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DETERMINING THE FACTORS FOR PASSENGERS' AIRPORT CHOICE WITHIN NORTHEAST ASIAN AIRPORT SYSTEMS
A Focus on the Northeast Asian Aviation Circle

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Summary

Passengers, as one of the consumers of airport services, play a vital role in the development and success of airports around the world. In the age of globalization, most individuals have undoubtedly traveled internationally before, most likely through an airport gateway in reaching their destination. Many of these destinations nowadays feature airport systems, or multiple airports serving the same metropolitan area. Often, these airport systems are regulated by the government or some other entity that prevent the intensification of competition in order to allow the different airports to flourish. However, the recent deregulations in these controls have allowed airports within airport systems to openly compete with each other.

This study is aimed at analyzing the various factors that passengers consider when they are selecting an airport within an airport system. For example, these factors may include overall impressions and perceptions about airports, personal ratings of airport facilities and services, opinions about flight availability and so forth. In specific, this study will utilize airport systems in three major airport systems within Northeast Asia: Tokyo, Taipei, and Seoul. These airport systems contain airports that are often highly ranked in the world, experience large passenger and aircraft traffic, and are widely used by international travelers. Furthermore, these airport systems provide a sampling that could tentatively be used as insight into other airport systems around the world.

This study is structured into four major sections. The first section introduces the topic of airport systems and passenger choice, as well as describes the purpose and motivations behind the study. The second section describes the background and history of airport systems, focusing on the specific airports that are compared in this study. These include Narita International Airport (Tokyo), Haneda International Airport (Tokyo), Taoyuan International Airport (Taipei), Songshan International Airport (Taipei), Incheon International Airport (Seoul), and Gimpo International Airport (Seoul). The third section summarizes the results obtained from survey respondents and presents the data analysis. The fourth section reviews the findings of the study and also suggests various directions of future research.

A survey was developed and distributed to a wide variety of respondents, with responses collected over a period of two weeks. The survey was designed in four sections. The first section asked respondents background questions regarding overall preferences regarding airport factors as well as their preference of airports within airport systems. The second section asked respondents specific questions about each of the six airports, with the respondent skipping questions for airports that they have not visited before. The third section asked respondents about airport comparison questions. The final section asked respondents demographics-related questions. In all, 101 responses were collected from respondents.

From the results of the survey, respondents have shown that the most important factor for airport choice is airfares. It seems that regardless of how highly respondents rate an airport or what their overall impressions of an airport are, respondents tend to react more to the cost of the airfares when choosing an airport within an airport system. Overall, a majority of passengers also tend to choose to travel through primary airports more than through secondary airports when traveling, though the percentage of passengers choosing primary airports drops slightly when respondents were asked to name the preferred airport they would use, rather than the actual airport they use. This realization further supports the case that airport choice is strongly correlated with the cost of airfares, at least with the leisure travelers that formed the bulk of the survey respondents in this study.

Airports, airlines, and passengers may all benefit from the contributions of this study to the aviation industry. Airports may study how passengers generally perceive different aspects of airports,

allowing airports to develop strategies and innovate in order to become more competitive. Airlines, on the other hand, may use the results of this study to determine a gauge for how passengers respond to the airports that that airlines choose to fly through. Using this gauge, airlines may be able to better plan and develop route choices that optimize the satisfaction of the passengers while fulfilling other factors that airlines consider while planning routes. Finally, passengers may benefit from understanding how their peers view the airports and also gain a better knowledge of the different aspects of the airport. As a result, passengers may be better informed when making the selection of which airports to travel through, especially when faced with a choice of airports in an airport system.

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CHAPTER 1. THESIS MOTIVATION AND EXPLANATIONS

Section 1. BACKGROUND

Throughout the latter half of the 20th century and well into the current 21st century, globalization and the expanding interconnections between regions around the world has necessitated the growth and expansion of airports as a means of linking these regions. Airports are seen not only as a transportation hub and a gateway to the outside world for cities, but also as a catalyst for the regional economy. However, airports sometimes outgrow their capabilities to expand beyond their originally intended capacity, which thus necessitates the construction of alternate airports close to the city.

In East Asia, this has become a popular trend as older, outdated airports have outlived their use and are often replaced with modernized airports designed specifically for an increased amount of passenger and aircraft traffic. However, in some cities, such as Tokyo, Taipei and Seoul, the older airports have been retained and have often been modernized gradually in such a way that these older airports often serve as a secondary airport to the newly built primary airport, effectively creating a market competition between airports. Initially, governments may induce regulations on these airport systems to control competition and shift specific types of traffic to different airports. However, recent deregulations in the airport systems have intensified the competition between airports within airport systems.

