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A Comparative Analysis of Three Major Transfer Airports in Northeast Asia Focusing on Incheon International Airport Using a Conjoint Analysis

Tae Won CHUNG^a, Yong Joo LEE^b, Hyun Mi JANG^c

^a Associate Professor, Sungkyul University, Korea, E-mail: logichung@sungkyul.ac.kr (First Author)

^b Associate professor, Central Washington University, WA, USA, E-mail: yongjoo.lee@cwu.edu (Corresponding Author)

^c Research Fellow, Korea Maritime Institute y, Korea, E-mail: jangh@kmi.re.kr

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ABSTRACT

Due mainly to the privatization and commercialization of airline companies and deregulation of the aviation rules, the demand for air transport has continuously been increasing. Airport authorities state that transfer passengers, who contribute to the large portion of the airports' profits, are gaining much more importance, particularly in the Northeast Asia region where the air transport industry is very vital. Therefore, this study aims to investigate the competitiveness of IIA (Incheon International Airport) with other major airports located in Northeast Asia in passenger transfers made between Southeast Asia and China to North America using Conjoint Analysis. Results have indicated that airport brand is the most important attribute for the competitiveness of airport, followed by cost, connectivity and duty free shops. In further analysis focusing on brand value of the three airports measured by the use of transfer passengers, it was revealed that IIA needs more effort in developing their brand identity to become the leading transfer hub airport. Based on the results, recommendations for increasing the brand value have also been suggested.

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1. Introduction

As globalization has been accelerating over the last few decades, airline business today plays a pivotal role in transporting business and leisure travelers domestically and internationally. Lately, due mainly to the privatization and commercialization of airline companies and deregulation of the aviation rules, competition in the aviation market has become intensified, resulting in efforts of each airline to construct strategies to maximize the utilization of airports at which their aircrafts station. One of them is to build a globalized hub- and- spoke network system through the connection of many different airports economically, which enable airline

firms to improve route efficiency by increasing the boarding rates and minimizing the demand of seasonal air transport. This strategy will eventually provide the customers great benefits as well since they have more options for choosing the travel routes and consequently pay lower prices.

The passengers who transfer in the airports have different needs from those who terminate at the airport and thus they would switch their connecting airport to an alternative one when offered better options in terms of airline services, airport operations, and transfer type (Barros et al, 2007). Hence, there is a need for an airport to identify the expectations of

transfer passengers to become a competitive hub. Among others to attract more transfer customers, many leading airports highlight the reputation of their own brand as a differentiation tool since higher brand recognition from the customers will bring in the companies increased competitive advantages, customer satisfaction, and ultimately overall revenue (Chung et al, 2013).

It is anticipated that demand of air transport among countries in North Asia including South Korea, China, and Japan will increase much more than any other region in the world due to rapid economic development in the region (John, 2013), high population density, and stabilized political status (Park 2003). On the other hand, the increasing demand trend in the region has brought fierce competition to accommodate transfer demands and strengthen one’s positions as a regional hub among the three major airports in each of the countries; Incheon International Airport (IIA) in South Korea, Shanghai Pudong International Airport (PVG) in China, and Narita International Airport (NRT) in Japan (Figure 1)



Fig. 1. Geographical locations of IIA, PVG, and NRT

Source: Park (2003, p.354)

Geographically, taking the middle place into consideration, IIA might be most suitable as a hub among the three airports. Passengers through IIA can save time and receive cost advantages when departing from Asia to the USA, or vice versa, as compared to NRT and PVG (HMC Investment Securities, 2014). One thing noteworthy with regards to IIA is that number of passengers who travel on the routes of China and Southeast Asia-USA have been gradually increasing in accordance with the growth of incomes in those countries. As is seen in figure 2, IIA is connected to 176 cities globally. Also IIA offers routes to China, Japan, and Southeast Asia more than any other airports as is evidenced in Figure 3.

