

## An Investigation of Service Quality in China Low Cost Carrier Market

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**Abstract:** This study aims to empirically investigate customer satisfaction in China low cost carrier (LCC) market. Three importance-performance analysis (IPA) methods – traditional IPA and two revised IPA (partial correlation model, PCM and dummy regression model, DRM) are adopted and compared. The results show that the top-priority attributes to be improved recognized by the traditional IPA are Flight on-time and Complaint response, which are different to those suggested by PCM-- Complaint response and Meal service. In addition, according to the evaluation results of DRM on the passengers with various journey purposes, Attributes importance viewed by passengers with various journey purposes significantly differs. Corresponding improvement strategies are then proposed based on three methods.

**Key Words:** *Low cost carrier, service quality, revised IPA*

### 1. INTRODUCTION

The successful low cost air service business model of Southwest Airline has spread worldwide in the late 2000s. A number of LCCs was established in EU during the late 1990s to the early 2000s. In the mid of the 2000s, LCC entered Asian market, first in the Southeast Asia, then to China and India. Numerous studies have focused on low cost carriers in the past decade, but most of the studies are based in the carriers of EU and US. There is hardly any LCC research focusing on the greater China market, which is one of the most rapidly growing air transport markets in the world and deserves in-depth investigation. For better understanding the China LCC market, Shon *et al.* (2008) employed traditional importance-performance analysis (IPA) to investigate passenger satisfaction on the service quality delivered by LCC through an in-flight service quality survey. Based on the IPA evaluation maps, several improvement and marketing strategies were then proposed.

Obviously, IPA has been applied as an effective method of assessing firm competitiveness, identifying improvement opportunities, and guiding strategic planning. (Hawes and Rao, 1985; Martilla and James, 1977; Myers, 2001; Deng, 2007). IPA evaluation map, a major outcome of IPA, can straightforwardly illustrate the strengths and weaknesses of the attributes under investigation and thus identify directions for service improvement. IPA has also been widely used by researchers in the fields of aviation and tourism management (*e.g.* Tonge and Moore, 2007; Huang *et al.*, 2006; Chen and Chang, 2005; Feng and Jeng, 2005; Zhang and Chow, 2004; Deng, 2007).

However, the interpretation of the IPA evaluation map is based on assumptions of

independence between importance and performance and linearity and symmetry between attribute performance and overall performance, but many studies question the validity of these assumptions, especially when respondents were asked to rate the degrees of importance and performance simultaneously (Eskildsen and Kristensen, 2006). Actually, numerous studies indicate that the relationship between customer attribute perception (performance) and overall satisfaction is asymmetrical, and the relationship between attribute importance and attribute performance is causal (Deng, 2007). Thus, Deng (2007) and Deng *et al.* (2007) respectively proposed two revised IPA methods which integrates concepts of three-factor theory, natural logarithmic transformation, and partial correlation analysis (or dummy regression method).

Based on this, the aim of this research is to employ Deng's two revised IPA methods to investigate service quality of the first China LCC, Spring Airlines. Spring Airlines is China's first LCC, and was established on 26 May 2004 and began operations on 18 July 2005. Comparison to the study of Shon *et al.* (2008) which was conducted by using traditional IPA is also conducted. The discrepancies between two studies provide a re-visit on the suggested improvement strategies proposed by Shon *et al.* (2008) and indicate the consideration for choosing the IPA methods.

The remainder of this paper is organized as follows: Section 2 briefly introduces the IPA technique and revised IPA methods. Section 3 then details the questionnaire design and survey, including profiling the survey respondents. Next, section 4 presents comparisons between the results of conventional IPA and revised IPA. Different methodologies among customer types are also tested and examined. Moreover, corresponding improvement strategies are proposed and prioritized. Finally, concluding remarks and suggestions for future research are given.

## 2. METHODOLOGY

### 2.1 Traditional Importance-performance Analysis

Service industry practitioners commonly measure levels of satisfaction with service attributes while failing to address the importance of service attributes to customers. Understanding customer attitude towards a product is essential for market analysis. In doing so, IPA has been applied to assess firm competitiveness, identify improvement opportunities and guide strategic planning (Martilla and James, 1977; Hawes and Rao, 1985; Myers, 2001; Deng, 2007). IPA was first developed by Martilla and James (1977), and simultaneously identifies the relative importance and performance of service or product attributes. The results are plotted graphically on a two-dimensional grid. Attribute importance is listed on the vertical axis while satisfaction level is displayed on the horizontal axis, as depicted in Fig. 1, resulting in four quadrants: *Keep Up the Good Work*, *Concentrate Here*, *Low Priority*, and *Possible Overkill*.