Furthermore, current trends in the growth of the Asian economies have indicated that there is great importance in the development of gateways into this region. These trends demonstrate the importance of the airports in these airport systems scattered around East Asia. However, the presence of multiple airports lends itself to natural competition between the various different airports within regional boundaries. In essence, rival airports must be able to effectively compete with each other and attract enough customers to be able to generate profits and succeed. An excellent representation of the situation that the airport is in deCoat's quote: ""First, customers are more demanding…to them the airport is the airport. They demand that someone take control to provide good and seamless

service regardless of who the service provider is." (deCoat, 2011). The passengers are the key to determining the success or failure of each airport.

Section 2. RESEARCH MOTIVATION AND RATIONALE

This thesis dives into the degree of success different airports in the "Northeast Asia Golden Aviation Circle" (Shan, 2011) have had in attracting passengers to selecting their airport rather than rival airports in the region. As will be described in a later section, there have been numerous past researches on airport competition, but these researches focus primarily on airport-airline relationships, rather than on airport-passenger relationships. Furthermore, much of what has been done on airport competition has focused on the airport systems in the San Francisco Bay Area or in the Greater London Area. In contrast to previous researches, this thesis intends to focus on the Tokyo Area (Narita and Haneda), Taipei Area (Taoyuan and Songshan), and Seoul Area (Incheon and Gimpo).

Passenger choice between competing airports in these three regions in Northeast Asia is particularly interesting because of the various factors, not only access time and airfare considerations, that go into the selection of an airport as a departure or arrival point. Furthermore, as these three regions are expected to grow in importance in tandem with the rise of the Asian economies, the degree of success that these airports have in attracting passengers to their airports can determine what role that airport will play in its corresponding Northeast Asian city. Furthermore, this topic is of particular interest to the author as the author has flown multiple times through several of these cities in the past, utilizing the different airports available in the different cities. However, interrelationships between the airports have become more dynamic as secondary airports grow in importance, which stimulated the author into pursuing an increased understanding of the factors that various people consider when choosing airports.

Section 3. SCOPES AND LIMITATIONS

This thesis researches into the factors that influence a passenger's choice in a specific airport

out of multiple airports in each of the included Northeast Asian airport system. This thesis will focus its attention primarily on factors that the passenger has direct interactions with, particularly from the time the passenger leaves home to the moment of departure from the airport by plane (or conversely, from the moment of arrival at the airport by plane to the moment the passenger arrives at home). Essentially, this thesis will be evaluating an airport's value chain in context of the passenger's point of view. As such, the researched area will include topics such as airport access, airport facilities and service, air travel offerings, security and immigration processing, etc. Because of the primary focus on the passenger's choice in airport, areas related to the airports' relationships with government, airlines or other entities will not be considered as primary focal points as these relationships often are not foremost in the passenger's logical thinking process during the airport selection process. Furthermore, much research has already been previously performed on several of these other areas, which allows the author to focus on new, unexplored areas related to airport competition.

While the Northeast Asia Golden Aviation Circle is used as the initial basis for selecting airport systems to investigate, it should be noted that only three of the four systems in the Circle were selected. The Northeast Asia Golden Aviation Circle comprises of Tokyo, Taipei, Seoul and Shanghai (Shan, 2011). However, due to the limitation on information that could be acquired relating to the Shanghai airports (Pudong International Airport and Hongqiao International Airport), Shanghai was excluded from the research and analysis within this thesis.

Furthermore, due to the constraints in resources, the research survey undertaken constitutes a convenience sample. This method of sampling centers around the collection of data from a population that is conveniently available for participating in the survey. While this method of sampling is effective in its simplicity, ability to be facilitated in a short duration of time, as well as cost effectiveness, it may be more vulnerable to selection bias ("Convenience Sampling", 2015). While it may be difficult to effectively represent the results of this thesis as representative for all of the passengers that may travel through the airports in Tokyo, Taipei, and Seoul, this thesis does represent the opinions of a portion of the passenger traffic at these airports.

As a final note on limitations, this study was conducted primarily on English-based resources

available to the author. Therefore, although there may be studies and resources available pertaining to the relevant airport systems in Northeast Asia, they may not have been found or used because they were available only in a non-English language. However, the survey conducted as part of this study was available in both English and Japanese, so data was collected from a wider respondent range than could be possible with a survey conducted only in English. It must be noted that the survey was translated by non-native Japanese speakers, so some of the translations may be slightly confusing in Japanese.

