additional analysis based on a questionnaire survey revealed that a certain percentage of respondents choose Kobe Airport just because they prefer it, meaning that the non-economic factor of attachment influences passengers' decisions. The results of this research suggest that enhancing attachment to an airport might be a possible idea for policy makers of airport cities to increase their passengers.

KEYWORDS

Airport choice, Multiple airport region, Airport city, Attachment, Nested logit model, Revealed preference data

1. INTRODUCTION

Airports are essential transport infrastructures for long-distance travel, and they contribute to the regional economy of airport cities by making the interactions among cities more convenient. Therefore, with strong requests and support from citizens and industries, some local governments have constructed and own their airports. The construction costs of these local public airports are mainly paid for by taxpayers, and if the airports run a deficit, the local government is required to make up the deficit with taxes. Nevertheless, the use of taxes can be justified if citizens need and use the airports. In addition, if more citizens use the airport, the deficit will be reduced, and the airport will even be profitable, which is positive for the local government's finances. Therefore, it should be of great interest for policy makers of airport cities to determine whether citizens are willing to use their local airports and how to increase their use.

There are mainly two situations in which citizens of airport cities make decisions whether they use their local airport. The first is the choice of transportation mode. For medium-distance travel, passengers can choose among flying, railways, buses, cars and so on. In countries with high-speed railways, there is fierce competition between airlines and railway companies for inter-city traffic of 500 km to 1,000 km. In fact, in Japan, passengers can choose between flights and the Shinkansen to travel between Tokyo and Hiroshima and Tokyo and Yamaguchi, and the market shares of air transport and railways on these routes are very close[1]. The second situation is airport choice among multiple airports in the same region. For example, London (Heathrow, Gatwick, Stansted etc.), New York (JFK, LaGuardia, Newark) and the Pearl River Delta (Hong Kong, Shenzen, Guangzhou) are well known as multi-airport regions. In a multi-airport region, passengers can choose the most desirable airport to maximise their utility. This study focuses on the latter situation—that is, a multi-airport region—in order to clarify whether citizens of a city with a local public airport prefer that airport over other airports.

In addition, a psychological factor is focused on to explain the background of the decisions made by citizens of airport cities. Previous research on transportation economics has explained decisions from the viewpoint of economic factors such as fares

[1] The distance between Tokyo and Hiroshima is 674 km, and the market share of air transport and railway transport is 33.8% and 64.3%, respectively. The distance between Tokyo and Yamaguchi is 768 km, and the market share of air transport and railway transport is 65.5% and 32.6%, respectively. Data source: 2015 Inter-Regional Travel Survey by Ministry of Land, Infrastructure, Transportation and Tourism.

and access costs, and that of convenience such as the number of flights and airport facilities (Hess et al. (2007) and Marcucci and Gatta (2011)). However, previous studies in marketing have indicated that product loyalty influences purchasing behaviour (Halpern and Graham (2013)). In the choice of airport, if citizens are attached to their local airport, they may be motivated to use it. Since public opinion is one of important factors in the construction of local public airports that requires huge financial resources, it is quite possible that citizens who requested or supported the construction of the airport feel a sense of attachment and have loyalty to it.

Here, the research questions can be summarised as the following:
i) Do citizens of a city that owns a local public airport tend to use it?
ii) Does the psychological factor of attachment influence airport choice behaviour?

2. LITERATURE REVIEW

Following Harvey (1987), who formulated passengers' behaviour based on the discrete choice model, much research on airport choice has focused on passengers' decisions and the factors that influence them. Most of the early studies measured the effects of access time and access cost to the airport, flight frequency and fares (e.g., Innes and Doucet 1990; Windle and Dresner 1995). Recent research has made more use of the nested logit (NL) model to investigate combined choices while considering multiple factors. Pels et al. (2000) and Jung and Yoo (2016) analysed passengers' decisions regarding a combination of airports and airlines. Zhou et al. (2019) analysed the choice of transportation mode and airline. Although much research on airport choice has been conducted, only few papers have focused on passengers in a specific region or city. Lian and Ronnevik (2011) and Morimoto (2019) focused on the choices of passengers living in an airport city and showed that those passengers preferred larger and further airports to their smaller and closer local airports because flight frequency is higher at the larger airports. However, these papers did not analyse differences in preference between citizens of an airport city and other passengers.

In general, customer loyalty is an important factor in marketing. Jones et al. (2002) found that the source of loyalty is switching costs and that the strength of a customer's connection to a particular product creates consistency in product selection. As for the airline industry, Basso et al. (2009) and de Boer and Gudmundsson (2012) indicated that airlines have strategically introduced frequent flyer programmes in order to increase

passengers' cost of switching over to competitors. This is an example where airlines use economic incentives to strengthen their connection with customers. Although attachment is not an economic factor, psychological connection with a product makes customers less willing to switch to another product. An example of how attachment to a region or home country is reflected in purchasing behaviour is seen in the 'buy local' phenomenon, where people buy local products to support local businesses (Saffu et al. 2010; McEntee 2010). As another example, in terms of equity investment, Seasholes and Zhu (2013) showed that individual investors tend to invest in the shares of companies that are geographically close to them. In this way, people are connected to their local companies and products to some extent. Thus, it could be hypothesised that people tend to choose their city's airport just because it is in their city. Nesset and Helgesen (2014), Castro and Lohmann (2014) and Bezerra and Gomes (2019) studied airport loyalty from the viewpoint of airport branding and the importance of airport facilities. However, so far, there is no research related to the hypothesis.