Attributes located in the *Keep Up the Good Work* quadrant are perceived as important by customers and moreover are areas in which firms are performing strongly. Attributes in the *Concentrate Here* quadrant are evaluated by customers as being very important areas in which firm performance is below average. These attributes are identified as priority directions for improvement. Attributes in the *Low Priority* quadrant are perceived by customers as having low importance and poor firm performance. If resources are limited, firms should not invest heavily in improving performance in these attributes, since customers do not assign them a

high ranking. Finally, the *Possible Overkill* quadrant contains attributes that customers assign low importance and in which they perceive firm performance as relatively high. Resources devoted to improving firm performance in these areas yield limited benefits in terms of enhanced customer satisfaction and hence managers should consider expending resources elsewhere.

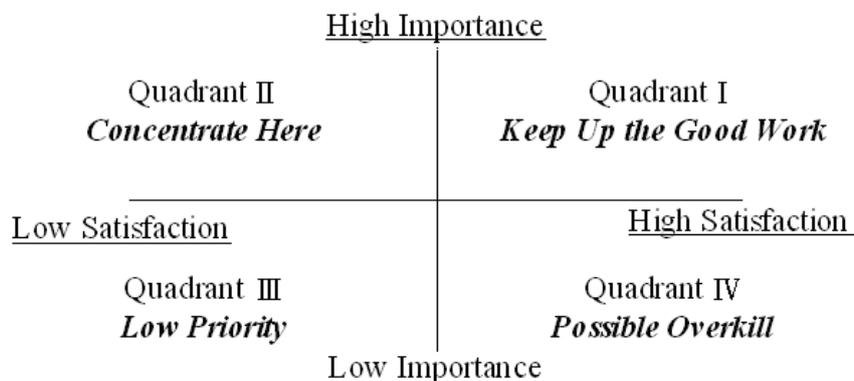


Figure 1 IPA evaluation map (Martilla and James, 1977)

## 2.2 Revised Importance-performance Analyses

IPA is a simple and effective technique that can assist practitioners in prioritizing customer attributes when enhancing service quality and customer satisfaction. Although IPA is an extremely valuable method, several serious shortcomings still remain. Matzler *et al.* (2004) noted the traditional IPA has two implicit assumptions: (1) attribute performance and attribute importance are independent variables; and (2) the relationship between attribute performance and overall performance is linear and symmetrical. These assumptions may be erroneous in the real world, since the relationship between attribute-level performance and customer overall satisfaction is asymmetrical (Kano *et al.*, 1984; Matzler and Sauerwein, 2002; Matzler *et al.*, 2003; Ting and Chen, 2003; Matzler *et al.*, 2004), and the relationship between attribute performance and attribute importance is causal (Sampson and Showalter, 1999; Oh, 2001; Ryan and Huyton, 2002; Matzler *et al.*, 2004).

Therefore, Kano *et al.*, (1984) proposed a two-dimension quality model which classified the evaluated attributes or products into five categories – attractive, one-dimensional, must-be, indifference and reverse, based on the concept that the relationship between fulfillment of a need and the satisfaction or dissatisfaction experienced is not necessarily linear. Obviously, Kano’s model can provide more insightful investigations on service quality survey. However, to develop a Kano’s model, a burdensome questionnaire survey may be required. Therefore, Matzler and Sauerwein (2002) and Matzler *et al.* (2004) suggested a three-factor theory – basic factor, excitement factor, and performance factor by regressing customer overall satisfaction on two dummy variables. Based on the core logic, Deng *et al.* (2007) further proposed a new methodology (partial correlation analysis with natural logarithmic two dummy variables) for replacing the conventional Kano’s model to categorize two-dimensional quality attributes and get the customer satisfaction increment index (CSII) and customer dissatisfaction decrement index (CDDI). Then, the “effective improving service quality attributes” can be identified according to the graphically plotted customer satisfaction index

matrix. The Deng’s “dummy regression model” comprises five steps:

Step 1: Introduce two dummy variables:  $D1$  and  $D2$ , where  $D1$  represents the high performance index and  $D2$  represents low performance index according to the following transformations (Table 1):

Table 1 Value settings of two dummy factors

Satisfaction perceived (five-point Likert scale)	High performance index $D1$	Low performance index $D2$
5	3	1
4	2	1
3	1	1
2	1	2
1	1	3

Step 2: Take natural logarithmic of  $D1$ ,  $D2$  and customer overall satisfaction.

Step 3: Compute partial correlation coefficient of each attribute performance with customer overall satisfaction. The partial correlation coefficients ( $\beta_1$  and  $\beta_2$ ) represent the implicitly derived importance of the attribute.

Step 4: Classify attributes into four categories according to the significance of  $D1$  and  $D2$ : Performance factor (if both  $D1$  and  $D2$  are significant), excitement factor (if  $D1$  is significant but  $D2$  is not), basic factor (if  $D1$  is not significant but  $D2$  is), and indifferent quality attribute (if both  $D1$  and  $D2$  are insignificant).

