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Service quality effects on air passenger intentions: a service chain perspective

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This study divides entire airline services into eight service stages and uses a second-order confirmatory factor analysis (CFA) to constitute service quality and to examine the causal relationships between two consecutive service stages from a service chain perspective. Two conceptual frameworks – overall framework and service chain framework are proposed. The former incorporates the constructs of service quality, sacrifice, servicescape, service value, satisfaction, switching barriers, and behavioural intentions combined with seven hypothetical causal relationships. The latter depicts seven hypothetical causal relationships between two consecutive service stages. The proposed models are validated by a case study of Spring Airlines, a low-cost carrier (LCC) based in China. The empirical results support all hypotheses except hypothesis 7 that service quality positively impacts behavioural intentions. Notably, test results for the interrelationships between two consecutive service stages suggest that a lack of satisfaction at a specific service stage will affect customer perception of the consequent service stage. Therefore, to improve the service quality for a service stage, the service quality of all upstream service stages must be improved first. This study also found that service quality has a large effect although not direct on behavioural intentions while sacrifice has the smallest effect. A low-fare strategy may not be effective when an airline fails to deliver high-quality service.

Keywords: service quality; service chain; low-cost carrier; structural equation model

1. Introduction

To develop strategies for increasing passenger patronage, many airlines worldwide have attempted to identify factors that significantly increase the re-purchase and recommendation intentions of their passengers. Numerous studies have administered surveyed airline passenger by questionnaire and have used various statistical methods, including descriptive statistics and tests (e.g. Gilbert and Wong 2003, O'Connell and Williams 2005), the disaggregate choice model (e.g. Rose *et al*. 2005, Hess 2007), importance-performance analysis (e.g. Tam and Lam 2004, Chen and Chang 2005, Gursoy *et al*. 2005), factor analysis (e.g. Aksoy *et al*. 2003, Liou and Tzeng 2007), and structural equation modelling (SEM) (e.g. Park *et al*. 2004, Chang and Chen 2007, 2008, Park 2007, Chen 2008, Jou *et al*. 2008, Tam *et al*. 2010) for in-depth analysis of contributing factors in

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behavioural intentions. The SEM method is generally considered as one of the best integrated strategic methods for measuring latent influential factors (constructs) and then assesses the structural relationships among these constructs.

Previous studies have used SEM to identify many constructs considered key factors in the behavioural intentions of air passengers. For example, most studies consider the effects of service quality, service value, airline image and switching barriers on air passenger behavioural intentions (e.g. Park *et al*. 2004, Park 2007, Chen 2008). However, sacrifice and servicescape, which are widely believed to be key factors in customer behavioural intentions, are seldom considered in the context of airline service. Undoubtedly, the more factors are considered, the longer questionnaire is required and the fewer returned questionnaires are expected. It might be one of the main reasons that some studies only consider part of factors. Toward the completeness of the conceptual framework, all important factors affecting behavioural intentions should be considered.

Furthermore, service quality has been identified as the most decisive factor affecting the behavioural intentions of customers. However, most studies directly measure service quality based on various observed variables without further investigating the interrelationships among the variables. However, unlike other short-range transport services, such as bus, taxi, rail and subway, airline service usually involves a much more complex service procedure. In the airline service context, service is typically delivered in the following sequence: seat reservation, ground service, flight operation, cabin facilities, meal service, cabin service, baggage delivery and complaint response. Customer satisfaction in one service stage may affect that in later stages. For an in-depth analysis of service quality, a second-order confirmatory factor analysis (CFA) was performed to develop a model for measuring service quality from a service chain perspective.

Accordingly, the main purposes of this article are twofold. The first is to propose and validate a conceptual framework incorporating the constructs of service quality, sacrifice, servicescape, service value, satisfaction, switching barriers and behavioural intentions. Additionally, to account for the service process characteristics of the airline and to provide a detailed analysis of the interrelationship between two sequential service stages, this study divides overall airline services into eight service stages and uses a second-order CFA to constitute the service quality and then develop a separated service chain framework to examine the interrelationships between two consecutive stages. The remainder of this article is organised as follows. Section 2 briefly introduces the conceptual background of the proposed hypothetical model and theoretical background of the adopted method. Section 3 then describes the questionnaire and survey design and the survey respondent profiles. Next, Section 4 presents empirically estimated results and the corresponding policy implications. Finally, Section 5 draws conclusions and recommends future research.

2. Hypothetical model and estimation method

The conceptual background of the hypothetical model along with postulated cause-and-effect relationships is first given below. The estimation method adopted in this study is then introduced.

2.1. *Hypothetical model*

Previous studies (e.g. Park *et al.* 2004, Park 2007, Chen 2008) typically assume that four constructs, service quality, service value, satisfaction, and sacrifice, directly or indirectly influence behavioural intentions. Moreover, studies by Jones *et al.* (2000), Hightower *et al.* (2002) and Sureshchandar *et al.* (2002) determined that two constructs, servicescape and switching barriers, significantly affect behavioural intentions. The underlying theory of these relationships is described below.

