

## 論文

# The Comparative Analysis of Perceived Risks in South Korean Low Cost Carriers and Full Service Carriers

Hew-Jong Choi\*

## 우리나라 대형항공사와 저가항공사의 지각위험에 대한 비교분석

최 휴 중\*

### ABSTRACT

This paper concentrate on the passengers' perception of risks by analyzing data gathered through a field survey in the South Korean air market. Twenty two Koreans were killed in the accident of PMT Air in the Kingdom of Cambodia on June 25th 2007 and This has caused customers to be more concerned about the safety of airline. Three hundred forty-two samples were collected from field survey at Kimpo International Airport in Seoul and Jeju International Airport on Jeju island and the findings are based on 316 questionnaires. The multiple regression analysis, Analysis of variance (ANOVA), Correlation analysis, T-test were carried out to examine the effect, relationship and difference of data set. The results show that there are differences between passengers' perceived risks in LCC's and those in FSC's. Passengers of LCC's took serious consideration of the type of fleet and feeling physical risk, whereas those of FSC's only took consideration of financial risk.

본 연구는 한국항공시장의 지각위험에 대한 실증적 연구이다. 김포국제공항 및 인천국제공항에서 수집한 316부의 설문지를 다중회귀분석, 분산분석, 상관분석, 및 T-test 기법을 동원하여 분석하였다. 연구결과, 대형항공사와 저비용항공사 승객간의 지각위험에는 차이가 있었으며 대형항공사 승객은 재무적 위험에 민감한 반면, 저비용항공사의 승객은 기종 및 물리적 위험에 민감하였다. 따라서 대형항공사에서는 섬세한 서비스 제공이 더욱 요구되며, 저비용항공사가 신항공기를 사용하는 것이 저비용항공사의 안전성 인식 제고에 효과적이라 사료된다.

**Key Words** : low cost carriers (저비용항공사), perceived risks(지각위험), South Korean airline market(한국항공시장), choice factors(선택속성들), safety and risks(안전과 위험)

### 1. Introduction

Perceived risks have been more significant for passengers' choices in South Korea since 22 Kore

ans were killed in the accident of PMT Air in the Kingdom of Cambodia on June 25th,2007. Due to the potentially severe consequences of accidents like the PMT Air accident, safety and risks have been considered the two issues of the greatest importance in the air transport sector (Janic, 2000) because risks have been related to accidents triggering the fierce loss of life and property in air transport industry. Furthermore, according to psych

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\* 경인여자대학 항공관광과

연락처, E-mail : hjchoi@kic.ac.kr

인천광역시 계양구 계산동 계산길 101

ological research, people tend to formulate their responses on the basis of perceived rather than objective risk and overestimate risks that can be characterized as unknown against those which are obvious, involuntary, uncontrollable and certain to fear (Slovic, 2000).

Despite the fact that people are at least basing their choice of airline and route on their perceived risks of flying (Reisingers and Mavondo, 2005), there is still a lack of empirical work, especially in the South Korean air transport market. This paper will concentrate on the passengers' perception of risks by analyzing data gathered through a field survey in the South Korean air market.

## 2. Accidents record

According to a study conducted by M. Janic (2000), aircraft accidents may take place at any point in time or space because flying may occur over long distance and accident risk is always present. The number of incidents has increased since 2006 when Low Cost Carriers (LCC'S's) started providing services in the South Korean air market. Jeju air, the third scheduled civil airline company in South Korea, has had several accidents or incidents since its service start in June 2006 (See Table 1). This increase has caused customers to be more concerned about the safety of LCC's. On the other hand, with the introduction of technical and operational measures in Full-Service Carriers (FSC's) in South Korea, safety has improved on average over a recent period, particularly after 2000, as no fatal accidents or incidents have occurred on FSC's since 2000. However, the worry of the probability of a hazardous event occurring is still prevalent in the minds of South Korean consumers. It clearly influences their choice of airline (Lee and Kim, 2002).