Step 5: Plotted the customer satisfaction index matrix.  $\beta_1$  is customer satisfaction increment index and  $\beta_2$  is customer dissatisfaction decrement index. In the matrix, the attributes locate in the quadrant of high customer satisfaction increment index and customer dissatisfaction decrement index are identified as effective improving service quality attributes.

In addition, Deng (2007) also proposed a novel method that integrates three-factor theory with partial correlation analysis and natural logarithmic transformation to measure implicitly derived importance of attributes. The method comprises four steps:

Step 1: Gather customer perceptions for the performance of attributes. A questionnaire survey is commonly used for this step. The questionnaire measures attribute performance and customer overall satisfaction perception for focal services.

Step 2: Acquire implicitly derived importance of each attribute by performing natural logarithmic partial correlation analysis mentioned.

Step 3: Use the mean of all implicitly derived degrees of importance for attributes and the mean of all performance for attributes to divide the IPA matrix into four quadrants.

Step 4: Plot all attributes on the IPA matrix. IPA practitioners decide a reasonable action plan for each attribute according to the matrix.

For ease of comparisons, the method by regressing customer overall satisfaction on two dummy variables, proposed by Deng *et al.* (2007), is named as dummy regression model (DRM) and the method by computing partial correlation coefficients between attributes and customer overall satisfaction, proposed by Deng (2007), is named as partial correlation model (PCM).

### 3. QUESTIONNAIRE SURVEY

### 3.1 Questionnaire Design

The questionnaire comprised five parts. The first part gathered passenger travel information, including origin and destination airports, purpose of journey, flight frequency, frequent flyer membership, booking channel, and reasons for flying Spring Airlines. The second part contained 21 statements reflecting importance dimensions for LCC service levels, which are primarily based on the SERVQUAL scale developed by Parasuraman *et al.* (1988), together with insights gained from in-depth interviews with airline managers and focus group responses. The respondents were asked to rate the degree of importance they ascribed to the 21 statements using a five-point Likert scale. Identical statements were included in the third part to survey respondent satisfaction (namely the performance of Spring Airlines). The fourth part surveyed passenger perceptions of the aspects of service value, airline image, overall satisfaction and behavioral intentions, respectively, represented by two to three items. The final part included respondent demographic information.

According to the questionnaire designed by IATA, air transport service can be represented via nine service attributes, including seat reservation, ground service, cabin facility, meal service, cabin service, baggage delivery, complaint response, flight on-time, and flight safety. Based on these representation scheme, the above 21 statements in the second and third parts of the questionnaire were aggregated to represent the nine service attributes.

### 3.2 Data Collection and Analysis

A total of 2,000 questionnaires were disseminated to travelers flying Spring Airlines in airports and airplane cabins from March 5 to March 11, 2007. Customers completed the questionnaires themselves before arriving at their destination airport. A total of valid 968 questionnaires were returned. The breakdown of respondents' demography is given in Table 2. Interestingly, customers of Spring Airlines are roughly even split between males and females. Moreover, the majority (73.6%) of the customers of Spring Airlines are aged below 40 years old, suggesting that young people are the target market of the airline. Furthermore, in terms of personal occupation, the customers of the airline are a very diverse group. Most of the customers of Spring Airlines earned monthly incomes ranging from RMB2001-4000, representing a low income group in the context of China. A slightly higher percentage of respondents do not hold VIP membership of Spring Airlines than those having such membership. As for journey purpose, the largest segment is traveling for tourism (39.4%), followed by business (32.6%), and finally visiting family or friends (28%). However, the distribution among different journey purposes is relatively even.

Table 2 Breakdown of respondents' demography

Characteristics	Number of Respondents	Percentage (%)
<i>Gender</i>		
Male	512	52.1
Female	456	47.9
<i>Age</i>		
20 or Younger	50	5.2
21-30	363	37.5
31-40	299	30.9
41-50	150	15.5
51-60	78	8.1
61 or Older	28	2.9
<i>Occupation</i>		
Government	175	18.0
Science / Academia	139	14.4
Foreign-funded Enterprise	213	22.0
Private Enterprise	198	20.5
Government-owned Enterprise	116	12.0
Farming	62	6.4
Others	65	6.7
<i>Education</i>		
Primary or below	46	4.8
High school	261	27.0
University	577	59.6
Master or above	84	8.7
<i>Monthly income (RMB)</i>		
2000 or Lower	182	18.8
2001-4000	341	35.2
4001-6000	164	16.9
6001-8000	140	14.5
8001 or Higher	141	14.6
<i>VIP membership</i>		
Member	472	48.8
Nonmember	496	51.2
<i>Journey purpose</i>		
Business	316	32.6
Tourism	381	39.4
Visiting / Home	271	28.0

Note: 6.84 China RMB was equivalent to \$1 USD as of August, 2009.