The first two hypotheses in the conceptual model define the determinants of service value. Generally, service value is the quality of service received after making a sacrifice. Zeithaml (1988) defined this relationship as 'get *versus* give', and Grewal *et al.* (1998) defined it as 'net gain.' Sacrifice refers to what is given to acquire a service, including monetary prices, such as ticket cost, and nonmonetary prices, such as time, search and psychological costs (Zeithaml 1988, Dodds *et al.* 1991). Parasuraman *et al.* (1988) characterised service quality as the relative excellence or superiority of a received service. Similarly, Grewal *et al.* (1998) indicated that service value is the net perceived value transactional or economic cost (Lee and Cunningham 2001). An unacceptable price yields little or no net perceived value. If the perceived benefit is high, perceived value is likely to be high (Dodds *et al.* 1991). This theoretical concept yields the first two hypotheses:

Hypothesis 1: Sacrifice positively impacts service value.

Hypothesis 2: Service quality positively impacts service value.

The next two hypotheses are related to the determinants of satisfaction. Satisfaction is an emotion-based feeling, a degree of pleasure and contentment, and a distance between performance and service expectations (Dick and Basu 1994, Bloemer and Kasper 1995, Fornell *et al.* 1996, Andreassen and Lindestad 1998, Cronin *et al.* 2000). Satisfied customers are more likely to repurchase, and greater levels of repurchase result in increased sales and market share for firms. Satisfied customers also have higher price tolerance compared to unsatisfied customers, and they tend to view switching to a competitor as an unattractive option (Fornell *et al.* 1996). Service value and service quality have been identified as important factors associated with satisfaction (Dodds *et al.* 1991, Gronroos 1997, Woodruff 1997, Cronin *et al.* 2000, Petrick and Backman 2002). This study therefore postulated the following two hypotheses:

Hypothesis 3: Service quality positively impacts satisfaction.

Hypothesis 4: Service value positively impacts satisfaction.

Services are produced and consumed simultaneously in a physical environment or 'servicescape' created and controlled by a service organisation. The three components of a servicescape, which is considered a package of services, are ambient conditions, spatial layout, and decoration and orientation signals (Bitner 1992). Conventionally, servicescape is not considered as important as price and advertising when determining corporate policy. However, given the importance of corporate image in the current era, several researchers have underlined the very influential role of servicescape in the process of managing corporate image (Bitner 1990, Clarke and Schmidt 1995). With improved understanding of the effects of servicescape on the purchase decision making processes of their customers, practitioners can adjust their marketing plans to achieve a sustainable advantage over their competition. After investigating and validating the significant effects of servicescape on service quality, Hightower *et al*. (2002) and Sureshchandar *et al*. (2002) proposed the following hypothesis.

Hypothesis 5: Servicescape positively impacts service quality.

Four constructs, service quality, service value, satisfaction and switching barriers, are considered the most influential factors in behavioural intentions. Undoubtedly, service quality is the most decisive factor in the behavioural intentions of customers. Customers who receive high-quality services are likely to have increased intentions to repurchase the brand (Parasuraman *et al*. 1985). Many researchers have suggested that service quality directly impacts behavioural intentions (Bitner 1990, Zeithaml 1996, Cronin *et al*. 2000, Brady *et al*. 2005). In the specific context of airline services, the important relationship between service quality and behavioural intentions has been validated by Park *et al*. (2004) and Chen (2008). Both satisfaction and service value have also been identified as direct antecedents of behavioural intentions (Cronin *et al*. 2000, Tam 2000, Petrick and Backman 2002). The importance of the relationships between airline service quality, satisfaction and behavioural intentions was confirmed by Ostrowski *et al*. (1993) and Sultan and Simpson (2000). Switching barriers include anything that makes changing service providers difficult or costly for customers, including hard and soft benefits provided by a firm, which are also key factors in behavioural intentions (Jones *et al*. 2000, Balabanis *et al*. 2006, Carlsson and Löfgren 2006, Chang and Chen 2007). Based on the above theoretical propositions, the following four hypotheses are postulated.

Hypothesis 6: Service value positively impacts behavioural intentions.

Hypothesis 7: Service quality positively impacts behavioural intentions.

Hypothesis 8: Satisfaction positively impacts behavioural intentions.

Hypothesis 9: Switching barriers positively impact behavioural intentions.

Compared to other construct measures, the service quality construct measure involves many more variables, including seat reservation, check-in service, on-time performance, meal service, seat comfort, in-flight service, baggage delivery, safety, and complaint response (e.g. Elliott and Roach 1993, Bowen and Headley 2000, Chen and Chang 2005, Liou and Tzeng 2007). The interrelationships among these factors cannot be investigated if they are simultaneously incorporated into the service quality construct without proper decomposition. Moreover, airline service can be viewed as a set of stages. The airline service chain starts at seat reservation and ends at complaint response. Passenger satisfaction with service process quality determines their subjective perceptions of subsequent service processes. Passengers have expectations and perceptions particular to different stages of the airline service chain (Park *et al*. 2004, Chen and Chang 2005). Thus, this study divides the entire airline service chain into the following eight stages: seat reservation, ground service, flight operation, cabin facility, meal service, cabin service, baggage delivery, and complaint response. The hypothesised interrelationships among these eight service stages were as follows.

Hypothesis 10: Seat reservation service positively impacts ground service.

Hypothesis 11: Ground service positively impacts flight operation.