The originality of this research is its focus on regionality and the psychological factor in passengers' airport choice. In this paper, regionality means that people have a specific preference for something located in their place of residence. In the context of air transportation, regionality indicates preference of citizens of airport cities to the local airport and will be defined in the empirical model in Section 4 as the dummy variables. While previous studies have investigated the general effects of various factors such as airport access, ticket price and airport facilities on passengers' decisions, this research analyses the preference of citizens of airport cities. That is, this research attempts to answer the question of whether passengers who live in an airport city behave differently from those in other cities because of an attachment to their local airport. For this purpose, the behaviours of passengers in the Greater Kansai Area (GKA) of Japan are analysed. In GKA, there are three airports: Kansai International Airport (KIX), Itami Airport (ITM) and Kobe Airport (UKB). Only UKB is a local public airport owned by Kobe. Using micro data, this research examines whether citizens of Kobe are likely to choose UKB when compared to other passengers. The details of GKA and the three airports are introduced in the next section.

The structure of this study is as follows. Section 3 introduces GKA and the three airports. It describes the history of UKB and the reason the area is a suitable subject for the study of passengers' regionality. In section 4, the research method and data used in this study

are explained. Although the analysis in this study is based on the standard nested logit (NL) model, a new variable is added to capture the preference of Kobe citizens. Section 5 discusses the results of the analysis. Some additional questions are examined. The first is whether only the citizens of Kobe prefer their local airport or if passengers who live near other airports also prefer their local airports. The second is whether passengers living in cities around Kobe also behave similarly to Kobe citizens. In section 6, the relationship between airport choice and attachment is investigated based on the questionnaire survey. Section 7 contains concluding remarks.

3. The GREATER KANSAI AREA AND THE THREE AIRPORTS

In this section, Greater Kansai Area (GKA) and its three airports are described. In Figure 1, GKA is indicated by the greyed-out area and is defined as the 1.5% urban employment area centred in Osaka. It is the second largest metropolitan area in Japan, with a total population of approximately 20 million. GKA includes Kyoto, the historical tourist city, and Kobe, the international port city. There are three airports in GKA, i.e., Kansai International Airport (KIX), Itami Airport (ITM) and Kobe Airport (UKB). The airports are located close to each other, and the distance between the airports is only 20–40 km. Thus, GKA can be considered a multi-airport region, and passengers can choose which airport to use. Table 1 summarises the basic information about each airport. Only KIX is an international airport, and it serves as an international gateway to GKA. Although ITM is easily accessible from major cities, international flights are prohibited, and only domestic flights are allowed. However, ITM is the main domestic airport, whose share of domestic passengers among the three airports is 63% due to its convenient access. UKB is a small airport with one runway, and it serves only domestic flights.

The reason for the co-existence of the three airports is as follows. In the past, ITM was the only airport in GKA, but due to the rapid increase in demand for air travel caused by rapid economic growth, it was not possible to provide enough slots for flights, and congestion became a problem. Since ITM was located in urbanised area, there was no room for expansion, and the noise problem worsened, so in the 1970s, the Japanese government took the initiative to construct a new airport to serve as a gateway to GKA. At first, Kobe was chosen as the location for the new airport, but the city refused to accept it because airports were regarded as nuisance facilities at the time. As a result, the Senshu area in the southern Osaka prefecture was selected as the final construction site, and KIX opened in 1994. After this, Kobe changed its mind about the need for the

airport to develop the local economy and provide convenience for the citizens of Kobe. However, it was no longer possible to construct the third airport in GKA as a national project, so Kobe had to construct it by itself. The construction of the airport has been a point of contention in many mayor elections because it required significant payment from taxes and the issuance of municipal bonds. In the 1997 and 2001 elections, a pro-airport mayor was elected. Finally, UKB was opened in 2006 with the support of citizens as well as local politicians.

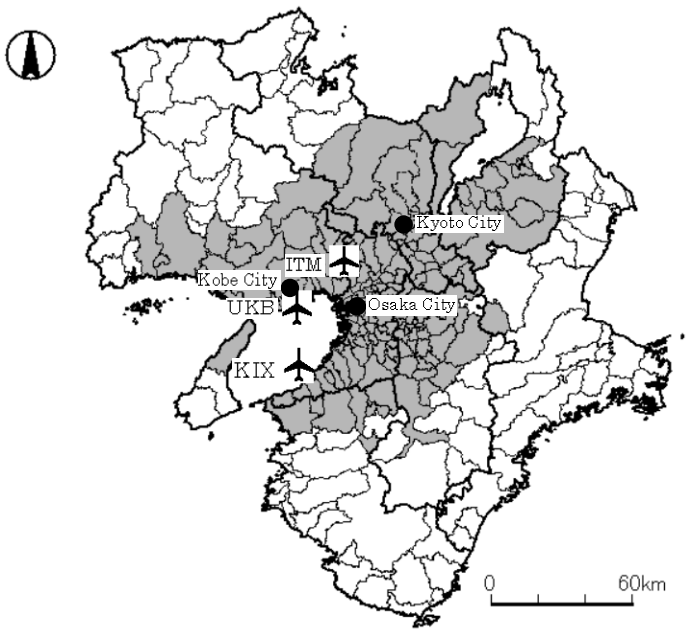

Figure 1. The greater Kansai area and the three airports

Table 1. Basic data of the three airports

		KIX	ITM	UKB
Open (year)		1994	1939	2006
Ownership		Company owned by national government	National government	Kobe city
Operation		The three airports are integrally operated by the private company, Kansai airport, since 2018		
Runways (m)		4000	3000	2500
		3500	1828	
Passengers (2018, Thousands)	International	22,439		
	Domestic	6,513	16,184	3,182
Direct routes (Summer, 2019)	International	75		
	Domestic	17	26	7
Access time to major cities by train (minutes)	Osaka city	45	22	48
	Kyoto city	108	63	79
	Kobe city	98	46	18

The three airports operated separately until 2018 (KIX was managed by a national government-owned company; ITM was owned by the national government; and UKB

was owned by Kobe), which made it difficult to achieve total optimisation. Thus, the three airports were privatised under the concession system, and their operation was integrated into one private concessionaire company, Kansai Airport Co., Ltd., in 2018. Although UKB was privatised, Kobe maintains the ownership of UKB, and the contract with Kansai Airport includes a clause dictating that Kobe receive a revenue-linked concession fee[2]. Thus, UKB is still the property of Kobe, and it is still important for Kobe to increase its passengers because a certain portion of the revenue is returned to the city.