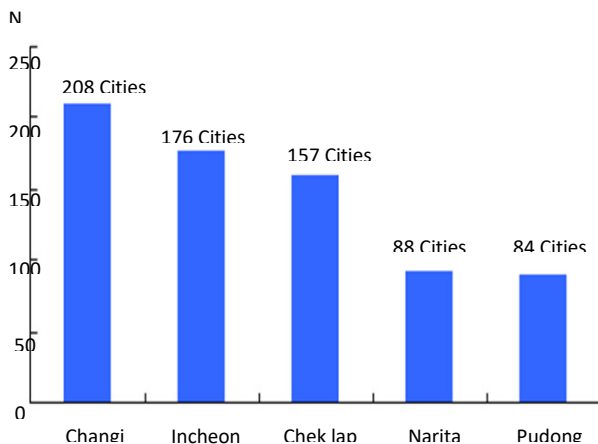


Fig. 2. No. of Destination Cities of Major Airports

Source: Industry Report (HMC Investment Securities, 2014)

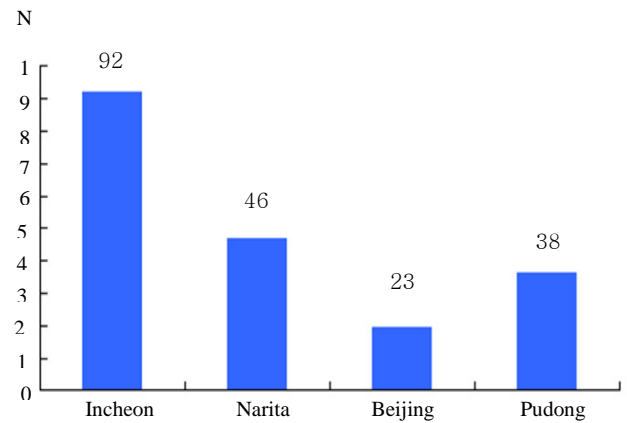


Fig. 3. No. of Routes to China, Japan and Southeast Asia

Source: Industry Report (HMC Investment Securities, 2014)

Moreover, 5,070,000 of total transfers were made by passengers in IIA in 2010, which was far larger than 810,000 occurred in PVG. IIA also leads NRT in the number of transfer passengers in 2012 as well; 6,860,000 in IIA vs. 5,700,000 in NRT (IIA, 2013).

However, the transfer rate of PVG is increasing lately due to the new practice that international passengers transferring to other international flights at PVG within 24 hours are not required to go through double immigration checks. On the other hand, the number of transfer passengers in NRT has declined since Haneda Tokyo airport started to offer international route in 2010 and the earthquake hit Japan in 2011. Nonetheless, NRT marks the shortest route from East Asia to North America and thus is still a critical airport for transfer passengers. To survive in the fierce competition, NRT has begun to expand the terminals on a large scale, strengthen the alliances, and build exclusive LCC(Low Cost carrier) terminals.

According to IIA (2013), transfer passengers of 3,098,336 from Southeast Asia and China accounted for more than 45% of total transfer passengers of 6,829,742 made in IIA and almost 50% of them traveled to North America. Also based on more recent data from ACI (Airport Council International)(2014), the number of international transfer of 7,207,000 represents 17.2% of total number of passengers of 40,786,000 in 2013. The report also indicated that more than 50% of transfers were made on routes between Southeast Asia or China and North America. From the statistics, we can infer that a large portion of passengers from Southeast Asia or China chooses IIA as a necessary transfer airport for the purpose of low cost instead of traveling directly to their final destination of North America. Besides Pudong airport in China and Narita airport in Japan in direct competition aforementioned, Hong Kong, and Beijing airport in China might be good alternatives as transfer places for passengers traveling from Asian countries. However, we will exclude HongKong and Beijing airports since they are not heavily competing with the ones that we chose in the route of Southeast Asia to North America.

Table 1

Current situation of transfer passengers in competitive airports between Southeast Asia and Northeast Asia

Unit: Thousand people				
Airports	The total number of passengers	number of international transfer passenger	Share of transfer passengers (%)	Main transfer Routes
IIA	40,786	7,027	17.2	South East Asia-North America
NARITA	30,529	5,665	18.	South East Asia-North America
PUDONG	18,065	1,701	9.4	South East Asia or China -North America North East Asia-Europe
HONG KONG	59,294	15,052	25.4	South West Asia- North America
BEIJING	16,165	1,376	8.5	North East Asia-Europe

Source: ACI, Sabre, 2014

In the sight of IIA, accommodating more transfer passengers among those who travel from Southeast Asia and China must be a priority as its competition with Pudong and Narita airports is becoming fierce.