### 3.3 Reliability Analysis

To evaluate the reliability, Cronbach's alpha is used to measure internal consistency. Cronbach's alpha is the average of all possible split-half coefficients resulting from different divisions of the scale items, and a value of 0.7 or above generally indicates satisfactory consistency reliability (Guieford, 1965). The Cronbach's alpha for seven service attributes are aggregated by at least two items, except for the two attributes of Flight on-time and Flight safety which are represented by single item, are listed in Table 3. Additionally, the overall reliability for both importance and performance are also calculated. Notably, all values of Cronbach's alpha exceed 0.7, implying good reliability.

Table 3 Reliability analysis

Aspects	Attributes	Items	Cronbach's $\alpha$	
			Construct	Overall
Importance	Seat reservation	Quick response to reservation lines	0.891	0.882
		Variety of reservation and ticketing channels		
		Friendly reservation staff		
	Ground service	Quick ticketing and check-in services without mistake	0.905	
		Easily-operated automatic check-in machine		
		Clear boarding broadcasting and staffs' instructions		
		Friendly check-in staff		
	Cabin facility	Clean cabin environment	0.793	
		Comfortable seats		
	Meal service	Clear and easily-understood marks/signs	0.836	
		Satisfied with service of offering spring water		
		Reasonable price of foods and drinks		
	Cabin service	Variety of meals	0.827	
		Easy to understand cabin crews' broadcasting		
Baggage delivery	Friendly cabin crew	0.877		
	Quick and well-managed baggage claim service			
Complaint response	Friendly baggage-handling staff	0.882		
	Appropriate responses to passengers' complaints			
Flight on-time	Quick response to passengers' requests	-		
Flight safety	Departure/arrival as scheduled	-		
Performance	Seat reservation	Reliability on safety	0.836	0.889
		Quick response to reservation lines		
		Variety of reservation and ticketing channels		
	Ground service	Friendly reservation staff	0.872	
		Quick ticketing and check-in services without mistake		
		Easily-operated automatic check-in machine		
		Clear boarding broadcasting and staffs' instructions		
	Cabin facility	Friendly check-in staff	0.728	
		Clean cabin environment		
	Meal service	Comfortable seats	0.818	
		Clear and easily-understood marks/signs		
		Satisfied with service of offering spring water		
	Cabin service	Reasonable price of foods & drinks	0.788	
		Variety of meals		
Baggage delivery	Easy to understand cabin crews' broadcasting	0.831		
	Friendly cabin crew			
Complaint response	Quick and well-managed baggage claim service	0.843		
	Friendly baggage-handling staff			
Flight on-time	Appropriate responses to passengers' complaints	-		
Flight safety	Quick response to passengers' requests	-		
	Departure/arrival as scheduled	-		
	Reliability on safety	-		

## 4. RESULTS

To prioritize the improvement strategies of Spring Airlines and gain in-depth insights into customer expectation and satisfaction regarding LCC service, the results of IPA model (Shon *et al.*, 2008), PCM model and DRM model are respectively presented and compared. Furthermore, more insightful investigations on customers with various journey purposes are also analyzed.

### 4.1 Results of Traditional IPA

The average ratings on importance (expected service) and performance (perceived service) of nine attributes are computed in Table 4. To construct the service attribute evaluation map, the locations of cross-hairs which divide the matrix into quadrants are set to their mean values as identified by Martilla and James (1977). Figure 2 further shows the importance and performance of nine service attributes for all customers.

Table 4 Results of traditional IPA

Attributes	Perceived service	Expected service
Seat reservation	3.87	4.37
Ground service	3.89	4.38
Cabin facility	3.75	4.41
Meal service	3.72	4.29
Cabin service	3.96	4.45
Baggage delivery	3.90	4.50
Complaint response	3.76	4.54
Flight on-time	3.76	4.68
Flight safety	3.87	4.83

Two service attributes of Flight on-time and Complaint response are in the *Concentrate Here* quadrant, indicating that Spring Airlines should devote itself to improving flight punctuality and increasing its ability to handle customer complaints. Since China airspace is currently tightly controlled by the military, availability of airspace for civil aviation is limited, causing serious air traffic congestion at many airports. Particularly, the home base of Spring Airlines, Shanghai Hongqiao Airport, is one of the most congested airports in China, creating difficulties in maintaining punctuality. Fortunately, China is expected to relax regulations regarding airspace in an effort to attract foreign investment to the sector. Additionally, the construction of a second runway is currently underway at Shanghai Hongqiao Airport, and when complete this is expected to relieve congestion. Additional strategies to enhance flight punctuality can also be considered, including reducing ground turnaround time, increasing taxiing speed, applying for the take-off permission earlier, developing a flexible flight schedule that avoids knock-on delays, maintaining aircraft condition, and building incident response capability through training and the development of standard operating procedures. As for the attribute of Complaint response, a satisfactory customer complaint response system should be developed, including a computer system capable of recording and tracing the handling status of each complaint, a designated team for handling customer complaints, a periodic training program for training designated personnel to build their ability to handle complaints, and a well-developed standard operating procedure to ensure each complaint is resolved in a timely and satisfactory manner. Of course, sufficient budget should be reserved for customer compensation. Additionally, periodic review meetings should be organized to

discuss the sources of frequent complaints and propose countermeasures.