Next is the outline of the air transport market in GKA. In 2015, the three airports served flights to six cities in common: Sapporo, Sendai, Tokyo, Nagasaki, Kagoshima and Naha. When travelling to or from these cities, passengers can choose an airport to use from among the three airports. Figure 2-4 show an overview of airport choice behaviours. Figure 2 shows the selection rate of UKB for each origin/destination point. 40–60% of passengers whose origin/destination was Kobe selected UKB, which indicates that UKB has the largest share of flight demand in Kobe. However, it is clear from Figures 3 and 4, which show the selection rates for ITM and KIX, that passengers tend to choose the airport closest to their origin or destination because of easy access. Therefore, to conclude whether Kobe citizens prefer their airport, it is necessary to control for factors that can influence passengers' airport choice decisions, such as access time and cost to each airport. For this purpose, the NL model is used in this paper.

[2] If operating revenues exceed 2 billion yen in a year, Kobe receives 3% of the exceeded revenue.

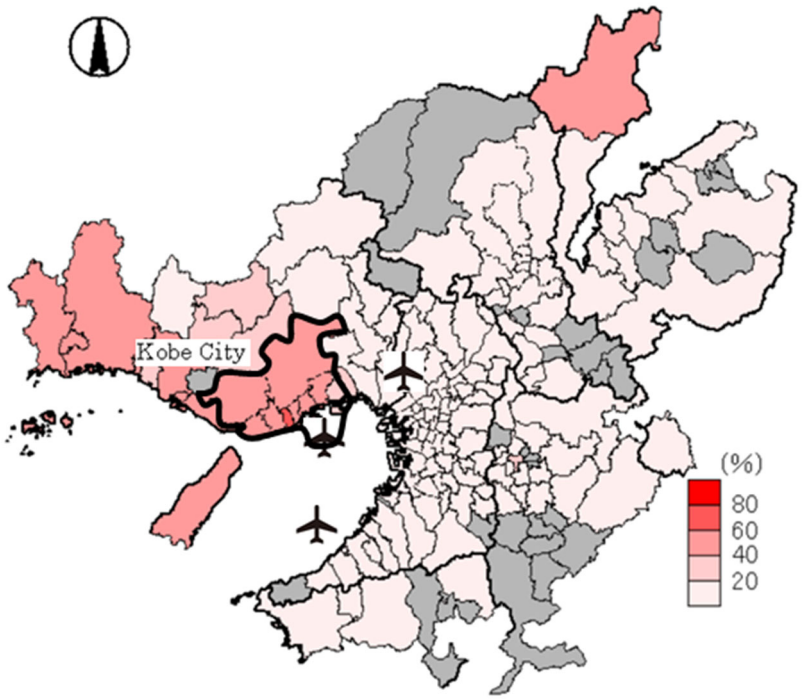

Figure 2. Selection rate of Kobe Airport (UKB) by passengers departing from or arriving at each city

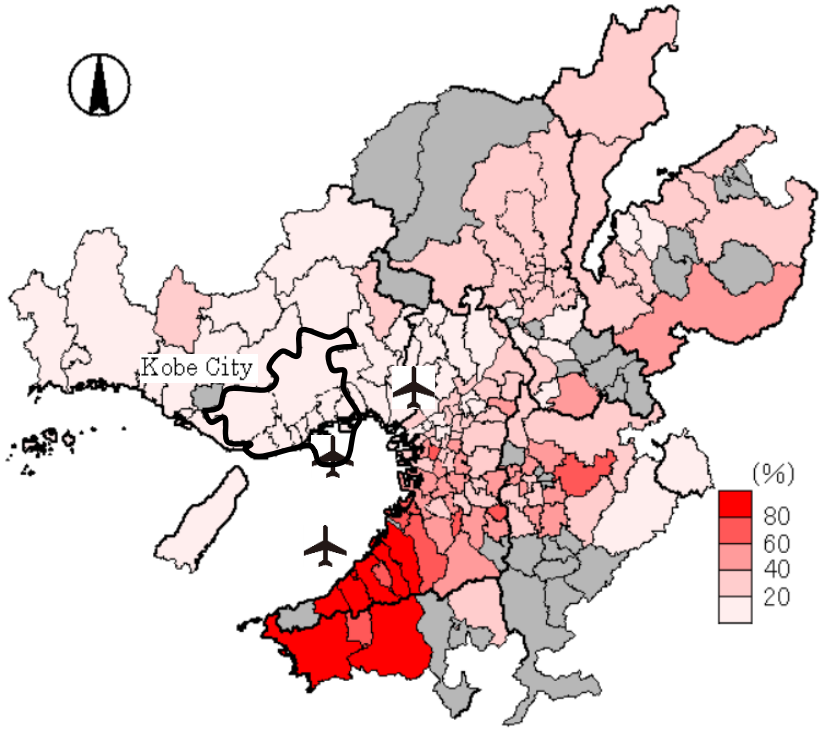

Figure 3. Selection rate of Kansai International Airport (KIX) by passengers departing from or arriving at each city