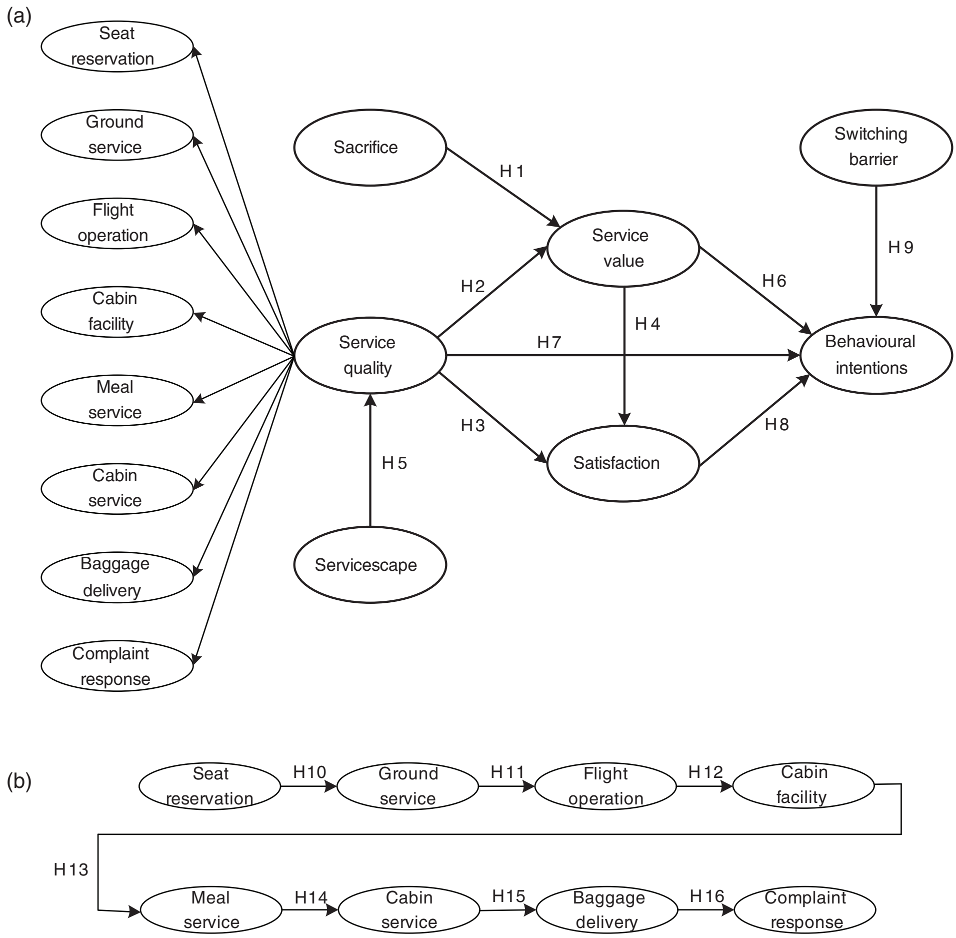

Figure 1. Conceptual models: (a) overall framework, (b) service chain framework.

Hypothesis 12: Flight operation positively impacts cabin facility.

Hypothesis 13: Cabin facility positively impacts meal service.

Hypothesis 14: Meal service positively impacts cabin service.

Hypothesis 15: Cabin service positively impacts baggage delivery.

Hypothesis 16: Baggage delivery positively impacts complaint response.

Figure 1 depicts the conceptual framework of these hypotheses. As shown in Figure 1, seven constructs are considered. Table 1 shows that studies of airline service usually use five constructs of service quality, service value, satisfaction, switching barriers, and behavioural intentions. The constructs of sacrifice and servicescape are rarely addressed. As noted above, these two constructs are important for identifying the factors affecting the behavioural intentions of airline passengers and should be incorporated into the framework.

Table 1. The constructs addressed by the related studies of airline service.

Related studies	Sacrifice	Service quality	Servicescape	Service value	Satisfaction	Switching Barriers	Behavioural intentions
Park *et al*. (2004)		✓		✓	✓		✓
Park *et al*. (2005)		✓					✓
Park *et al*. (2006a)		✓		✓			✓
Park *et al*. (2006b)		✓		✓	✓		✓
Park (2007)		✓		✓	✓	✓	✓
Yu (2007)		✓		✓	✓		
Chang and Chen (2007)						✓	
Chen (2008)		✓		✓	✓		✓
Chen and Chang (2008)						✓	✓
This study	✓	✓	✓	✓	✓	✓	✓

2.2. *Structural equation modelling (SEM)*

Since the latent variables in Figure 1 could not be measured directly, some surrogate indicators were measured using appropriate techniques to represent latent variables when analysing causal relationships. The SEM approach is an effective technique for identifying latent variables and analysing their causal interrelationships since it combines the advantages of CFA and path analysis (PA), each of which can test linear causal relationships among variables and assess a hypothetical model using both manifest and latent variables. The SEM approach has several technological advantages over other statistical methods. For instance, (1) SEM can assess the significance of indicators and constructs simultaneously across models; (2) it considers all relationships among residuals when estimating measurement errors in multiple regression equations; and (3) it allows simultaneous estimation of all direct and indirect effects (Chiou and Chen 2010a, 2010b).