However, regardless of the increasing significance of transfer to be a hub airport, little research has been conducted particularly in Northeast Asia region. While previous works emphasized the local context for understanding the geography of air transport as is mentioned by Graham (1998), our study will attempt to examine the attributes that determine the competitiveness of three major transfer airports, namely IIA, PVG and NRT in Northeast Asia region which are striving to attract transfer customers from Southeast Asia and China with final destinations toward North America. In this work, brand value for three airports will be calculated by using a conjoint analysis. We believe that this research would provide airport managers with useful information for preparing corporate strategies and deciding investment priorities to advance as a transfer hub airport in this area. This paper is organized as follows. Section 2 discusses the related prior studies which have influenced this research. In addition to Section 3 of research methodology, Section 4 provides the findings of data analysis, and Section 5 concludes this study.

2. Literature Review

According to the report on transfer passengers at IIA, conducted by the Korea Transport Institute in 2012, the transfer rate has been increasing 14.2 percent annually since IIA was opened in 2001. 529 foreign passengers transferring at IIA participated in the survey and among the passengers, 28.3% transferred from the USA, followed by those from Southeast Asia (24.1%), China (15.5%) and Japan (14.1%). Furthermore, the results indicate that the number of youth and students, who are sensitive to costs, is increasing with the intention of traveling, visiting relatives or going abroad for training, rather than for business. They also tend to use Korean national airlines, either Korean Airlines (67.8%) or Asiana Airlines (23.0%), demonstrating that the competitiveness of national airlines plays a critical role in improving the transfer rates of IIA. Based on the report it is notable that 'convenient transfer facilities' was selected as the most advantageous trait of using IIA. This is followed by 'reasonable ticket price' and 'a variety of transfer routes'. Contrary to this, 'long transit time' is the least satisfactory factor for transfer passengers among those who responded to the survey: a factor that should be resolved. The inability to sightsee near IIA while transferring has also been shown to be a disadvantage. Considering these factors, it is

necessary for IIA to develop various programs and to accommodate transfer passengers by providing convenient facilities in order to make a well use of their waiting time at the facility.

Besides the report from the IIA above, other reports also identify important factors in deciding the competitiveness of each airport as well. Referring to Porter's (1980) concept, Graham (2004) scrutinized the airport industry and the strategic options that airports adopted to influence competitiveness, namely, 'cost leadership', 'differentiation' and 'focus or niche'. Based on this approach, the report suggests several different ways to improve the competitive advantage of the airport operations, i.e., focusing on internal growth, integration, alliances and franchises, retrenchment and divesture, and particularly, the strategy for LCC (Low Cost Carrier) customers. Park (2003) argued that the competitive advantage of an airport seems to depend on 'five core factors' that may relate to passenger and cargo activities, including spatial factors, facility factors, demand factors, service factors, and managerial factors. From this study, the demand factors consisting of the level of origin-destination (O-D) demand and transit and transfer traffic volumes for hub-and-spoke network development were determined to be most essential, followed by the airport service factor related to the level of service to users, type of airport operations, and the level of charges. Through the assessment of these factors, the report found that IIA was 'more competitive', NRT 'less competitive' and PVG 'the least competitive'.

Nowadays, in addition to the variables affecting the competitiveness of airports, the aerotropolis, a metropolitan sub region, where the infrastructure and business development are concentrated on airports, is also deemed important for airports to remain competitive (Yeo et al. 2013).

Most of the existing empirical literature regarding the competitiveness of airports have focused on originating and terminating airports (Hess and Polak 2006; Windle and Dresner 1995). That is, departing and arriving passengers were of major concern in the previous airport-related studies due to the significance of them to the contribution of the revenues to the airports. Researchers have studied air-travel choice modelling since Skinner (1976) in order to identify critical choice factors in different areas, including the San Francisco bay area, with various data type, either revealed or stated preference, using a range of models, such as the Multinomial Logit (MNL), Mixed Logit (ML) models, or more advanced models, including the Cross-Nested Logit (CNL) model (Marcucci and Gatta 2011).