## 3. Literature review

Much research concerning the influential factors for carrier selection showed similar result such as Mason (2001), Evangelho et al. (2005) and Flourie and Lubbe (2006). According to research by Prousaloglou and

**Table 1. Accidents Record of South Korean Airline Industry**

	Date	Place	Fleet Details	Accident Details
1. LCC's				
Hansung Airlines	Dec. 28 2006	Jeju International Airport	ATR72-202 (HL5229)	Broken Landing Gear
Jeju Air	Aug. 31 2006	Kimhae International Airport	DHC-8-402 (HL5254)	Vertical Tail Scrape
	Feb. 21 2007	Kimpo International Airport	DHC-5-402 (HL5255)	Broken Landing Gear
	May 17 2007	Kimhae International Airport	DHC-5-402 (HL5255)	Broken Body Tail
	Feb. 8 2007	Jeju International Airport	DHC-5-402 (HL5255)	Lighting Strike
2. FSC's Korean Air	Aug. 6 1997	Antonio B. Won Pat International Airport	B747-300 (HL7648)	229 Passengers Died from
	Mar. 15 1999	Pohang Airport	MD82 (HL7570)	Runway Break-out 66
Asiana Airlines	July. 26 1993	Mokpo Airport	B737-500 (HL7229)	Passengers Died from aircraft crash
	July. 25 1997	Kunsan Airport	B767-300 (OZ712)	Broken Engine

Source: Airline annual reports

Koppleman (1995), carrier selection was made by a combination of various factors: schedule, fares, punctuality, reliability and frequent flier programs, comfort, safety and company policy.

Research conducted by O'Connell and Williams (2005) presented that reliability and quality were the top factors for selecting a Full Service Carrier, while fares and flight schedule were principal reasons for passengers travelling on LCC's. A study undertaken by Park et al. (2004) illustrated that airline image was also a key variable when modeling passengers' decision making processes. On the other hand, the research result by Lee and Kim (2002) showed that safety was a very important selection factor in the South Korean airline market.

Perceived risk is the level of risk that a consumer believes exists regarding the purchase of a specific product from a specific retailer (Bauer, R.A, 1960). According to Bauer's statement, consumer behavior involves risk in the sense that any action of a consumer will produce consequence which he can not anticipate with anything approaching certainty. Mitchell (1998) concluded that consumers could not calculate the risk accurately and the perceived risks are not objective but

rather subjective. Also, the study by Peter and Ryan (1976) indicated a similar result that perceived risk is based on consumers' judgment on the likelihood of negative outcomes as well as the severity.

Bahr(1997) contended that in air transport, risk has traditionally been related to air traffic accidents resulting in the significant loss of life and property. In terms of safety, perceived risk can be considered to combine a probability of an occurrence and the magnitude of the consequences. In addition, there are very general classifications of perceived risk (Sage and White, 1980; Stone and Gronhaug, 1993). Jacoby and Kaplan (1972) presented that the conceptualization of perceived risk has become standardized as a multidimensional construct that includes financial, functional, physical, psychological, social and temporal losses. However, the after-followed empirical research conducted by Kaplan et al.(1974) showed that perceived psychological risk and perceived social risk are deeply interrelated, which were supported with the similar results provided by Philipp et al.(2007).

#### 4. Hypotheses

Linked to literature review this conceptualization of perceived risk in empirical research has been

come a multidimensional construct which consists of financial, functional, physical, psycho-social and temporal risks. Also, the combination of airline choice factors includes tangibles, schedule, in-flight service, ancillary service, image, airport service and ticket booking & issuing service.

Based on the theoretical framework, an overview of the role of perceived risks on passengers' airline choice is depicted in Fig.1.

According to research model building, the following hypotheses are investigated in the empirical analysis:

H1: There are differences in the perception of risks between passengers in Low Cost Carriers and those in Full Service Carriers

H2: Passengers' choices of Low Cost Carriers are influenced by their perceived risks.