Using the matrix notation and formulation of Muller (1996), an SEM for observed variables was defined in the following form:

$$\eta = B\eta + \Gamma\xi + \zeta \tag{1}$$

$$x = \Lambda_x \xi + \delta \tag{2}$$

$$y = \Lambda_y \eta + \varepsilon \tag{3}$$

where Equation (1) is the structural model for latent variables (i.e. PA), and Equations (2) and (3) are the measurement models for observed variables (i.e. CFA). η is a vector of endogenous latent variables. ξ is a vector of exogenous latent variables. ζ is a vector of disturbance (errors). B is a matrix of coefficients representing the direct effects of endogenous latent variables on other latent endogenous variables. Γ is a matrix of coefficients representing the direct effects of exogenous latent variables on other endogenous latent variables. The two coefficient matrices B and Γ determine the structure of an SEM. x is a vector of exogenous observed variables. y is a vector of endogenous observed variables. Λ_x and Λ_y are factor loadings associated with x and y, respectively, representing the magnitude of expected change in the observed variables for every change in the related latent variables. ε and δ are vectors of error terms associated with x and y, respectively. In addition, a covariance matrix φ for exogenous latent variables ξ and a covariance matrix Ψ for error terms ζ can be specified. The B, Γ, φ and Ψ matrices together establish an SEM for observed variables. To construct an SEM, the model-implied covariance matrix (Σ) of observed variables can be reproduced in terms of specific values for the unknown model parameters. Inserting specific values for the unknown parameters in these functions obtains a model-implied covariance matrix. The difference between this matrix and the observed covariance matrix S is then calculated based on specified criteria. The goodness-of-fit of an SEM depends on how well its model-implied covariance matrix Σ conforms to its observed covariance matrix S (Raykov and Marcoulides 2000).

Most of the constructs in the proposed framework can be directly measured by the observed variables according to Equations (1)–(3), meaning that the covariance between measured items is explained with a single latent factor layer. However, the service quality construct is represented by the latent variables covering a whole service chain. Obviously, this construct contains two layers of latent variables and must be estimated by a second-order CFA model that first measures the service quality of each service process (first-order factor) by the corresponding observed variables; the summated scales of these service processes are then further aggregated to represent the service quality construct (second-order factor). A second-order CFA model enables analysis of causal relationships among first-order factors. Jöreskog (1974) generalised the common factor model to accommodate second-order factors:

$$\Sigma_{xx} = \Lambda_x \Phi \Lambda_x + \Theta_\delta \tag{4}$$

$$\Sigma_{yy} = \Lambda_y (\Gamma \Phi \Gamma^T + \Theta_\delta) \Lambda_y + \Theta_\varepsilon \tag{5}$$

where Σ_{xx} is the covariance matrix of exogenous variables, Σ_{yy} is the covariance matrix of endogenous variables, and Θ_δ and Θ_ε are the diagonal matrices of unique variances of first-order exogenous factors and endogenous factors, respectively. Φ is a matrix of correlations among second-order factors.

3. Questionnaire Survey

To examine the validity of the proposed hypothetical models, an empirical case study of Spring Airlines, a Chinese low cost carrier (LCC), is conducted. Spring Airlines was established in 2004 with a base at Shanghai Hongqiao International Airport. In 2007, the airline operated 28 domestic flight routes (Figure 2) with an average load factor of 97%, a daily aircraft operation time of 13 hours, and an average turnaround time of 35 min. Only one aircraft type, the 180-seat Airbus 320, was operated.

3.1. *Questionnaire design*

The first part of the five-part questionnaire collected passenger travel information, including origin and destination airports, journey purpose, flight frequency, booking channel, and reasons for flying Spring Airlines. The second part contained 21 items

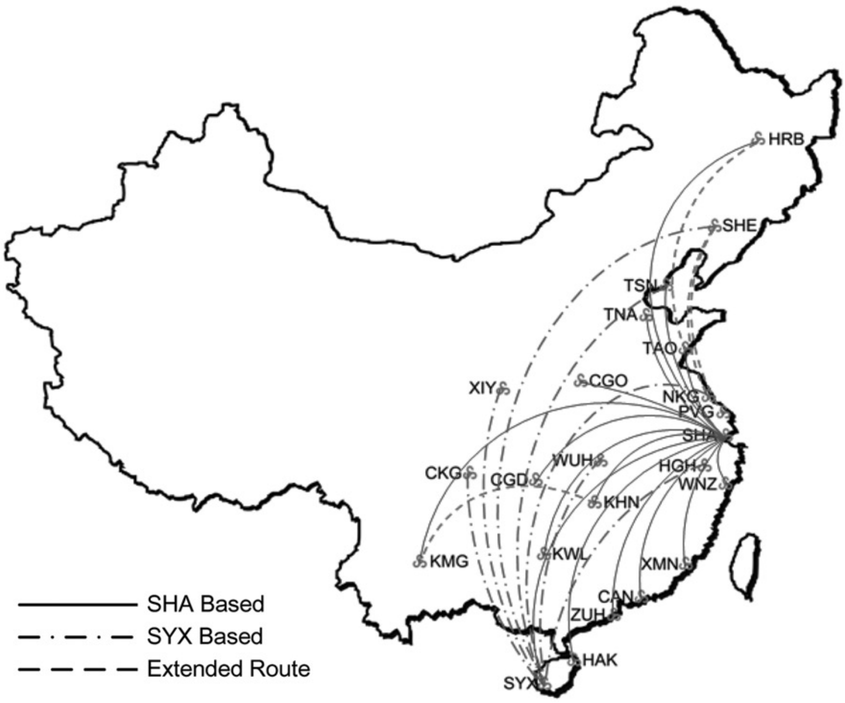

Figure 2. Domestic air routes operated by Spring Airlines.