To fully understand the behaviors of passenger choices, the quality of the airport as well as airline service must be considered. For example, Kouwenhoven (2008) first divided the influential factors on passenger behaviors for airport choices into two groups; flights and airlines-related factor and airport-related factor. The flights and airlines-related factor consists of quality of available flights, such as on-board service and punctuality, flight time, ticket price, frequency of flights, availability of flights from a preferred airline, and availability of flights to a certain destination. The airport-related factor encompasses accessibility of the airport, including access time, access costs, parking conditions, baggage/customs/immigration facilities, shopping/lounge/restaurant facilities, and check-in facilities. These elements have been empirically tested in the context of a unique airline or airport, having found that flight frequency and ground accessibility are repeatedly considered most vital, while its significance depends on the target market (Hess and Polak, 2006; Loo, 2008; Pels et al., 2003; Skinner, 1976).

However, compared to numerous studies on departing passengers in multi-airport regions, little is known about the specific needs of transfer passengers, regardless of their importance to many airlines and hub

airports. Because transfer signifies the moving and waiting at airports, minimization of walking distances was widely discussed while assessing different terminal configurations (Bandara and Wirasinghe 1992; Wirasinghe 2003), and was considered essential in order to maximize operational efficiency and to minimize connection times. As an example study, Barros et al. (2007) sought to examine the perceptions of airport transfer passengers on facilities and services related to transfer by utilizing regression analysis in the context of Bandaranaike International Airport in Sri Lanka. The results have shown that transfer passengers view the display conditions of the flight information and the attitude of the security check staff as the main factors for competitive transfer airports. Park and Jung (2011) have attempted to study whether cultural orientations impact transfer passengers' perceptions regarding airport service quality. Collecting the data from three transfer passenger groups at Incheon International Airport, using English, Chinese and Japanese, they conducted their analyses with one-way analysis of variance (ANOVA). By using eight dimensions of air-service quality including tangibility, reliability, responsiveness, assurance, empathy, restaurants, duty-free shops and other facilities, it found that perceptions of transfer passengers rely heavily on their own cultural backgrounds. Specifically, transfer passengers who speak English had more positive perceptions on the levels of airport services than those who speak Chinese or Japanese. The rationale behind this is that English-speaking passengers from Western cultural backgrounds have relatively lower expectations than those from other Asian countries. From this, it can be concluded that cultural orientation should be valued highly for the management of airport service.

Based on previous arguments, recent airport-related studies have paid much attention to brand value to increase competitiveness of airports. Brand value, defined as 'the sale or replacement value of a brand' (Raggio and Leone 2007), is likely to be influenced by brand equity which positively impacts on financial profits with the friendly attitude to a specific brand. As higher brand value guarantees higher shareholder values, demonstrated by Kerin and Sethuraman (1999), more efforts are needed to develop a standard metric system suitable for each airport to manage airport brand strategically. According to Halpern and Regmi (2011), they identified five brand name categories applied to airports; 1) Place, such as country, city, town, or village, 2) Attraction, including tourist attractions, 3) Scope of services in international, national, regional, or domestic perspective, 4) Famous people, including royalty, political leaders/revolutionary, or others 5) The use of a slogan which is significantly common at airports in Europe that are owned or operated by private interests versus those that are publicly owned and operated. By measuring brand value of IIA from the financial viewpoint, in comparison with the world's six major airports (i.e., Paris Charles de Gaulle Airport, Tokyo Narita International Airport, Hong Kong International Airport, Netherlands Amsterdam Airport, Singapore Changi Airport and Shanghai Pudong Airport), Chung et al. (2013) argued that IIA has only the fourth highest in the brand value, NRT has the second highest, while PVG, marking the lowest. Despite some studies reporting on the brand value of airports in the academic arena, we learned that research on brand value in the context of competitiveness of transfer airports has been rarely conducted. This motivates us to launch this project that investigates strategic and operational differences in the brand values among the three major airports in Northeast Asia.