H3: Passengers' choices of Full Service Carriers are influenced by their perceived risks.

The Hypotheses are stated as alternative hypotheses. These hypotheses will be tested empirically in the following based on data collected by field survey.

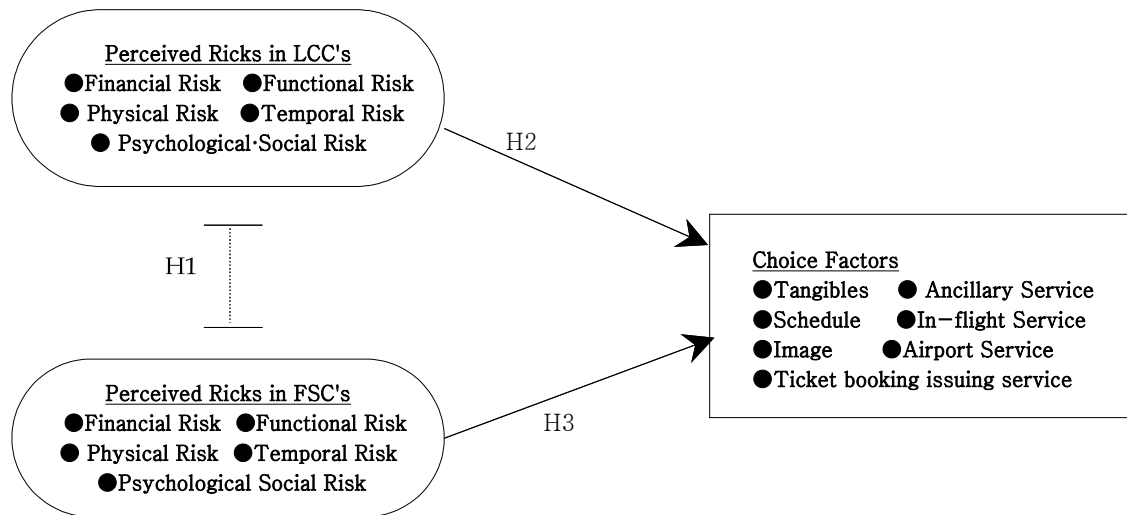


Fig.1 Role of perceived risks

## 5. Research design

A field survey was carried out between Aug. 3rd and Aug. 13th 2009 at Gimpo International Airport in Seoul and Jeju International Airport on Jeju island.

This survey was organized as a structured, self-administered questionnaire to elicit responses from travelers. A Judgment Sampling Technique was employed by small teams of trained personnel to maintain half and half balance between participants who experienced flying with LCC's and those who did with FSC's. This strategy of proper balance of responses was selected in order to improve the quality of response without bias. The respondents were required to mark the importance of each item on a five point Likert Scale between 1 and 5 where 1=strongly disagree and 5=strongly agree.

The full survey questionnaire included 69 items, which were divided into three sets: Passengers' perceived risks (25 items), passengers' airline choice factors (31 items) and passengers' general behavior (13 items). The main focus of the sets of items on perceived risks was to capture respondents' perception regarding the specification and magnitude of passengers' risks in taking a ride on airlines. Similarly, the second set of items sought respondents' perceptions on the prevailing preferences and choice attitude. The third part of items was about respondents' demographic details and general travel behaviors.

To improve the internal reliability of the items of the questionnaire a team of post-graduate students was used. A panel of colleagues conducted a general re-examination of the wording and a re-organization of the questionnaires.

Three hundred forty-two samples were successfully collected from 400 distributed questionnaires, which showed a collection rate of 85.5%. The findings are based on 316 questionnaires which were considered valid because they had a 100% question completion rate, representing 79% of total surveyed passengers during the period.