measuring 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 members. Some questionnaire items from related studies (e.g. Park *et al.* 2004, Chen and Chang 2005) were modified for this population of LCC passengers. Moreover, according to Chen and Chang (2005), airline service can be evaluated from a process perspective (i.e. a service chain). The questionnaire used by Park *et al.* (2004) for a general evaluation of all staff was revised to collect detailed information about the sequence of services provided by specific airline crew members during embarking and disembarking. The revised questionnaire evaluated appearance and attitude of reservation staff toward customer service and timeliness of response to reservation lines (for reservation staff), appearance and attitude of check-in staff toward customer service, check-in service, ease of operating automatic check-in machines (for check-in staff), appearance and attitude of cabin crew toward customer service, clarity of broadcasting boarding instructions, clarity of cabin crew broadcasts, timeliness of response to passenger requests (for the cabin crew), appearance and attitude of baggage handling staff and efficiency and management of baggage claim service (for staff handling baggage).

Respondents rated the importance of the 21 items on a five-point Likert-type scale ranging from 1 for ‘strongly disagree’ to 5 for ‘strongly agree’. 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 sacrifice, servicescape, service value, satisfaction, switching barriers and behavioural intentions. Each perception was measured by 2–3 items. The final section collected respondent demographic data.

Sacrifice, service quality, servicescape, service value, satisfaction, switching barriers, and behavioural intentions were 'indirectly measured' by questions (Table 2). A reliability test based on Cronbach's α was used to test the consistency and reliability of these factors. All reliability values exceeded 0.7, which indicated satisfactory reliability (Hair *et al.* 1998).

3.2. *Respondent demographics*

The questionnaires were distributed to passengers by randomly selected flights and collected at the airport which Spring Airlines operates and airplane cabins during a 2-week period. The questionnaires were distributed randomly during peak and non-peak periods. Customers were asked to complete the questionnaires according to their most recent experience flying Spring Airlines and before arriving at the destination airport. However, infrequent or first-time flyers were given self-addressed stamped envelopes to mail back the completed questionnaires after the whole trip. In total, 968 valid samples were obtained. Table 3 lists respondent demographic data. Interestingly, Spring Airlines customers were roughly evenly split between males and females. Moreover, most (73.6%) customers were aged less than 40 years old, which indicated that the primary market was younger travellers. In terms of personal occupation, the customers were a highly diverse group. Most earned monthly incomes in the RMB2001–4000 range. A slightly higher percentage of respondents did not have a frequent flyer membership to Spring Airlines, compared with those with such a membership. For journey purpose, the largest segment was travelling for tourism (39.4%) followed by business (32.6%) and visiting family or friends (28%). Thus, the distribution among different journey purposes was relatively even.

4. Results

The CFA measurement models related to observed indicators of latent constructs were conducted first. Three types of goodness-of-fit indices were used to assess model performance – absolute fit measures, incremental fit measures and parsimonious fit measures. An absolute fit index was used to directly determine how well the *priori* theoretical model fit the sample data. The incremental fit index assessed the proportionate fit by comparing a target model with a more restricted, nested baseline model. The parsimonious fit measure was used to determine whether model fit was achieved by over-fitting data with excessive coefficients (Hu and Bentler 1995). Table 4 shows the goodness-of-fit indices for both measurement models. Notably, all goodness-of-fit indices for the proposed measurement models are acceptable, except for the AGFI values (0.86 for overall framework and 0.89 for service chain framework) which are slightly below 0.9, indicating a good fit of the measurement model, since some studies suggested a good fit of the model if the value AGFI exceeds 0.8 instead of 0.9 (Doll *et al.* 1994, Baumgartner and Homburg 1996, MacCallum and Hong 1997).

Table 5 presents the convergent validity of the proposed overall measurement model. The convergent validity can be represented by indices of item reliability, factor loading significance, composite reliability, and average variance extracted (Hair *et al.* 1998).

Table 2. Reliability of latent constructs with their observed indicators.