3. Methodology

3.1. Research Methodology

Our study aims to scrutinize the attributes for the competitiveness of transfer airports focusing on brand value by means of conjoint analysis. Accordingly, in this section the methodology used in this study will be discussed in detail.

3.2. Conjoint Analysis

Conjoint analysis (CA) evolved from the seminal research of Luce and Tukey (1964), is one of the most popular research methods for finding out the best combinations of attributes by analyzing the trade-offs among the several attributes, which influence the demands or preferences of consumers (Green et al., 2001). Of course, if subjective values of the measurements are not known, the utility of customers cannot be estimated. However, if it is supposed that individual factors contribute according to a certain proportion, their contributions can be calculated by a simple mathematical rule suggested as follows:

In the equation above, utility, denotes the optimized sum of the effects among the factors of A(a), B(b), and C(c). In the application of airport, for instance, given that the measured values of the airport brand, landing fee, number of cities, and duty-free are known in advance the utility of an airport can be derived by optimizing and summing the constructs, which can be conveniently accomplished by some commercial software.

CA has been widely applied in a variety of research fields, particularly in the area of marketing. For instance, it has been used in order to examine what factors of the locally produced goods are significant to consumers, such as the origin of production (i.e. local or not), farm size, and product freshness (e.g., Darby et al., 2008), and used in order to establish student preference for universities in Australia, including course suitability, academic reputation, job prospects, and teaching quality (e.g., Soutar and Turner, 2002). To date, the application of CA in airport studies has been conducted with a view to understanding passengers' airport preferences in multi-airport regions (MARs) (e.g., Loo, 2008) and to recognizing the major factors that consumers attribute to the choice of their origin airports (e.g., Marcucci and Gatta, 2011). However, CA has been implemented very limitedly, particularly in the passenger study of the transfer behavior at the airport, which our study investigates on.

3.3. Five Stages in Conjoint Analysis

The methodology of this study is described on the basis of five general stages of the CA application suggested by Ryan and Hughes (1997): 1) defining the attributes of interest to be included in the study; 2) assigning levels to these attributes; 3) presenting scenarios to individuals which involve different levels of the attributes; 4) obtaining preferences for these scenarios and 5) analyzing the responses.

The first stage of a CA is to identify the attributes which will be utilized in the study. Several ways can be considered for this such as reviewing relevant literatures, interviewing with individuals or group members, and directly contacting a person in order to inquire about attributes that are not predefined.

In this study, comprehensive literature reviews in Table 2 were employed, with attributes chosen based on expert interviews in the airport industry. The attributes applied in this study encompass airport brand, landing charges, number of connecting cities, and the sales of duty free shops.

In-depth interviews ensure the elimination of factors which are not suitable to model the customers' behavior at the airport among those chosen from the relevant literature.

In order to identify and categorize the most relevant factors in our study, a panel containing five experienced experts (2 professors, 3 directors of IIA (Incheon international airport) who are in charge of passenger department) was formed. The panel first selected four main factors from more than ten total factors (identified through the literature review) and then developed the sub-factors of each main one based on literature review through a brainstorming process. The main factors and sub-factors selected are shown in table 3.

As an attribute for cost aspect, landing charges were deemed to be a better measure rather than ticket price in that it is impractical to apply a variety of ticket prices among different routes in this exploratory study. More importantly, the changes of the airport fees including landing charges are applied to the customers' fares directly. For example, if the landing fees are getting cheaper, this in turn helps keep ticket prices down. In addition, the competitive landing charges will increase the frequency of transfer and expand the transfer service at the airport, eventually impacting on the competitiveness of transfer airport (Sainz-González et al., 2011; Yoo 1997).

As one of core factors to attract transfer passengers, Richard de Neufvill (1998) found connectivity to be a competitive factor and Suzuki (2007) and Loo (2008) categorized competitive factors such as the number of connected cities and number of airlines.