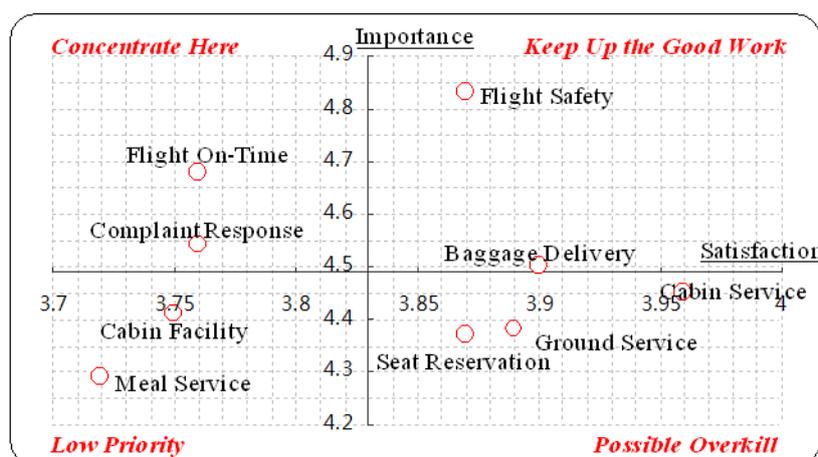


Figure 2 IPA evaluation map

Two attributes, Flight safety and Baggage delivery, are located in the *Keep up the Good Work* quadrant. These are thus rated as important attributes in which the airline has achieved good performance. Although Flight safety is assigned the highest importance among the nine service attributes, customers are satisfied with the performance of Spring Airlines in this area. Obviously, despite its good performance in this area, like all airlines Spring Airlines must continue to strive to improve. Furthermore, a well-managed baggage delivery service also achieved a high importance rating. This phenomenon indicates that the customers of LCC require a safe, efficient, punctual and seamless air service. Obviously, Spring Airlines is doing well.

The two attributes of Cabin facility and Meal service are situated in the *Low Priority* quadrant. Although these attributes exhibited below average performance, they are also relatively unimportant to customers. As anticipated, LCC customers have minimal expectations regarding cabin facilities and meal service. Thus, given resource constraints, such airlines are best allocating resources elsewhere. To maximize flight profitability, LCCs usually fill the cabin with as many seats as possible to as to accommodate the largest possible number of passengers. Spring Airlines is no exception. Each Spring Airlines airplane (Airbus-320) is equipped with 180 seats, the maximum number this type of aircraft can accommodate. It is suggested that Spring Airlines should reserve seats near entrances/exits for handicapped customers and design some larger seats (by sacrificing neighboring seats) for handicapped customers or those willing to pay higher ticket prices. Reducing meal prices and providing a variety of meals will increase customer satisfaction.

The final three attributes, Cabin service, Ground service and Seat reservation, are located in the *Possible Overkill* quadrant. These attributes were rated as low importance and high performance, indicating the airline should not invest excessively in these areas. With respect to Cabin service, Spring Airlines currently provides bottled mineral water for each customer. However, bottled water could be replaced by a paper cup of water to reduce the water procurement costs and on-board water weight (thus realizing fuel cost savings). Additionally, commercial advertisements on cups offer a potential untapped revenue source. Since each aircraft accommodates a maximum of 180 customers, the number of check-in channels can be reduced as appropriate to minimize personnel costs. Furthermore, automatic check-in

machines can be installed at airports and customers encouraged to use them, again reducing personnel costs. In addition, only 20-30% of customers of Spring Airlines make on-line reservations, with most customers (over 60%) still booking via travel agents. According to O'Connell and Williams (2005), the website booking channel of Ryanair, a LCC, takes the lion's share (77.9%) of seat reservations while in the case of Malaysia Airlines, a full service carrier, travel agents account for most reservations (50.8%). In fact, low cost airlines are forcing change through the competitive advantage of online distribution. Spring Airlines thus should strengthen its online reservation system. The online reservation ratio will increase as the percentage of the Chinese population with personal computers rises.

To further investigate the differences of IPA evaluation results between LCC and full service carriers (FSC), another IPA evaluation result conducted by Feng and Jeng (2005) is compared in Table 5. Feng and Jeng (2005) also employed traditional IPA method to investigate service quality of a FSC in Taiwan market. Interestingly, although two studies were separately conducted in two different markets, six of nine attributes are located in the same quadrant. However, three attributes, Seat reservation, Baggage delivery and Complaint response are rather differently evaluated, explaining the dissimilarity of service quality of LCC and FSC.