Latent construct		Observed indicator	Cronbach's α
Service quality (SQ)	Seat reservation (SR)	SR1: I feel the reservation lines are easily connected.	0.835
		SR2: I feel the reservation and ticketing channels are designed with a wide choice.	
		SR3: I feel the reservation staffs are friendly.	
	Ground service (GS)	GS1: I feel the ticketing and check-in services are quick and correct.	0.872
		GS2: I feel the automatic check-in machines are easily-operated.	
		GS3: I feel the boarding broadcasting and staffs' instructions are clear.	
		GS4: I feel the check-in staffs are friendly.	
	Flight operation (FO)	FO1: I feel the flights always depart and arrive as scheduled.	0.735
		FO2: I feel the flight safety is good.	
	Cabin facility (CF)	CF1: I feel the cabin environment is clean.	0.729
		CF2: I feel the passenger seats are comfortable.	
		CF3: I feel the marks and signs are clear and easy to understand.	
	Meal service (MS)	MS1: I feel I am satisfied with the service of spring water offered.	0.819
		MS2: I feel the price of foods and drinks is reasonable.	
		MS3: I feel the meals are served with a wide choice.	
	Cabin service (CS)	CS1: I feel the cabin crews are friendly and the broadcasting is easy to understand.	0.785
		CS2: I feel the cabin crews are friendly.	
	Baggage delivery (BD)	BD1: I feel the baggage claim service is quick and well-managed.	0.831

(*continued*)

Table 2. Continued.

Latent construct	Observed indicator	Cronbach's α
	BD2: I feel the baggage-handling staffs are friendly.	
Complaint response (CR)	CR1: I feel the passengers' complaints are appropriately responded.	0.842
	CR2: I feel passengers' requests are quickly responded.	
Sacrifice (SF)	SF1: I feel the ticket price is reasonable.	0.800
	SF2: I am satisfied with the reimbursement and ways for flight delay or cancellation.	
	SF3: I am satisfied with the reimbursement and ways for luggage delay or loss.	
Servicescape (SS)	SS1: I feel I don't need to wait a long time to buy a ticket at the service places of the airline.	0.726
	SS2: I feel the service places of the airline are widely-located and satisfy my needs.	
	SS3: I feel the business hours of the service places of the airline can satisfy my needs.	
Service value (SV)	SV1: I feel the service is acceptable at this ticket price.	0.742
	SV2: I feel the airline offers more valuable services than other airline companies.	
	SV3: I feel the service is valuable at this ticket price.	
Satisfaction (ST)	ST1: As a whole, I am satisfied with the services of the airline.	0.848
	ST2: I feel satisfied with the experience flying with the airline.	
Switching barriers (SB)	SB1: I feel the cost flying with other airlines is very high.	0.734
	SB2: I feel other airlines cannot provide better service to satisfy my needs.	
Behavioural intentions (BI)	BI1: I am willing to fly with the airline for the same flight route next time.	0.862
	BI2: I am willing to recommend the airline to someone else.	

Table 3. Breakdown of respondents' demography.

Characteristics	Number of respondents	Percentage
Gender		
Male	512	52.1
Female	456	47.9
Age		
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
Occupation		
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
Education		
Primary or below	46	4.8
High school	261	27.0
University	577	59.6
Master or above	84	8.7
Monthly income (RMB)		
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
Frequent flyer membership		
Member	472	48.8
Nonmember	496	51.2
Journey purpose		
Business	316	32.6
Tourism	381	39.4
Visiting/Home	271	28.0

Note: 6.849 China RMB was equivalent to $1 USD as of October, 2009.

The recommended cutoffs for these indices are standardised loadings exceeding 0.4, composite reliability exceeding 0.7, and average variance extracted exceeding 0.5. All indices were acceptable, indicating good convergent validity of the proposed model (Table 5).

Figure 3 shows the estimated structural models for both overall framework and service chain framework. Notably, except for hypothesis 7, all other hypotheses were validated. As hypothesised, causal relationships within the service chain exist, suggesting that a low

Table 4. Goodness-of-fit indices for the proposed measurement models.

	Absolute fit measures				Incremental fit measures				Parsimonious fit measures	
Models	χ^2/df	GFI	RMR	RMSEA	AGFI	NFI	NNFI	CFI	PGFI	PNFI
Cutoffs	<5.00	>0.90	<0.05	<0.08	>0.90	>0.90	>0.90	>0.90	>0.50	>0.50
Overall framework	4.42	0.91	0.04	0.06	0.86	0.90	0.91	0.91	0.75	0.81
Service chain framework	4.56	0.90	0.03	0.07	0.88	0.91	0.91	0.92	0.70	0.78

Notes: χ^2 = Chi-square; df = degrees of freedom; GFI = goodness-of-fit index; RMR = root mean residual; RMSEA = root mean square error of approximation; AGFI = adjusted goodness-of-fit index; NFI = normed fit index; NNFI = non-normed fit index; CFI = comparative fit index; PGFI = parsimonious goodness-of-fit index; PNFI = parsimonious normed fit index. Although both GFI and AGFI are sensitive to sample size, GFI can be thought of as being roughly analogous to the multiple R-square in multiple regression, it is generally considered as one of important model fit indices (e.g. Bagozzi and Yi 1988, Bentler 1990, 1992, Jöreskog and Sörbom 1992). As to AGFI, it is based on a correction of GFI for the number of degrees of freedom in a less restricted model obtained by freeing more parameters. Accordingly, both GFI and AGFI are still reported. Additionally, three additional fit measures that do not suffer from this weakness are used to respectively represent the model absolute fit (χ^2/df, RMR, RMSEA) and incremental fit (NFI, NNFI, CFI).

Table 5. Convergent validity of the proposed measurement model.