Also, this study applied duty free shop as a significant factor, considering that consumers perceive airports as special environments (Geuens et al., 2004) where their engagement in commercial activities is influenced by various shopping motivations, mainly related to the use of their dwell time to reduce anxiety and boredom during their airport transfer (Li and Chen, 2013). In addition to the traditional needs for shopping, the specific infrastructure and atmosphere can incite travelers to consume at the duty free shops during transient time. Besides common retail shops as duty-frees, food and beverage services, passenger and leisure facilities, some airports have added structures as golf facilities, karaoke, swimming pools, and bathing facilities (Kim and Shin, 2001 and Geuens et al., 2004) to create their revenue as well as to facilitate customers' convenience during their stay at the airport. This way, the passenger has regarded retail shops of duty-frees in the airports as one of the importance factors in deciding where to travel (Gillen and Lall, 2004 and Castillo-Manzano, 2010). For these reasons we have selected duty-free as one of the factors in our study.

In addition, our report develops the airport brand attributes, which are closely related to airport experience and image that passengers have (Suzuki, 2007) and frequent flyers (Suzuki et al., 2003; Suzuki, 2007). Finally, it reviews how important the brand attribute is in the competitiveness of transshipment airport to attract passengers in Northeast Asia.

Table 2
Previous studies and the applied attributes related to airport choice factors

Authors	Applied Attributes
Hess and Polak, 2005a, b, 2006a,b; Hess et al., 2007; Loo, 2008; Ishii et al., 2009, Sainz-González et al., 2011; Yoo 1997	- Airfare, - Landing charge
Richard de Neufvill, 1998; Skinner, 1976; Harvey, 1987, Pels et al., 2003, 2009; Suzuki et al.,	-Flight frequency and connectivity

2003; Basar and Bhat, 2004; Hess and Polak, 2005a,b,2006a,b; Hess et al., 2007; Suzuki, 2007; Loo, 2008; Ishii et al., 2009, Loo, 2008, Suzuki et al., 2003	-The number of cities connected -Number of airlines -Flight leg
Gillen and Lall, 2004, Castillo-Manzano, 2010 Kim and Shin, 2001, Geuens et al., 2004, Li and Chen, 2013	-Duty free shop
Suzuki, 2007; Kim and Shin, 2001 and Geuens et al., 2004 Suzuki et al., 2003; Suzuki, 2007, Ishii et al. , 2009, Hess et al., 2007	-Airport experience, image(airport brand) -Frequent flyers -Contribution with more complex systematic utility specifications include measure of the delay

The second stage is to assign levels to the selected attributes. These can be either categorical, ordinal or cardinal, and should be realistic and plausible enough to facilitate respondents' participation. Table 3 presents details of the attributes and their levels used in this work.

Table 3
Attributes and levels for this research

Attributes	Levels
Airport brand	IIA, NRT, PVG
Landing charges	3,150 USD, 3500 USD, 8500 USD
Number of connecting cities	169, 101, 76
Sales of duty free shops	9 hundred million USD, 5 hundred million USD, 2 hundred million USD

The *third stage* is to provide respondents with scenarios developed on the basis of the various groupings derived from the attributes' levels. Since it is difficult to include all profiles generated from the combination of attributes and levels, factorial design was used to reduce the number of profiles to a manageable level. Consequently, eleven carefully controlled profiles (2 holdout cards) were prepared for the respondents.

The *fourth stage* is to set up the respondents' preferences for these scenarios. Preferences can be obtained by asking respondents to either rank, rate, or choose their preferred scenarios from two or more scenarios, while making trade-offs between the levels of different attributes. Given that people are familiar with these kinds of choices in their daily life, the discrete choice method was applied in this study. After preliminary questionnaires were given to a convenient sample of experts and persons in charge of duties relating to international air transport, the main surveys were then conducted with experts in charge of duties relating to international air transport at IIA, NRT and PVG, and also conducted with those who have a high level of expertise in this area. A total of 50 randomly selected persons participated in the survey, namely, 8 CEOs, 25 academics and 17 researchers. To improve the response rate, personal visits were made after phone calls. This study shows limitation that it doesn't investigate real experienced passengers on the route between Southeast Asia or China and North America.