A factor analysis with varimax rotation was used in order to clarify the underlying

structure of the data. The multiple regression analysis, Analysis of variance (ANOVA), Correlation analysis, T-test were carried out to examine the effect, relationship and difference of data set. All statistical analyses were performed using the SPSS12.0 package.

## 6. Result

The effort of maintaining the balance of sample from LCC's and FSC's sample yield acceptable responses and of them, 52.8% were sample from LCC's and 47.2% FSC's. The participant profile shows that about 33% of respondents had taken 1-3 airlines trips in the previous one year before the survey while 9.8% of the respondents had no experience of airline travel. The reason for traveling is given as 39.4% business and 60.6% leisure. About half of the respondents earn less than us \$5,000 a month and 35% earn between us \$5,000 and us \$10,000 a month and 15% earn over \$10,000 a month.

The items are aggregated for analysis and five factors were extracted by factor analysis from the variable: Tangibles, In-flight service, Ground service, Schedule service, and Ancillary service.

The criteria for the validity and reliability of these factors are presented in Table 2. For the validity of the factors their Eigen value and explained variance are examined. All factor loadings are greater than 0.5 and the Eigen value of each factor exceeds the threshold of 1.5. The cumulative explained variance of all five factors is greater than 60%. The reliability of the factor is examined by Cronbach's  $\alpha$  (Cronbach, 1951) and the Kaiser-Meyer-Olkin criterion.

The Cronbach's Alpha is above 0.6 and KMO of sampling adequacy is also above 0.6, which means all factors exceed the minimum score of 0.5. Therefore, all factors fulfill the criteria for validity and reliability and can be used for further procedures.

Table 2. Validity and reliability of factors

Factors	Eigen v.	Variance	KMO	Cronbach's alpha
<b>Tangibles</b>	4.052	21.48	0.83	0.78
Type of fleet				
Up-to-date aircraft				
Seat space and leg room				
In-flight entertainment facility				
<b>In-flight service</b>	2.164	11.47	0.81	0.74
Tasty meal service				
Courtesy of employees				
Employees' knowledge				
Magazines & movies service				
<b>Ground service</b>	2.131	11.30	0.79	0.68
Promptness of reservation				
Convenient ticket issuing				
Kind check-in service				
Convenient baggage claim				
<b>Schedule</b>	1.838	9.74	0.71	0.62
Convenient route				
Frequent flight schedule				
Network to other route				
<b>Ancillary service</b>	1.737	9.21	0.67	0.61
Frequent flyer program				
Compensation				
Relevant package product				

Table 3 shows the mean values and the significant level of the t-tests. All risks are significant at the 5% level. The result reveals some interesting patterns in passengers' perception of risk. First, the mean values of perceived risks in LCC's are in total higher than those in FSC's, which means passengers in LCC's are in general more concerned about potential risks than those in FSC's. Second, respondents with experience flying on LCC's scored higher values for physical risk and functional risk whereas those on FSC's scored higher values for functional risk and temporal risk. This indicated that safety was important concerns for LCC's passengers while all passengers on both LCC's and FSC's were keeping their eyes on airline service quality.

On the whole, the perceived risk components were scored and tested by significant difference due to the airline type between LCC's and FSC's, therefore, hypothesis H.1 can be accepted.

Table 3. Comparison of mean differences for perceived risk

	LCC's	FSC's	t-value	p-value
<b>Financial risk</b>	3.26	3.04	2.64	0.02
<b>Functional risk</b>	4.06	3.75	3.88	0.00
<b>Physical risk</b>	4.17	3.71	3.93	0.00
<b>Psycho-social risk</b>	3.53	3.38	1.98	0.05
<b>Temporal risk</b>	3.94	3.73	2.80	0.01

As shown in Table 4, all correlation coefficient values are significant at the 5% Level. Therefore, significantly positive interrelationships between passengers' perceived risks and LCC's attributes are to be expected. In particular, physical risk is strongly related with tangible attributes as the value is 0.662.