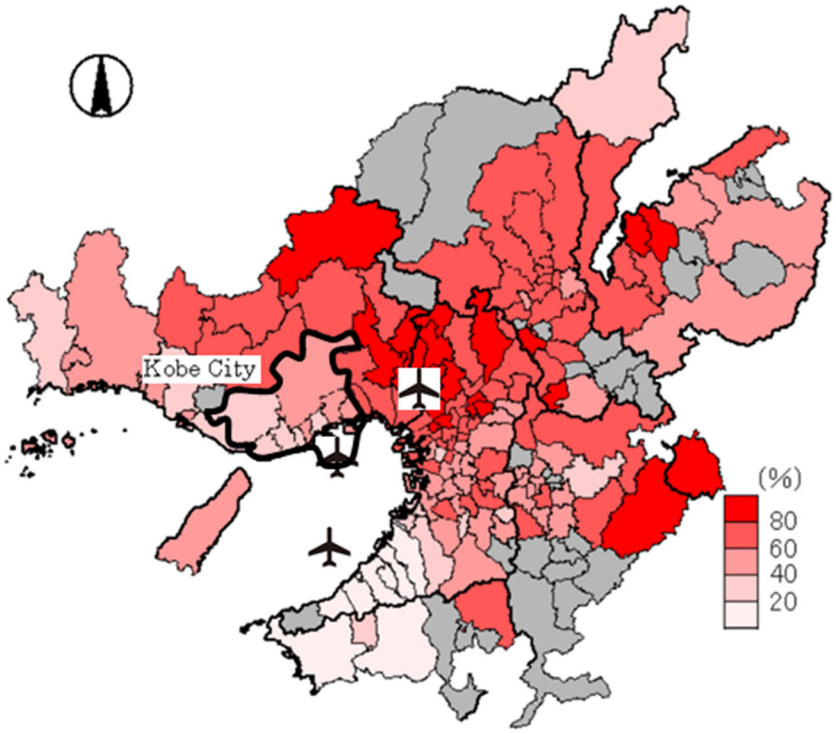

Figure 4. Selection rate of Itami Airport (ITM) by passengers departing from or arriving at each city

4. EMPIRICAL CONTIBUTION

4.1. Modelling Passengers' Behaviour

In this study, the NL model was used to formulate passengers' airport choice behaviour. The decision tree of passengers is shown in Figure 5. It shows passengers' first level decisions of airline type—that is, full-service carrier (FSC)[3] or low-cost carrier (LCC)[4]—and the second level decisions of airport from among KIX, TIM and UKB. The alternative sets at the first and second level are denoted as $t \in \{FSC, LCC\}$ and $a \in \{KIX, ITM, UKB\}$.

The explanatory variables are set to explain passengers' decisions at each level. For airline type selection at the first level, it is expected that decision making will differ depending on whether the purpose of the trip is business or leisure. Business passengers generally have a higher time value and require on-time performance, whereas leisure passengers put more value on lower ticket prices because they purchase tickets at their own expense. Thus, a dummy variable ($BUSINESS_n$) representing business passengers is used to capture the effects of travel purpose. Here, $n \in \{1,2,\dots,N\}$ denotes the index

[3] In this research, FSC refers to JAL and ANA and the airlines that code-share with them (except Jetstar).
[4] LCC refers to Peach, Jetstar and Skymark.

of passengers.

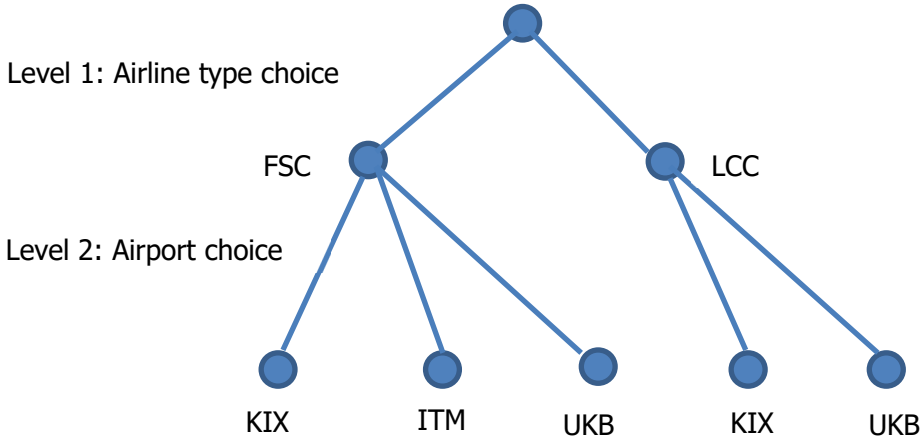

Figure 5. Decision flow of passengers

For the airport choice at the second level, access time ($ATIME_{an}$), access ($ACOST_{an}$) and scheduling cost (SC_{tan}) are used as explanatory variables. Access time and access cost are included in the analysis because passengers are expected to take the accessibility to each airport into account in choosing the airport. Scheduling cost is used to represent the convenience of flight schedule. Scheduling cost refers to the cost to adjust a schedule when there is a difference between the desired departure time and the actual departure time. In addition to these, a dummy variable ($KOBE_{an}$) for Kobe citizens was created. The $KOBE_{an}$ dummy variable, which is the originality of this paper, is set to capture the preference of Kobe citizens for UKB. Note that ticket price is an important factor in decision making (Chang and Sun 2012; Jung and Yoo 2014), but this cannot be included as an explanatory variable due to the nature of its data, as discussed below.