Latent construct		Observed indicator	Factor loading		Standardized loading		*t*-value		Composite reliability		Average variance extracted	
Service quality (SQ)	Seat reservation (SR)	SR1	1.000	1.000	0.864	0.777	–	–	0.985	0.905	0.894	0.760
		SR2		0.971		0.794		25.065				
		SR3		1.040		0.806		25.459				
	Ground service (GS)	GS1	1.030	1.000	0.916	0.784	21.083	–		0.926		0.759
		GS2		1.016		0.787		26.151				
		GS3		1.090		0.821		27.557				
		GS4		1.070		0.784		26.042				
	Flight operation (FO)	FO1	0.977	1.000	0.828	0.700	17.003	–		0.819		0.695
		FO2		1.051		0.838		20.558				
	Cabin facility (CF)	CF1	1.109	1.000	0.921	0.773	20.666	–		0.838		0.639
		CF2		0.628		0.530		15.909				
		CF3		0.918		0.762		23.630				
	Meal service (MS)	MS1	0.919	1.000	0.815	0.717	17.868	–		0.878		0.707
		MS2		1.202		0.814		22.843				
		MS3		1.170		0.809		22.730				
	Cabin service (CS)	CS1	1.067	1.000	0.878	0.792	20.165	–		0.875		0.779
		CS2		0.925		0.821		25.358				
	Baggage delivery (BD)	BD1	1.111	1.000	0.885	0.849	21.690	–		0.897		0.814

(*continued*)

Table 5. Continued.

Latent construct	Observed indicator	Factor loading	Standardized loading	*t*-value	Composite reliability	Average variance extracted
	BD2	1.021	0.837	29.439		
Complaint response (CR)	CR1	1.126 1.000	0.830 0.849	20.421 –	0.898	0.815
	CR2	0.968	0.858	28.849		
	SF1					
Sacrifice (SF)		1.000	0.487	–	0.877	0.718
	SF2	1.898	0.908	15.739		
	SF3	1.947	0.918	15.724		
Servicescape (SS)	SS1	1.000	0.416	–	0.773	0.550
	SS2	1.048	0.820	12.446		
	SS3	0.983	0.804	12.389		
Service value (SV)	SV1	1.000	0.785	–	0.870	0.691
	SV2	0.996	0.790	24.083		
	SV3	0.942	0.723	22.034		
Satisfaction (ST)	ST1	1.000	0.414	–	0.708	0.543
	ST2	0.909	0.801	10.936		
Switching barriers (SB)	SB1	1.000	0.788	–	0.842	0.727
	SB2	1.179	0.847	21.264		
Behavioral intentions (BI)	BI1	1.000	0.884	–	0.921	0.854
	BI2	1.000	0.908	34.550		

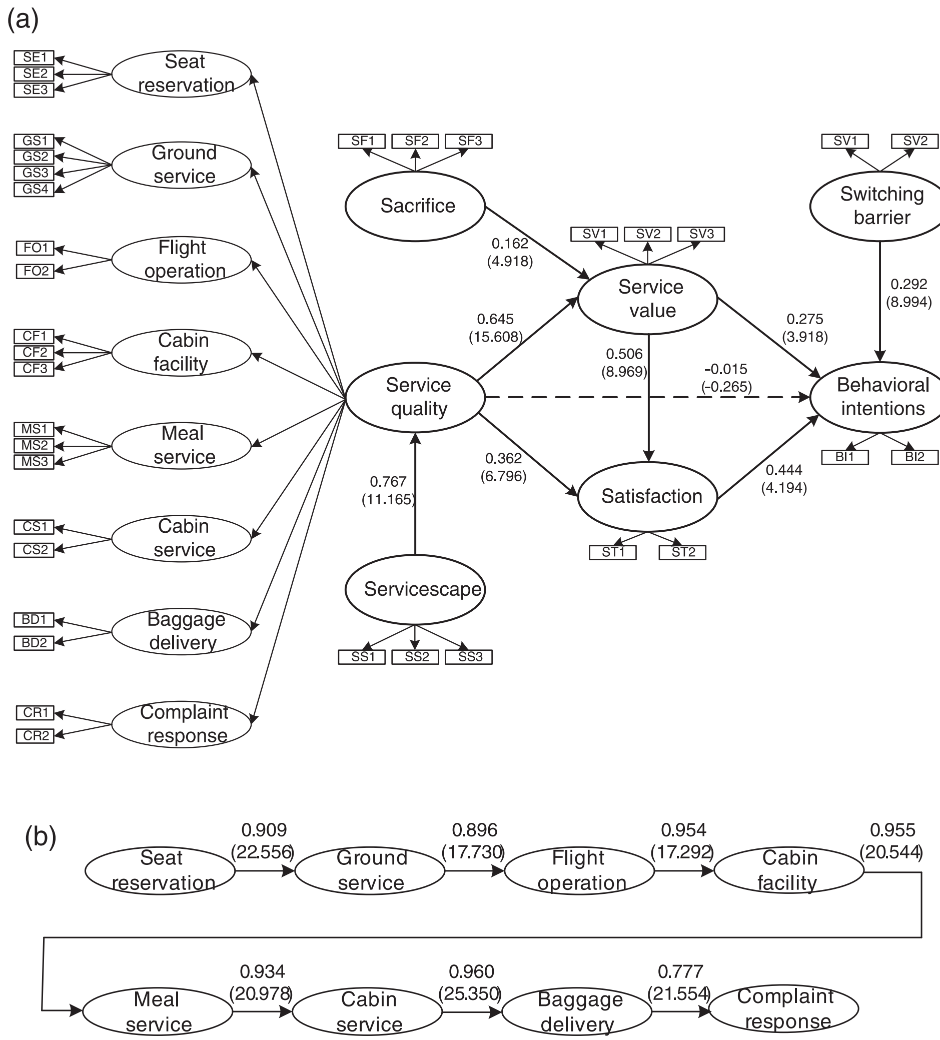

Figure 3. Estimated results of the structural models (*t*-values in parentheses). (a) Overall framework and (b) service chain framework.