Table 5 Comparisons of traditional IPA evaluation results of LCC and FSC

Attributes	LCC (This study)	FSC (Feng and Jeng, 2005)
Seat reservation	<i>Possible Overkill</i>	<i>Keep Up the Good Work</i>
Ground service	<i>Possible Overkill</i>	<i>Possible Overkill</i>
Cabin facility	<i>Low Priority</i>	<i>Low Priority</i>
Meal service	<i>Low Priority</i>	<i>Low Priority</i>
Cabin service	<i>Possible Overkill</i>	<i>Possible Overkill</i>
Baggage delivery	<i>Keep Up the Good Work</i>	<i>Possible Overkill</i>
Complaint response	<i>Concentrate Here</i>	<i>Possible Overkill</i>
Flight on-time	<i>Concentrate Here</i>	<i>Concentrate Here</i>
Flight safety	<i>Keep Up the Good Work</i>	<i>Keep Up the Good Work</i>

#### 4.2 Results of PCM

The implicit importance of each service attribute was obtained by performing natural logarithmic partial correlation analysis as mentioned in Section 2.2. Table 6 compares the importance measures of IPA and PCM. Note that the ranking of importance directly answered by passengers (*i.e.* IPA importance) significantly differ from that of the importance implicitly derived by PCM (*i.e.* PCM importance), suggesting that the customer overall satisfaction does not closely and directly reflect the importance expressed by passengers. By examining IPA and PCM importance rankings, the IPA importance ranking is more coincided with prior knowledge regarding the passenger satisfaction to air service of full service carriers. Safety and punctuality are always the top two essential attributes. However, in association with overall satisfaction, it is interesting to note that the importance of these two attributes is ranked medium to low. In contrast, Complaint response and Meal service are the two most important attributes, suggesting that to properly respond to customer complaints is extremely imperial, which has also been acknowledged by the traditional IPA model. Surprisingly, LCC

does not provide free meal service, but only provide a bottle of water and optional paid meal. Passengers must clearly know the service provided by Spring Airline very well, because 77% of them fly with the Airline more than 10 times a year. However, the PCM importance indicates that the low satisfaction of this attribute will remarkably deteriorate overall satisfaction. To increase overall satisfaction, Spring Airlines may consider providing more free meal service, such as sandwich or dessert, or more options of paid meal at a lower price.

Table 6 Results of Traditional IPA and PCM

Attributes	Perceived service	Expected service	Rank	Implicitly derived importance	Rank
Seat reservation	3.87	4.37	8	0.48	6
Ground service	3.89	4.38	7	0.54	3
Cabin facility	3.75	4.41	6	0.46	8
Meal service	3.72	4.29	9	0.56	2
Cabin service	3.96	4.45	5	0.49	4
Baggage delivery	3.90	4.50	4	0.49	5
Complaint response	3.76	4.54	3	0.56	1
Flight on-time	3.76	4.68	2	0.35	9
Flight safety	3.87	4.83	1	0.48	6

With the implicitly derived importance and satisfaction performance, the nine LCC service attributes were plotted on the revised IPA diagram as depicted in Figure 3. Note that Complaint response and Meal service were located in the *Concentrate Here* quadrant – perceived to be important, but performed poorly. Three attributes -- Ground service, Cabin service and Baggage delivery, were situated in the *Keep up the Good Work* quadrant, suggesting that passengers comparatively satisfied with these service attributes delivered by Spring Airlines. Two attributes -- Cabin facility and Flight on-time, were loaded in the *Low Priority* quadrant. Although these attributes performed below average, they were considered not very important to the respondents. Two attributes -- Seat reservation and Flight safety, were identified in the *Possible overskill* quadrant that was rated as having low importance and high performance.