4.2. Micro Data and Explanatory Variables

The micro data are taken from the 'Travel Survey for Domestic Air Passengers', conducted by Ministry of Land, Infrastructure, Transportation and Tourism (MLIT) in 2015. The advantage of this survey is that it covers all boarding passengers on all flights on the survey date (21 October 2015), which allows for avoiding sampling bias. The overall survey had 166,791 responses with a response rate of 59.6%. This data are categorised as revealed preference (RP) data because they are a collection of actual passengers' behaviour. The reason to use RP data is that they directly capture reality. However, RP data have a disadvantage in that they do not provide information on alternatives that were not chosen. For this reason, ticket prices could not be included in the analysis of

this research. In contrast, stated preference (SP) data that are collected by questionnaires or interviews have an advantage in that the decision-making situation for all choices is clear because researchers set hypothetical alternatives, and respondents choose from them. Thus, the researchers can include factors they want to focus on (e.g., de Luca (2012) and Paliska et al. (2016)). However, SP data have a major problem in that all the choices are hypothetical, and there can be a gap between the actual behaviour and the answers provided. Comparing the advantages and disadvantages of both types of data, this research adopted RP data to capture actual behaviours because, in general, passengers decide their choices without recognising attachment to a specific airport.

The analysis targets are passengers whose origin or destination is in GKA and who took a flight on the Sapporo or Naha route. Although all the three airports have routes to/from Sendai, Tokyo, Nagasaki and Kagoshima as well, these routes were excluded from the analysis. This is because passengers firstly make a mode choice between airways or railways on these short haul routes, and thus passengers' decision making does not conform to the airport choice model in this research. According to the Inter-Regional Travel Survey, conducted in 2010 by MLIT, railways occupy 71.6% of traffic between Osaka and Tokyo, and flights occupy only 18.6%. Approximately half of the passengers to/from Sendai, Nagasaki and Kagoshima took railways. Passengers under 15 years old were also excluded from the data set of this study because they are more likely to just accompany their parents or other adults rather than chose the airport by themselves. Therefore, 3885 individuals remained in the sample for the analysis. The descriptive statistics of the sample are summarised in Table 2.

The explanatory variables are set as the following. In the 'Travel Survey for Domestic Air Passengers', the purpose of the trip was chosen among one of four reasons: business, sightseeing, visiting relatives and friends and other. The $BUSINESS_n$ dummy variable is 1 when the travel purpose is business and the airline type is LCC and 0 otherwise. Two variables, $ATIME_{an}$ and $ACOST_{an}$, are used to describe airport access. Since the survey asked for the origin or destination at the city level, the central station of the city is assumed as the departing or arriving points of travel. The access time (in minutes) and cost (in thousands of yen) by train from the central station of each city to airport a are used as the values for $ATIME_{an}$ and $ACOST_{an}$. In calculating SC_{tan}, it is assumed that the scheduling cost is proportional to the inverse of the number of flights. Therefore,

SC_{tan} of the airline type t at airport a is calculated as $1/f_{ta}$. Here, f_{ta} denotes flight frequency. The flight schedule of October 2015, when the survey was conducted, is used for the values of f_{ta}. The $KOBE_{an}$ dummy variable is set to 1 if a passenger is a Kobe citizen and his/her departure airport is UKB. Note that origin/destination cities and residential cities are distinguished in the database because the survey asked for these places separately.

Table 2. Sample data

Total samples			3885	
Travel purpose	Business		1024	26.4%
	Leisure		2861	73.6%
Airline type and airports	KIX		1281	33.0%
	ITM	FSC	997	25.7%
		LCC	906	23.3%
	UKB	FSC	386	9.9%
		LCC	315	8.1%
Average access time (min.)			71	
Passengers living around airports	Around ITM		121	
	Around KIX		49	
	Around UKB	Kobe	289	
		Amagasaki	88	
		Nishinomiya	93	
		Ashiya	29	
		Akashi	53	
		Kakogawa	40	

5. RESULTS AND DISCUSSION

In subsection 5.1. the results from the empirical model explained in Section 4 are discussed. Then, subsection 5.2. to 5.4. focus on various factors, such as travel purposes, passengers near ITM and KIK, and passengers around Kobe to analyse Kobe citizens behaviour deeply.

5.1. Basic Model

Table 3 shows the results of the analysis using the basic model described in Section 4. Decisions on the airline type choice at the first level differ based on the travel purpose. The coefficient of $BUSINESS$ is negative at the 0.5% significance level, which indicates that business passengers are more likely to choose FSCs rather than LCCs when compared to non-business passengers. This may reflect the tendency of business travellers who place a high value on on-time performance and business environment on board and at airports. In addition, according to Miliotiet al. (2015), business travellers

value frequent flyers program in their choice of airline. For these reasons, they prefer FSCs that in general provide high-quality services.

$ATIME$ and $ACOST$, which affect airport choices at the second level, are negative at the 0.5% significance level. This indicates that passengers prefer airports with shorter access times and lower access costs. Although SD is not statistically significant at even 10% significance level, the sign is negative. This implies that frequent flight services attract passengers because they can take a flight that fits their schedule. The reason SD is not statistically significant is that non-business passengers do not avoid airports with low flight frequency, as will be discussed in sub-section 5.2. The signs of the coefficients of the explanatory variables are consistent with intuition. Furthermore, previous papers, such as those by Ong and Tan (2010), Baser and Bhat (2004) and Hess and Polak (2005) also showed similar results. Thus, it can be considered that the model adequately captures passengers' behaviour.

Table 3. Modelling results of the basic model

		Coef.	Std. Err.	t-value
First level	BUSINESS	−0.6110 ***	0.0850	−7.19
Second level	ATIME	−0.0067 ***	0.0016	−4.14
	ACOST	−0.5630 ***	0.1342	−4.20
	SD	−0.3652	0.2272	−1.61
	KOBE	0.2186 ***	0.0763	2.87
Constant (First level)	FSC	(base)		
	LCC	−0.3010 ***	0.0776	−3.88
Constant (Second level)	ITM	(base)		
	KIX	0.3887 ***	0.0863	4.50
	UKB	−0.2783 ***	0.0836	−3.33

*** Significant at the 0.005level.
** Significant at the 0.01 level.
* Significant at the 0.05 level.

The $KOBE$ dummy variable, which is the focus of this research, is positive at the 0.5% level of significance. This means that Kobe citizens tend to choose UKB when compared to other passengers, even after controlling for all factors that could influence passengers' decisions.