Correlation coefficients in FSC's are presented in Table 5. All values are significant at the 5% level and these correlations between perceived risks and FSC's attributes are found positively significant.

In order to test furthermore H.2 and H.3, multiple linear regression analyses are conducted. Tangibles, in-flight service, ground service, schedule, and ancillary service are taken as regressed on financial risk, functional risk, physical risk, psycho-social risk, and temporal risk respectively.

As shown in Table 6, the multiregression model using these five parameters has given a good evaluation of the tangible variable at 23% ( $r^2=0.23$  adjusted for the variables,  $p<0.0000$ ) for LCC's, and 15% ( $r^2=0.15$  adjusted for the variables,  $p<0.0000$ ) for FSC's. Moreover, function risk and physical risk parameters have contributed significantly to the model ( $P<0.05$ ) in the case of LCC's. Financial risk and psycho-social risk parameters have done the same ( $P<0.05$ ) to FSC's. All scores are positively correlated with tangible variables in both cases of LCC's and FSC's.

The results show that the more serious the perceived physical and functional risks were to LCC's passengers, the more consideration they gave in choosing airlines. In contrast, the passengers taking a ride on FSC's put financial risk and psycho-social risk as the most influential factors.

Table 4. Correlation table for LCC's

	1	2	3	4	5	6	7	8	9	10
1. Financial risk	1.000									
2. Functional risk	0.314	1.000								
3. Physical risk	0.276	0.313	1.000							
4. Psycho-social risk	0.307	0.276	0.313	1.000						
5. Temporal risk	0.385	0.307	0.276	0.313	1.000					
6. Tangibles	0.471	0.593	0.662	0.432	0.514	1.000				
7. In-flight service	<b>0.098</b>	0.332	0.458	0.436	0.378	0.354	1.000			
8. Ground service	0.365	0.358	0.259	0.283	0.298	<b>0.091</b>	0.315	1.000		
9. Schedule	0.308	<b>0.104</b>	0.292	0.230	0.319	0.298	1.000	0.286	1.000	
10. Ancillary service	0.278	0.246	0.254	0.37	0.365	0.356	0.249	0.324	0.297	1.000

All values are significant at the 1% level whereas values in bold are 5%

Table 5. Correlation table for FSC's

	1	2	3	4	5	6	7	8	9	10
1. Financial risk	1.000									
2. Functional risk	0.286	1.000								
3. Physical risk	0.269	0.299	1.000							
4. Psycho-social risk	0.301	0.314	0.293	1.000						
5. Temporal risk	0.313	0.346	0.209	0.278	1.000					
6. Tangibles	0.396	0.487	0.414	0.398	0.446	1.000				
7. In-flight service	0.211	0.283	<b>0.073</b>	0.691	0.287	0.335	1.000			
8. Ground service	<b>0.081</b>	0.317	0.238	0.278	0.288	0.195	0.253	1.000		
9. Schedule	0.283	0.224	0.253	0.212	0.294	0.248	0.304	0.229	1.000	
10. Ancillary service	0.255	0.227	0.213	0.278	0.288	0.274	0.310	0.278	0.304	1.000

All values are significant at the 1% level whereas values in bold are 5%

Table 6. Multiple regression coefficient of Tangibles

	LCC's(Adj R <sup>2</sup> =0.23,F=9.14,P=0.000)			FSC's(Adj R <sup>2</sup> =0.15, F=11.27,P=0.000)		
	beta	t	p	beta	t	p
Constant	3.807	18.048	0.000	2.612	12.812	0.000
Financial risk	0.078	0.665	0.562	<b>0.184</b>	<b>2.232</b>	<b>0.032</b>
Functional risk	<b>0.194</b>	<b>2.615</b>	<b>0.022</b>	0.410	0.551	0.598
Physical risk	<b>0.391</b>	<b>2.123</b>	<b>0.032</b>	0.078	1.014	0.212
Psyco-social risk	0.020	0.623	0.553	<b>0.167</b>	<b>2.175</b>	<b>0.034</b>
Temporal risk	0.058	0.113	0.911	0.243	0.989	0.238

Values in bold are significant at the 5% level

Table 7 illustrates the multiregression model has given a good evaluation of the in-flight service variable explaining 11.4% of the variance ( $r^2=0.114$  adjusted for the variables,  $P<0.0000$ ) in case of LCC's, 17.4% ( $r^2=0.174$  adjusted for the variables,  $P<0.0000$ ) in the event of FSC's.