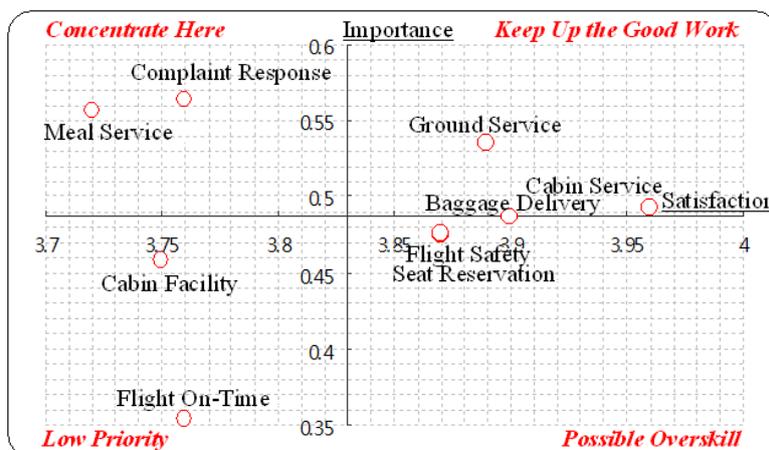


Figure 3 PCM evaluation map

### 4.3 Results of DRM

Table 7 presents the results of DRM. Note that only Seat reservation and Cabin facility are classified as basic factor, a must-be factor. If the quality of these two attributes is low will remarkably decrease customer satisfaction, but overfill the quality won't enhance customer satisfaction. Other seven attributes are classified as indifference factor due to the insignificance of attributes to overall satisfaction, suggesting that passengers don't pay much attention to the service quality of these attributes. Such findings are rather different from related studies and our anticipation. The insignificance of the attributes might be caused by the smoothing effect by aggregating different types of customers together. Based on this, the DRM is further applied to the service quality analysis for the customers with various journey purposes.

Table 7 Attribute classifications for overall passengers

Attributes	$\beta_1$	$\beta_2$	(I <sub>1</sub> , I <sub>2</sub> )	Classification
Seat reservation	0.010	-0.060*	(0,1)	Basic factor
Ground service	0.012	-0.049	(0,0)	Indifference factor
Cabin facility	0.035	-0.077**	(0,1)	Basic factor
Meal service	0.002	-0.046	(0,0)	Indifference factor
Cabin service	0.110	-0.005	(0,0)	Indifference factor
Baggage delivery	0.050	-0.029	(0,0)	Indifference factor
Complaint response	0.230	-0.045	(0,0)	Indifference factor
Flight on-time	0.130	-0.110	(0,0)	Indifference factor
Flight safety	0.004	-0.310	(0,0)	Indifference factor

Note: \* indicates p-value < 0.1; \*\* indicate p-value < 0.05; \*\*\* indicates p-value < 0.01.

Table 8 gives the results of DRM for passengers with various journey purposes. Note that the passengers on business or visit & home trips tend to view all nine attributes as performance factor; while the passengers on tourism trip rate four attributes – Seat reservation, Ground service, Cabin facility, and Baggage delivery as excitement factors and other five attributes – Meal service, Cabin service, Complaint response, Flight on-time and Flight safety, as performance factors. The results are very different to those for overall passengers, suggesting the necessity of the separated analysis. According to Table 8, Spring Airlines should propose two sets of marketing strategies, one for the passengers on business and visit & home trips and one for the passengers on tourism trips. For the former passengers, all attributes are identified as performance factors which should be improved continually. For the latter passengers, four attributes classified as excitement factors which can be improved to increase overall satisfaction but low satisfaction of these attributes won't decrease overall satisfaction.

Table 8 Attribute classifications for passengers with various journey purposes

Journey purposes	Attributes	$\beta_1$	$\beta_2$	(I <sub>1</sub> , I <sub>2</sub> )	Classification
Business	Seat reservation	0.455***	-0.188***	(1,1)	Performance factor
	Ground service	0.379***	-0.236***	(1,1)	Performance factor
	Cabin facility	0.391***	-0.111**	(1,1)	Performance factor
	Meal service	0.507***	-0.170***	(1,1)	Performance factor
	Cabin service	0.492***	-0.192***	(1,1)	Performance factor
	Baggage delivery	0.482***	-0.357***	(1,1)	Performance factor
	Complaint response	0.346***	-0.151***	(1,1)	Performance factor
	Flight on-time	0.335***	-0.160***	(1,1)	Performance factor
	Flight safety	0.452***	-0.255***	(1,1)	Performance factor
Tourism	Seat reservation	0.369***	-0.116	(1,0)	Excitement factor
	Ground service	0.396***	-0.105	(1,0)	Excitement factor
	Cabin facility	0.373***	-0.012	(1,0)	Excitement factor
	Meal service	0.414***	-0.147***	(1,1)	Performance factor
	Cabin service	0.343***	-0.142***	(1,1)	Performance factor
	Baggage delivery	0.351***	-0.082	(1,0)	Excitement factor
	Complaint response	0.505***	-0.276***	(1,1)	Performance factor
	Flight on-time	0.379***	-0.221***	(1,1)	Performance factor
	Flight safety	0.393***	-0.208***	(1,1)	Performance factor
Visiting & Home	Seat reservation	0.504***	-0.294***	(1,1)	Performance factor
	Ground service	0.516***	-0.291***	(1,1)	Performance factor
	Cabin facility	0.495***	-0.277***	(1,1)	Performance factor
	Meal service	0.432***	-0.208***	(1,1)	Performance factor
	Cabin service	0.485***	-0.242***	(1,1)	Performance factor
	Baggage delivery	0.519***	-0.260***	(1,1)	Performance factor
	Complaint response	0.525***	-0.294***	(1,1)	Performance factor
	Flight on-time	0.426***	-0.144***	(1,1)	Performance factor
	Flight safety	0.497***	-0.243***	(1,1)	Performance factor

Note: \* indicates p-value < 0.1; \*\* indicate p-value < 0.05; \*\*\* indicates p-value < 0.01.