5.2. Results By Travel Purpose

Next, passengers' decisions were analysed based on their travel purpose to check whether business and non-business travellers have different preferences. Since the data were analysed separately for business and non-business passengers, the $BUSINESS$ dummy variable was excluded from the explanatory variables of the first level. Tables 4 and 5 summarise the results for business and non-business passengers, respectively. For both types of passengers, $ATIME$ and $ACOST$ are negative at the 1% or 0.5% level of significance, which is the same as the results of the overall analysis. While SD is negative for business passengers at the 5% significance level, the sign of SD is not significant for non-business passengers. The background of this result can be considered in that the schedules of business passengers to attend meetings and visit their customers are fixed, whereas non-business passengers have a flexible schedule. Loo (2008) also reported that business passengers place more importance on flight frequency than non-business passengers. The $KOBE$ dummy variable is positive at the 5% significance level for both type of passengers. Therefore, it was found that Kobe citizens tend to choose UKB regardless of their travel purposes.

Table 4. Modelling results using business passengers' data

		Coef.	Std. Err.	t-value
Second level	ATIME	−0.0091 **	0.0036	−2.51
	ACOST	−0.7904 **	0.2930	−2.70
	SD	−1.5225 *	0.7604	−2.00
	KOBE	0.4594 *	0.2130	2.16
Constant (First level)	FSC	(base)		
	LCC	−0.7203 ***	0.1669	−4.26
Constant (Second level)	ITM	(base)		
	KIX	0.4267 ***	0.1523	2.80
	UKB	−0.0121	0.1612	−0.07

*** Significant at the 0.005level.
** Significant at the 0.01 level.
* Significant at the 0.05 level.

The following two questions still need to be answered before the results about the regionality of Kobe citizens' behaviours are definitively concluded.

Q1: Do citizens of airport cities, not just Kobe citizens, generally tend to use the airport in their city?

The research question is whether the citizens prefer 'city-owned' airports such as UKB.

Thus, it is necessary to examine whether there is any difference between local public airports and other national airports.

Q2: Do people living in the neighbouring cities of Kobe also tend to use UKB?

Table 5. Modelling results using non-business passengers' data

		Coef.	Std. Err.	t-value
Second level	ATIME	−0.0059 ***	0.0018	−3.22
	ACOST	−0.4979 ***	0.1525	−3.26
	SD	0.1350	0.2263	0.60
	KOBE	0.1648 *	0.0784	2.10
Constant	FSC	(base)		
	LCC	−0.3620 ***	0.0828	−4.37
Constant	ITM	(base)		
	KIX	0.3703 ***	0.1068	3.47
	UKB	−0.3839 ***	0.1223	−3.14

*** Significant at the 0.005level.

** Significant at the 0.01 level.

* Significant at the 0.05 level.

It is worth clarifying whether the regionality of the preference to UKB is specific to Kobe citizens or is common in people living near Kobe. To answer these questions, additional analyses were conducted with new regional dummy variables for the passengers' place of residence.

5.3. Decisions Of Passengers Near Other Airports

To clarify differences in behaviour between Kobe citizens and passengers living near other airports, two regional dummy variables, $AKIX$ and $AITM$, were added to the basic model. AKIX is the dummy variable for passengers living near KIX. 'Near KIX' is defined as Izumisano, Sennan and Tajiri, where KIX is located. This variable takes 1 for passengers who live in these cities and choose KIX and 0 otherwise. Similarly, $AITM$ is set for citizens of Toyonaka and Itami, where ITM is located. The results of the model with the additional dummy variables are shown in Table 6.

The results for the $BUSINESS$, $ATIME$, $ACOST$, SD and $KOBE$ variables are largely similar to those in the basic model. The coefficient of $AITM$ is positive at the 5% significance level, which indicates that passengers living near ITM also tend to use their local airport. ITM had been scheduled to be closed down after the opening of the new

airport, KIX. However, ITM remained open due to a campaign by the local government to continue its operation. This history may influence the preference of the citizens close to the airport.

Table 6. Modelling results with AITM and AKIX dummy variables

		Coef.	Std. Err.	t-value
First level	BUSINESS	−0.6114 ***	0.0850	−7.19
Second level	ATIME	−0.0061 ***	0.0015	−4.04
	ACOST	−0.5788 ***	0.1358	−4.26
	SD	−0.3616	0.2206	−1.64
	AITM	0.2404 *	0.1131	2.13
	AKIX	−0.6138 **	0.2225	−2.76
	KOBE	0.2054 ***	0.0727	2.82
Constant (First level)	FSC	(base)		
	LCC	−0.3096 ***	0.0756	−4.10
Constant (Second level)	ITM	(base)		
	KIX	0.3959 ***	0.0868	4.56
	UKB	−0.2554 ***	0.0790	−3.23

*** Significant at the 0.005level.
** Significant at the 0.01 level.
* Significant at the 0.05 level.

On the other hand, $AKIX$ is negative at the 1% level of significance. This indicates that passengers living near KIX are rather reluctant to use the airport. In summary, the answer to Q1 is that in general, not all passengers have a preference for their local airports. Further investigation is needed to clarify this point regarding what factors shape preferences for local airports.

5.4. Decisions Of Passengers Around Kobe

The next analysis was on the decision making of the citizens of the five neighbouring cities of Kobe. The location of these cities is depicted in Figure 6. The curves in the figure represent the trunk railway lines. $AMAGASAKI$, $NISHINOMIYA$, $ASHIYA$, $AKASHI$ and $KAKOGAWA$ were introduced as new dummy variables. Each variable takes 1 when a passenger is the resident of each city and the choice of airport is UKB and 0 otherwise. The results of the model with these dummy variables are shown in Table 7.