Only psycho-social risk has contributed

significantly to the model( $P<0.05$ ) in the case of LCC's, whereas functional risk and psycho-social risk have done so significantly ( $P<0.05$ ) in the event of FSC's. All scores are positively correlated with in-flight service variables in both cases of LCC's and FSC's.

Table 7. Multiple regression coefficient of In-flight service

	LCC's(Adj R <sup>2</sup> =0.114,F=9.47,P=0.000)			FSC's(Adj R <sup>2</sup> =0.174, F=15.50,P=0.000)		
	beta	t	p	beta	t	p
Constant	2.852	18.891	0.000	2.793	11.439	0.000
Financial risk	0.143	1.459	0.123	0.079	0.868	0.386
Functional risk	0.107	1.433	0.254	<b>0.354</b>	<b>1.967</b>	<b>0.047</b>
Physical risk	0.008	0.100	0.821	0.024	0.300	0.765
Psyco-social risk	<b>0.172</b>	<b>2.120</b>	<b>0.037</b>	<b>0.154</b>	<b>1.932</b>	<b>0.049</b>
Temporal risk	0.154	1.236	0.348	0.023	0.569	0.546

Values in bold are significant at the 5% level

Table 8. Multiple regression coefficient of Ground service

	LCC's(Adj R <sup>2</sup> =0.041,F=3.676,P=0.001)			FSC's(Adj R <sup>2</sup> =0.46, F=9.136,P=0.000)		
	beta	t	p	beta	t	p
Constant	3.167	16.112	0.000	2.783	11.593	0.000
Financial risk	-0.064	-0.946	0.345	<b>0.164</b>	<b>1.968</b>	<b>0.041</b>
Functional risk	0.060	0.625	0.531	0.079	0.868	0.386
Physical risk	0.093	1.035	0.287	0.031	0.376	0.708
Psyco-social risk	<b>0.281</b>	<b>2.998</b>	<b>0.002</b>	0.023	0.310	0.764
Temporal risk	<b>0.093</b>	<b>2.087</b>	<b>0.032</b>	0.048	0.774	0.279

Values in bold are significant at the 5% level

Table 8 shows the multiregression model has given a good evaluation of the ground service variable explaining 4.1% of the variance ( $r^2=0.041$  adjusted for the variables,  $P<0.0000$ ) in the case of LCC's, and 46% ( $r^2=0.46$  adjusted for the variables,  $P<0.0000$ ) in the case of FSC's.

Psyco-social risk and temporal risk have contributed significantly to the model ( $P<0.05$ ) for LCC'S's, whereas financial risk has done so significantly ( $P<0.05$ ) for FSC's. All scores are positively correlated with ground service variables in both the cases of LCC's and FSC's.

Table 9. Multiple regression coefficient of Schedule

	LCC's(Adj R <sup>2</sup> =0.110,F=9.03,P=0.000)			FSC's(Adj R <sup>2</sup> =0.13, F=10.46,P=0.000)		
	beta	t	p	beta	t	p
Constant	2.187	14.597	0.000	2.512	11.583	0.000
Financial risk	<b>0.172</b>	<b>2.094</b>	<b>0.036</b>	<b>0.332</b>	<b>2.677</b>	<b>0.008</b>
Functional risk	0.008	0.090	0.928	<b>0.165</b>	<b>2.151</b>	<b>0.032</b>
Physical risk	0.021	0.108	0.875	0.058	0.779	0.437
Psyco-social risk	-0.001	-0.012	0.990	-0.031	-0.410	0.681
Temporal risk	<b>0.208</b>	<b>2.216</b>	<b>0.028</b>	0.643	0.884	0.493