The *fifth stage* of a CA is to analyze the data gathered. A series of choices that respondents made were analyzed using SPSS 18.0.

4. Results

4.1. Preferences on the Attributes

In measuring preferences with conjoint analysis, Spearman’s rho and Kendall’s tau could be used for investigating nominal and ordinal scale data, while Pearson’s R is appropriate for examining goodness-of-fit for quantitative data. For this study, Kendall’s tau was employed to analyze the qualitative data gathered. The goodness-of-fit in the model was satisfactory, as shown by the highest value, 1.0. The result of the cross-validity test for the preference survey with factorial design using 2 holdout cards also indicated the highest value of 1.0 in Kendall’s tau.

The results of the conjoint analysis shown in Table 4 provide the part-worth utility, which specifies the relative importance of each level of the four attributes in regards to its contribution to the overall worth of transfer airport competitiveness. By determining the part-worth utilities for each level of a specific attribute, the relative importance values of each attribute were estimated. According to the analysis, it has been determined that airport brand accounted for 28.3% of the total utilities, cost accounted for 27.9%, connectivity for 22.9%, and duty free shops accounted for 20.9% of the relative values of the four elements of transfer airport competitiveness.

Table 4
Conjoint analysis result – relative utility and importance

Attribute	Attribute Level	Part-worth Utility	Importance
Airport brand	NRT	0.220	28.3%
	PVG	-0.833	
	IIA	0.613	
Cost (Landing charges, USD)	8500	-0.947	27.9%
	3500	0.463	
	3150	0.484	
Connectivity (No. of connecting cities)	169	0.713	22.9%
	101	-0.253	
	76	-0.460	
The sales of duty free shops (One hundred million)	9	0.473	20.9%
	5	0.120	
	2	-0.593	
Reliability		Pearson's R= 1.000 Significance= 0.000 Kendall's tau = 1.000 Significance= 0.000	

Note: Landing charges were calculated based on aircraft B747-400(395 tons) and data on the number of connecting cities; the sales of duty free shops were borrowed from the air-portal of Korea Civil Aviation Development Association (KADA).

To determine the priorities of attributes affecting the competitiveness of transfer airport, the changes in part-worth utilities for all attributes were evaluated. Among all attributes, the change of part-worth utility of IIA was 1.56, indicating the highest importance. Contrary to this, the lowest change of part-worth utility was found to be landing charge at 8,500 USD. From this, it can be inferred that airport brand and cost are the most critical attributes governing the selection as a transport airport.

Table 5
Importance of utility changes of attributes for transfer airports

Attribute	Attribute Level	Part-worth Utility	Changes of Part-worth Utility	Importance	Importance of Part-worth Utility Changes
Airport brand	NRT	0.220	1.167	28.3%	0.35
	PVG	-0.833	0.114		0.03
	IIA	0.613	1.56		0.46
Cost (Landing charges, USD)	8500	-0.947	0	27.9%	0
	3500	0.463	1.41		0.35
	3150	0.484	1.431		0.35
Connectivity (No. of connecting cities)	169	0.713	1.66	22.9%	0.40
	101	-0.253	0.694		0.17
	76	-0.460	0.487		0.12

Duty free shop (One hundred million)	9	0.473	1.42	20.9%	0.31
	5	0.120	1.067		0.23
	2	-0.593	0.354		0.08

Note: Changes of part-worth utility was estimated by adding the lowest value among partial utilities (-0.947) to the part-worth utilities of each level for each attribute to eliminate the negative numbers.

4.2. Evaluating competitiveness of Transfer Airports

First, to compare the utility of each attribute level, utilities were jointly analysed using the part-worth utilities and the importance of each level based on each attribute. All combinations were devised to be similar to the actual situation of each airport. Specifically, for IIA, landing charges of 3,500 USD, 169 connecting cities and 9 hundred million in sales at duty free shops were determined and combined together. For PVG, landing charges of 3,150 USD, 76 connecting cities and 2 hundred million in sales at duty free shops, and for NRT, landing charges of 8,500 USD, 101 connecting cities and 5 hundred million in sales at duty free shops were designed. Consequently, it was suggested that the attribute combination of IIA provided passengers with the utility of 1.52 (0.46+0.35+0.4+0.31); whereas each combination of PVG and NRT offered the utility of 0.58 (0.03+0.35+0.12+0.08), and 0.75 (0.35+0+0.17+0.23) to transfer passengers, respectively. It means IIA stands at the highest market share ratio (53%) followed by NRT (26%) and PVG (20%) among competitive transfer airports in the North East Asia.