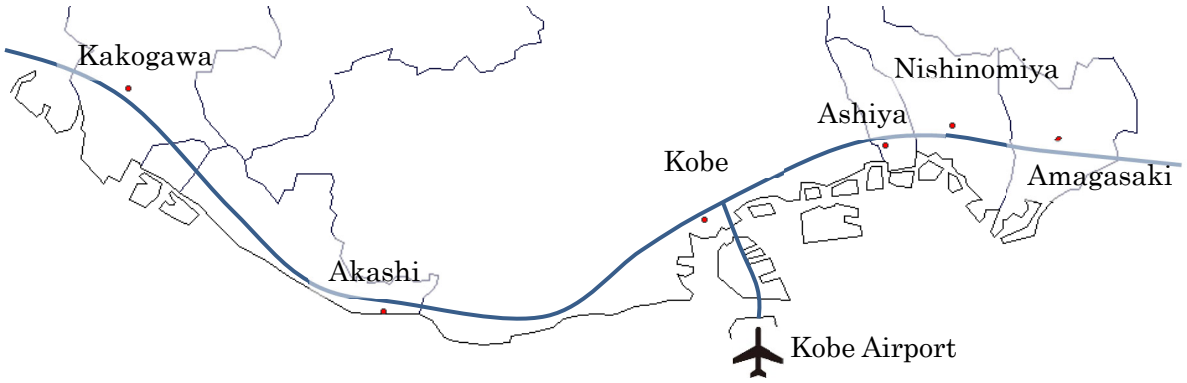

Figure 6. Map around Kobe

Table 7. Modelling results with dummy variables for cities near Kobe

		Coef.	Std. Err.	t-value
First level	BUSINESS	−0.6098 ***	0.0850	−7.17
Second level	ATIME	−0.0068 ***	0.0016	−4.15
	ACOST	−0.5644 ***	0.1363	−4.14
	SD	−0.3571	0.2436	−1.47
	AMAGASAKI	0.0340	0.1040	0.33
	NISHINOMIYA	0.2470 *	0.1023	2.41
	ASHIYA	0.3926 *	0.1739	2.26
	KOBE	0.3195 ***	0.0949	3.37
	AKASHI	0.5798 ***	0.1986	2.92
	KAKOGAWA	0.1459	0.1419	1.03
Constant (First level)	FSC	(base)		
	LCC	−0.2882 ***	0.0786	−3.67
Constant (Second level)	ITM	(base)		
	KIX	0.3821 ***	0.0849	4.50
	UKB	−0.3594 ***	0.0976	−3.68

*** Significant at the 0.005level.
** Significant at the 0.01 level.
* Significant at the 0.05 level.

In this model, the coefficients for $BUSINESS$, $ATIME$, $ACOST$, SD and $KOBE$ are almost the same as those in the basic model, respectively. The dummy variables for Nishinomiya, Ashiya and Akashi, which are very close to Kobe, are significantly positive, while those for Amagasaki and Kakogawa, which are relatively further away from Kobe, are not statistically significant. This result means that the preference for UKB is limited to passengers living in places very close to Kobe.

In summary, the answer to Q2 (Do people living in the neighbouring cities of Kobe also

tend to use UKB?) is yes. The reason citizens in the three cities close to Kobe have similar preferences to those of Kobe citizens may be that these cities have a strong connection with Kobe economically and socially. This hypothesis can be examined based on commuting rates to Kobe and the immigration rate from Kobe. Table 8, which is based on the National Census in 2015, summarises the population of the five cities, the number of people commuting to Kobe and the number of people moving in from Kobe.

Table 8. Commuting rates to Kobe and move-in rates from Kobe.

	Population	Workers and students	Commuters to Kobe city		Immigrants from Kobe city between 2010 and 2015	
Amagasaki	452,563	211,334	12,013	5.7%	3,475	0.8%
Nishinomiya	487,580	231,862	27,419	11.8%	7,467	1.5%
Ashiya	95,350	44,045	9,863	22.4%	2,975	3.1%
Akashi	293,409	142,234	40,972	28.8%	9,064	3.1%
Kakogawa	267,435	133,674	16,398	12.3%	2,605	1.0%

Firstly, the move-in rates of the three cities with significantly positive regional dummy variables are higher than those of other cities. More than 3% of the population of Ashiya and Akashi moved in from Kobe in the 5 years between 2010–2015. Including people who moved in before that period, a larger proportion of the population came from Kobe. Thus, it is not surprising that these people have similar preferences to those of Kobe citizens.

Second, commuting rates to Kobe from Nishinomiya, Ashiya and Akashi tend to be higher than those from other cities (Kakogawa's commuting rate is slightly higher than Nishinomiya's). Commuting rates from Akashi and Ashiya to Kobe are over 20%, so these cities have strong social and economic connections to Kobe. While passengers in areas strongly connected to Kobe prefer UKB, the decisions of passengers in areas with relatively weaker connections to Kobe are not statistically different from the average preferences of all passengers. People who commute to school and work in Kobe may have opportunities to visit UKB for school events or to take flights from UKB for business trips. Thus, it is possible that these social and economic connections make their airport choices similarly to Kobe citizens.

6. DOES ATTACHMENT TO A SPECIFIC AIRPORT AFFECT AIRPORT CHOICES?

Section 5 has indirectly presented the attachment to and preference for city-owned airports based on actual passengers' decisions. However, since the RP data did not

include a variable related to attachment, it was not possible to explicitly describe direct links between passengers' attachment and choice. Therefore, an additional survey of Kobe citizens was conducted to determine whether their attachment to UKB is linked to their airport choice.