Values in bold are significant at the 5% level

Table 9 illustrates the multiregression model has given a good evaluation of the schedule service variable explaining 11.0% of the variance ( $r^2=0.110$  adjusted for the variables,  $P<0.0000$ ) in the case of LCC'S's, and 13% ( $r^2=0.13$  adjusted for the variables,  $P<0.0000$ ) in the case of FSC's.

Financial risk and temporal risk have contributed significantly to the model ( $P<0.05$ ) in the case of LCC's, whereas financial risk and functional risk have done so significantly ( $P<0.05$ ) in the case of FSC's. All scores are positively correlated with schedule service variables in both the cases of LCC's and FSC's.

Table 10. Multiple regression coefficient of Ancillary service

	LCC's(Adj R <sup>2</sup> =0.73,F=5.12,P=0.000)			FSC's(Adj R <sup>2</sup> =0.46, F=9.136,P=0.000)		
	beta	t	p	beta	t	p
Constant	3.598	23.374	0.000	3.009	16.790	0.000
Financial risk	<b>0.244</b>	<b>2.795</b>	<b>0.004</b>	<b>0.168</b>	<b>2.084</b>	<b>0.038</b>
Functional risk	-0.105	-1.123	0.261	-0.065	-0.844	0.399
Physical risk	0.165	1.718	0.086	0.079	0.857	0.390
Psyco-social risk	0.015	0.115	0.867	0.069	0.774	0.439
Temporal risk	<b>0.156</b>	<b>2.231</b>	<b>0.029</b>	<b>0.173</b>	<b>2.203</b>	<b>0.028</b>

Values in bold are significant at the 5% level

Table 10 reveals the multiregression model has given a good evaluation of the ancillary service variable explaining 73% of the variance ( $r^2=0.73$  adjusted for the variables,  $P<0.0000$ ) in the case of LCC's, and 8.6% ( $r^2=0.086$  adjusted for the variables,  $P<0.0000$ ) for FSC's. Financial risk and temporal risk have contributed significantly to the model( $P<0.05$ ) for both LCC's and FSC's. Also, all scores are positively correlated with ancillary service variables in both the cases of LCC's and FSC's.

The results indicate that the perceived risks have an effect on passengers' airline choices. So that hypotheses H2 and hypotheses H3 can be accepted.

## 7. Implications and conclusion

The finding from the field survey presents the natures of and differences between perceived risk in Low Cost Carriers and Full Service Carriers. The results show that there are differences between passengers' perceived risks in LCC's and those in FSC's. The mean values between the airlines differ greatly on a significant level. This indicates that passengers of LCC's may take high risks to enjoy a low ticket price. A second analysis allows a more specific view on the perceived risks. All passengers' perceived risk in LCC's and FSC's can influence their choice of airlines. In particular, passengers of LCC's took serious consideration of the type of fleet and feeling physical risk, whereas those of FSC's only took consideration of financial risk.

Whenever passengers of LCC's consider psyco-social risk, they put in-flight service and ground service as important factors in selecting airlines. In contrast, passengers of FSC's are intent to take in-flight service as a main factor at the time of considering functional risk. Also, both passengers in LCC's and FSC's took ancillary service as a very important factor when they were feeling financial risk and temporal risk.

Therefore, this research suggests that the new-born low cost carriers with price competitiveness have to acquire and operate a new fleet because the recorded accidents of these years triggered passengers' concerns about safety and a new fleet may mitigate these worries. Full Service Carriers have to provide functional and psyco-social risk concerned passengers, namely business travelers, with more sensitive in-flight service as they are deeply correlated to each other in FSC's.

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