evaluation of a specific service process will affect a subsequent service process. In this case, an airline must ensure the quality of each service process. Most importantly, a service process cannot be improved until the quality of all upstream service processes has been enhanced. It should be noted that if the sequence of the service stages is arbitrarily re-shuffled, the hypotheses (H10–H16) would not to be all significantly tested, suggesting the existence of the service chain.

Although service quality does not have a significant and direct effect on behavioural intentions, a strong indirect effect on behavioural intentions is mediated by service value and satisfaction, suggesting the importance of service quality, even in the context for LCC. Satisfaction had a significant, positive, and direct effect on behavioural intentions.

Table 6. Total effects of latent constructs on behavioural intentions.

Causal path	Direct effect	Indirect effect	Total effect
Sacrifice → behavioural intentions	–	0.081	0.081
Service quality → behavioural intentions	–	0.483	0.483
Servicescape → behavioural intentions	–	0.359	0.359
Service value → behavioural intentions	0.275	0.225	0.500
Satisfaction → behavioural intentions	0.444	–	0.444
Switching barriers → behavioural intentions	0.292	–	0.292

Servicescape had a significant, positive, and large effect on service quality, implying that the layout and decoration of the check-in and waiting areas affect passenger evaluations of airline service quality. To create a good reputation and image, an airline should enhance its servicescape. Sacrifice significantly and positively affected service value, which is consistent with Brady *et al.* (2005). Reducing the flight fee (e.g. ticket cost) increases perceived service value. The effects of service value on behavioural intentions were both direct and indirect and were mediated by satisfaction. Again, service value, which is the net perceived value between the benefit of service quality and the sacrifice, affects the behavioural intentions of passengers. This causal path has been validated in the Chinese LCC industry. In this study, satisfaction significantly and positively affected behavioural intentions, which is consistent with the literature. Finally, switching barriers have significant and positive effects on behavioural intentions.

Table 6 lists the total effects, including direct and indirect effects, of all influential constructs on behavioural intentions. The empirical results show that service value has the largest effect (0.500) on behavioural intentions followed by service quality and satisfaction (0.483 and 0.444, respectively). Sacrifice has the smallest effect on behavioural intentions (0.081). Such a result runs counter to the stereotypical image of LCC passengers willing to accept reduced service quality for a low ticket price. In fact, service quality remains as the decisive factor affecting passenger behavioural intentions; this finding is in agreement with the results of other empirical studies of full-service carriers (e.g. Park 2005). Surprisingly, sacrifice only marginally affected behavioural intentions, suggesting that a low-price marketing strategy may not be the best route to increasing patronage.

5. Conclusions

To acknowledge service process characteristics of airlines and for in-depth analysis of the interrelationships between two sequential service stages, this study divides entire airline services into eight service stages and uses a second-order CFA to constitute the service quality and then to examine the causal relationships between two consecutive service stages from a service chain perspective. Two conceptual frameworks – overall framework and service chain framework are proposed. The former incorporates the constructs of service quality, sacrifice, servicescape, service value, satisfaction, switching barriers, and behavioural intentions combined with seven hypothetical causal relationships. The latter depicts seven hypothetical causal relationships between two consecutive service stages.

To validate the proposed models, a case study of a Chinese LCC, Spring Airlines, are conducted. Empirical results show that all hypotheses are successfully supported, except for hypothesis 7. Notably, test results for the interrelationships between two consecutive service stages suggested that low satisfaction at a specific service stage affects customer satisfaction in subsequent service stages. Therefore, service quality for a service stage cannot be improved until the service quality of all upstream service stages has been enhanced. This study also found that service quality has the second largest effect on behavioural intentions while sacrifice has the smallest effect. This finding runs counter to the stereotypical image of LCC passengers favouring low ticket prices at the expense of service quality. A low-fare strategy may be ineffective for airlines that cannot deliver high-quality service.

Some proposed directions for future studies are as follows. First, to simplify the interrelationships among service quality in the eight service stages, this study only examined the relationships between two sequential service stages. Relatively more complex interactions among these service stages should be further investigated. Second, the proposed conceptual model was only validated in a Chinese LCC. Case studies of other airlines (including LCCs and full service airlines) and other industries with clearly defined service stages should be performed. For example, the model can be applied to evaluate hotel service with a service chain of room reservation, parking/picking-up service, check-in, luggage service, room facilities, and recreation facilities. Lastly, to develop detailed and effective LCC marketing strategies, decision-making processes can be compared among passengers with different journey purposes.

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