Table 6
The attribute combination of applied transfer airports

Applied transfer Airports	Attribute Level value		Importance of Part-worth Utility Changes	Total market share
IIA	Brand	IIA	0.46	0.53
	Cost	3500	0.35	
	Connectivity	169	0.4	
	Duty Free shop	9	0.31	
PVG	Brand	PVG	0.03	0.20
	Cost	3150	0.35	
	Connectivity	76	0.12	
	Duty Free shop	2	0.08	
NRT	Brand	NRT	0.35	0.26
	Cost	8500	0	
	Connectivity	101	0.17	
	Duty Free shop	5	0.23	

In addition, the best combination of each attribute in this study was used to examine the impact of airport brand on attracting transfer passengers. The ratio of airport brand which accounted for the total utility of the best combination is 30% (0.46/1.52) for IIA, 5% (0.03/0.58) for PVG and 47% (0.35/0.75) for NRT. The brand values of the three airports could be evaluated by multiplying transfer passengers by the proportion of airport brand, accounting for the total utility of the combination. The results show that brand recognition was most important factor for IIA and NRT, whereas the cost was the most important one for PVG.

5. Conclusion and limitation

Recently, due to a large investment in the air transport industry in China and evolving airport policies focusing on the capital in Japan, it is

anticipated that Incheon International Airport (IIA), the major airport in South Korea, will face severe competition for achieving the title as the hub airport in Northeast Asia. In order for an airport to gain the competitive advantage as a regional hub, it should attract both transient and non-transient passengers who are going through its facility. Therefore, to help airport practitioners this study has attempted to evaluate the relative importance of the attributes contributing to the competitiveness of transfer airports, and further compare them in the context of three major airports, IIA (Incheon International Airport) in South Korea, PVG (Shanghai Pudong International Airport) in China and NRT (Narita International Airport) in Japan, which have begun to compete for transfer passengers on route between Southeast Asia or China and North America. Conjoint Analysis was used to evaluate four major attributes selected based on literature reviews and interviews; airport brand, cost (landing charges), connectivity (number of connecting cities), and duty free shops. By using this method, it was possible to assess the relative importance of different characteristics of attributes and the individual impact of each on overall benefit. From our analysis, it was determined that airport brand is the most preferred attribute for a transfer airport's competitiveness, with the part-worth utility of 28.3%. Airport brand, as defined by Marketing Science Institute (1989), is a degree of influence of airport name on the airlines' and passengers' selection of a specific airport; and the extent of profits implies that brand value becomes the critical marketing tool these days, and can be measured by currency.

Considering the results of this study, IIA should carefully plan and strategically implement airport branding strategies to improve its brand value which plays a key role in becoming a hub airport in Northeast Asia. For transfer passengers, brand identity of IIA should be established based on unique Korean ideals and culture. Korean tradition and Korea's latest world-leading trends, such as K-pop, can be introduced inside the airport, together with the demonstrations of new products of global Korean companies, such as Samsung and LG. Although some of the relevant programs have already been carried out, there should be an effort to promote these qualities by segregating the passenger groups based on the ages and the background cultures of the passengers. This will allow passengers to make use of their time at the airport, and will also create the special experiences associated with IIA. Social Network Services such as Facebook and Twitters will be more effectively used for brand marketing. They will facilitate communication with customers, and will also serves as a place for customers to share their stories. For transfer airlines, transfer packages, as well as wider air networks, should be developed. Most of all, customized strategies, including an incentive system suitable for each airline, should be built up to attract more airlines to IIA. This study also shows limitation that it doesn't investigate real experienced passengers on the route between Southeast Asia or China and North America and future research can be conducted by extending the research context and periods.

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