The survey was conducted on the Internet using the services of Macromill Inc. In this survey, respondents are sent e-mail with URL to the questionnaire page. For random sampling purpose, the company select respondents at random from the Kobe citizen monitors registered with Macromill. Note that the respondents may be biased towards those interested in airports and travel because the monitors could decide whether to respond the survey after seeing its title in the questionnaire page. There were 206 respondents in total, including 103 men and women respectively, each in their 30s to 50s. The survey asked respondents to select a flight to take out of six flights departing from the three airports. The combination of airlines, airports and fares for each flight reflects actual market conditions. See Table 9 for the detail of the flights. The respondents were also asked if they feel any attachment to UKB and why they chose that flight.

Table 9. Flight choice set

Departure	Arrival	Airport	Airline	Fare
8:00	9:55	KIX	JAL	14,300
8:00	9:50	ITM	ANA	14,730
8:10	9:55	UKB	Skymark	10,770
8:20	10:05	ITM	JAL	14,730
8:20	10:15	KIX	Peach	10,190
8:25	10:20	UKB	ANA	13,870

The results of the survey are summarised in Figure 7. The number of respondents who feel attachment to UKB was 98, of which, 89 chose to fly from UKB. Conversely, 108 respondents were not attached to the airport, and yet 99 of them chose to depart from UKB. The selection rates for UKB are 90.8% for the with-attachment group and 91.7% for the without-attachment group, and there is no large difference between the two groups in terms of airport choice. However, these two groups answered differently to a question about the reason for choosing the flight. The results showed that 19.1% of respondents with attachment answered that they chose a flight from UKB because 'they

love the airport'. Conversely, no respondent without attachment attributed their flight choice to their love of the airport. This result indicates that the psychological factor of attachment can arouse a preference for a specific airport and can be a reason for choosing the airport to some extent. So, it might be a possible idea for policy makers of airport cities to hold events such as runway walks and field trips for their citizens to enhance attachment to the airport and increase its passengers. Kobe and UKB invite children for 1-day airport tours, and the participants feel attachment to the airport as a result.

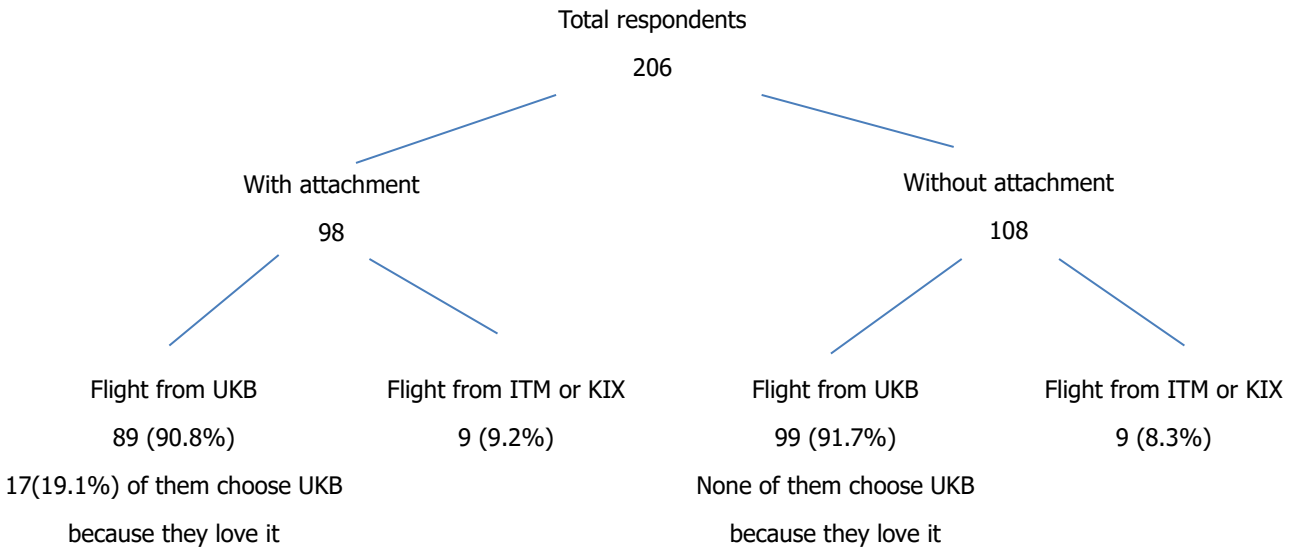

Figure 7. Results of the questionnaire survey

7. CONCLUSIONS

In this paper, an empirical analysis was conducted using micro data to examine whether passengers in a city with a local public airport tend to choose that airport. The analysis took Greater Kansai Area with multiple airports and Kobe as an example. The basic model showed that Kobe citizens prefer the local public airport when compared to passengers in other regions. The additional analysis on airport choice for non-Kobe citizens provided two results. Firstly, residents in other airport cities do not necessarily choose their local airports. Secondly, passengers living in cities with strong economic and social connections with Kobe also tend to use Kobe Airport (UKB). This means that passengers in these cities have a similar preference as Kobe citizens. Finally, the questionnaire survey revealed that a certain portion of people who are attached to UKB choose flights from UKB because they like the airport itself. This result suggests that attachment to a specific airport can be a reason for using it.

Although this research obtained meaningful results, future tasks are still left to be researched. The revealed preferences data used in the analysis have the disadvantage that they include only observable variables. For this reason, it is not possible to directly confirm whether passengers' decisions are affected by their attachment to a specific local airport. Therefore, this study indirectly demonstrates the existence of a relationship between attachment and airport choice based on the additional questionnaire survey.

To clarify whether attachment to an airport influences airport choice, it may be useful to conduct a questionnaire survey of passengers at airports. This makes it possible to collect data including attachment from passengers waiting to board who have finished airport choice and expressed their actual preferences. This eliminates the disadvantages of questionnaire survey in that questions must be hypothetical. Thus, it can be considered that this method helps researchers to directly analyse the relationship between attachment and airport choice.

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