#### 4.4 Discussions

From the methodological aspect, three IPA methods adopted in this study are rather different. Unsurprisingly, their evaluation results are also different as shown in Table 9. Noted from Table 9, the results of DRM method fail to identify key improvement attributes due to the smoothing effect. However, the DRM method can provide more improvement suggestions based on the segmentation on journey purposes. Although the evaluation results of the IPA and PCM methods are not consistent and even contractive, by taking a more conservative point-of-view for service quality enhancement, this study suggests the airline focusing on the improvement of the attributes which are identified in the *Concentrate Here* quadrant by either IPA or PCM, including Meal service, Complaint response, and Flight on-time and removing resources from the attributes which are located in the quadrants of *Possible Overkill* and *Low Priority* by both IPA and PCM, including Seat reservation and Cabin facility.

Table 9 Comparisons among the evaluation results of three IPA methods

Attributes	IPA	PCM	DRM
Seat reservation	<i>Possible Overkill</i>	<i>Possible Overkill</i>	<i>Basic factor</i>
Ground service	<i>Possible Overkill</i>	<i>Keep Up the Good Work</i>	<i>Indifference factor</i>
Cabin facility	<i>Possible Overkill</i>	<i>Low Priority</i>	<i>Basic factor</i>
Meal service	<i>Low Priority</i>	<i>Concentrate Here</i>	<i>Indifference factor</i>
Cabin service	<i>Low Priority</i>	<i>Keep Up the Good Work</i>	<i>Indifference factor</i>
Baggage delivery	<i>Keep up the Good Work</i>	<i>Keep Up the Good Work</i>	<i>Indifference factor</i>
Complaint response	<i>Concentrate Here</i>	<i>Concentrate Here</i>	<i>Indifference factor</i>
Flight on-time	<i>Concentrate Here</i>	<i>Low Priority</i>	<i>Indifference factor</i>
Flight safety	<i>Keep up the Good Work</i>	<i>Possible Overkill</i>	<i>Indifference factor</i>

## 6. CONCLUDING REMARKS

This study aims to empirically investigate customer satisfaction in China LCC market. The late introduction of the LCC business model to China market explains little related researches which can be found. The IPA method is a widely used analytical technique that can assist practitioners in prioritizing customer attributes when enhancing service quality and customer satisfaction and is suitable to accomplish the research purpose of this study. However, several drawbacks of IPA have been identified. Therefore, numerous revised IPA methods have been proposed. To remedy the drawbacks, two revised IPA methods, namely PCM and DRM models are also adopted. The top-priority attributes to be improved suggested by IPA are Flight on-time and Complaint response, while those suggested by PCM are Complaint response and Meal service. Although the evaluation results of the IPA and PCM methods are not consistent and even contractive, by taking a more conservative point-of-view for service quality enhancement, this study suggests the airline focusing on the improvement of the attributes which are identified in the *Concentrate Here* quadrant by either IPA or PCM, including Meal service, Complaint response, and Flight on-time and removing resources from the attributes which are located in the quadrants of *Possible Overkill* and *Low Priority* by both IPA and PCM, including Seat reservation and Cabin facility.

As to the results of DRM, due to the smoothing effect, two attributes (Seat reservation and Cabin facility) are identified as basic factors and rest attributes are identified as indifference factors. The results are quite not anticipated. To gain in-depth investigations, analysis was conducted on the passengers with various journey purposes. As a result, the passengers on business or visit & home trips view all nine attributes as performance factor; while the passengers on tourism trip rate four attributes – Seat reservation, Ground service, Cabin facility, and Baggage delivery as excitement factors and five attributes – Meal service, Cabin service, Complaint response, Flight on-time and Flight safety, as performance factors, suggesting the necessity of the separated analysis.

Some directions for future research are identified. First, the evaluation results obtained from various IPA methods – traditional IPA and two revised IPA (PCM and DRM) are rather different and even mutually contractive. It is worthy to develop an integrated method to

synthesize the results for proposing consistent improvement strategies. Second, to simplify the analysis, a total of 21 service items in the questionnaire based on the PZB model (Parasuraman *et al.*, 1985; Parasuraman *et al.*, 1988) are first averagely aggregated to represent the nine service attributes. It is might be one of reasons that most of factors are identified as performance factor by DRM model for the passengers with various journey purposes. The evaluation directly on these individual service items can be further explored. Last but not least, discrepancy in service quality evaluation of LCC and FSC is examined by simply comparing our evaluation results to those of other two studies. The discrepancy may come from the different questionnaire designs and survey methods. Therefore, it deserves to compare the service quality of these two kinds of air service business models under a consistent questionnaire survey plan. Similarly, it is also interesting to compare service quality of China LCC with that of LCC in other countries.

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