Section 4. INTERESTED PARTIES

An increasing number of people are utilizing air travel as a means of transportation to reach their destinations, which implies the importance that airports mostly likely place on being able to attract not only air carriers, but also passengers to their airports, particularly in regions with multiple airports. Therefore, the results of the study should be of particular interest to airports involved in airport systems, especially those in Northeast Asia, which is the focus of this study. These airports can better understand and connect their efforts in improving their airport. By doing so, they can improve passengers' perception of the airport as well as the airport's likelihood of being selected as a point of departure or arrival. Passengers themselves may also be interested in the results of the survey so as to understand overall perceptions and preferences of other passengers utilizing the different airports in the Northeast Asian region, as well as to possibly use the study results as a gauge for understanding the value of traveling through each airport, which may influence their subsequent choice in airport. Finally, the results of the survey may appeal to air carriers as the study may help them understand how effectively different airports are operating and how efficiently the airports are competing with one another to gain passenger traffic. Air carriers may be primarily interested in extending or expanding routes into more competitive airports as a means of capitalizing on the increased passenger traffic.

Section 5. DEFINING TERMINOLOGIES

For the purpose of this research and to differentiate the two airports in each airport system, the terms “primary airport” and “secondary airport” will be defined as such:

- Primary airport – the international airport in an airport system with the higher international passenger traffic
- Secondary airport – the international airport in an airport system with the lower international passenger traffic

In accordance to this definition, primary airports are Narita, Taoyuan and Incheon Airports while secondary airports are Haneda, Songshan and Gimpo Airports. It is interesting to note that the three secondary airports in the current study were once the main international airports in their respective city but were relegated to a secondary role once the new primary international airports were opened.

Section 6. HYPOTHESES

In order to focus the important aspects of passenger choice in airport competition within specific Northeast Asian cities, a set of hypotheses was developed that pinpointed various aspects of passenger choice in airports that may have a significant impact on a passenger’s final choice. While the ultimate goal of this study is to answer these hypotheses in view of all three surveyed airport systems, this study will first attempt to apply these hypotheses separately to each of the airport systems to determine if there are also any regional differences between the three systems. It may be noted that the hypotheses focus on three specific parts of the airports, namely airport access, airport facilities and services, and air travel offerings.

1. Travelers prefer to use secondary airports because of their ease of access from the city center.

2. Travelers prefer the airport that has better facilities (i.e., shopping, restaurants, services, etc.) within an airport system.
3. Travelers have a better impression of primary airports compared to their corresponding secondary airport.
4. Travelers prefer to travel into cities with airport systems rather than into cities with an integrated airport hub.
5. Airport procedures (i.e., check-in, security, immigration, baggage retrieval, customs, etc.) and airport procedures time at each airport are not an important determinants for travelers in choosing between airports.
6. Airfare is an important determinant in choosing between airports for travelers.
7. Available flight times is an important factor for travelers deciding between airports.

CHAPTER 2. AIRPORT AND AIRPORT SYSTEMS

Section 1. DEVELOPMENT OF AIRPORT AND AIRPORT SYSTEMS

2.1.1. Defining an Airport

In terms of simple definition, an airport is “a complex of runways and buildings for the take-off, landing, and maintenance of civil aircraft, with facilities for passengers” (“Airport”, 2015). However, airports play a much larger role than just what is listed as a definition. The function of an airport is to provide a location that allows for passengers to transition from local ground transportation to an aerial transportation and vice versa. More specifically, it allows for a change of mode between ground and aerial transportations, processing such as ticketing and control of passengers/luggage, and change of movement type based on a schedule (Ashford, 1997). Airports can be thought of as divided into two parts: landside and airside (shown in Figure 1). Passengers often cross between the two sides, which indicates that airports have to make the transfer as smooth as possible.

Although small to medium sized airports with low passenger traffic can be run very similarly in complexity to railroad or bus stations, medium to large sized airports with a significant amount of passenger traffic require much more organization and planning in order to manage the large complexity involved in such an airport. Some examples of what an airport has to manage include the following (Ashford, 1997):

- *Handling of passengers*
- *Servicing, maintenance, and engineering of aircraft*
- *Airline operations including aircrew, cabin attendants, ground crew, terminal and office staffs*
- *Businesses necessary for the economic stability of the airport (concessions, leasing companies, etc.)*
- *Aviation support facilities (air traffic control, meteorology, etc.)*

- *Government functions – agricultural inspection, customs, immigration, health*

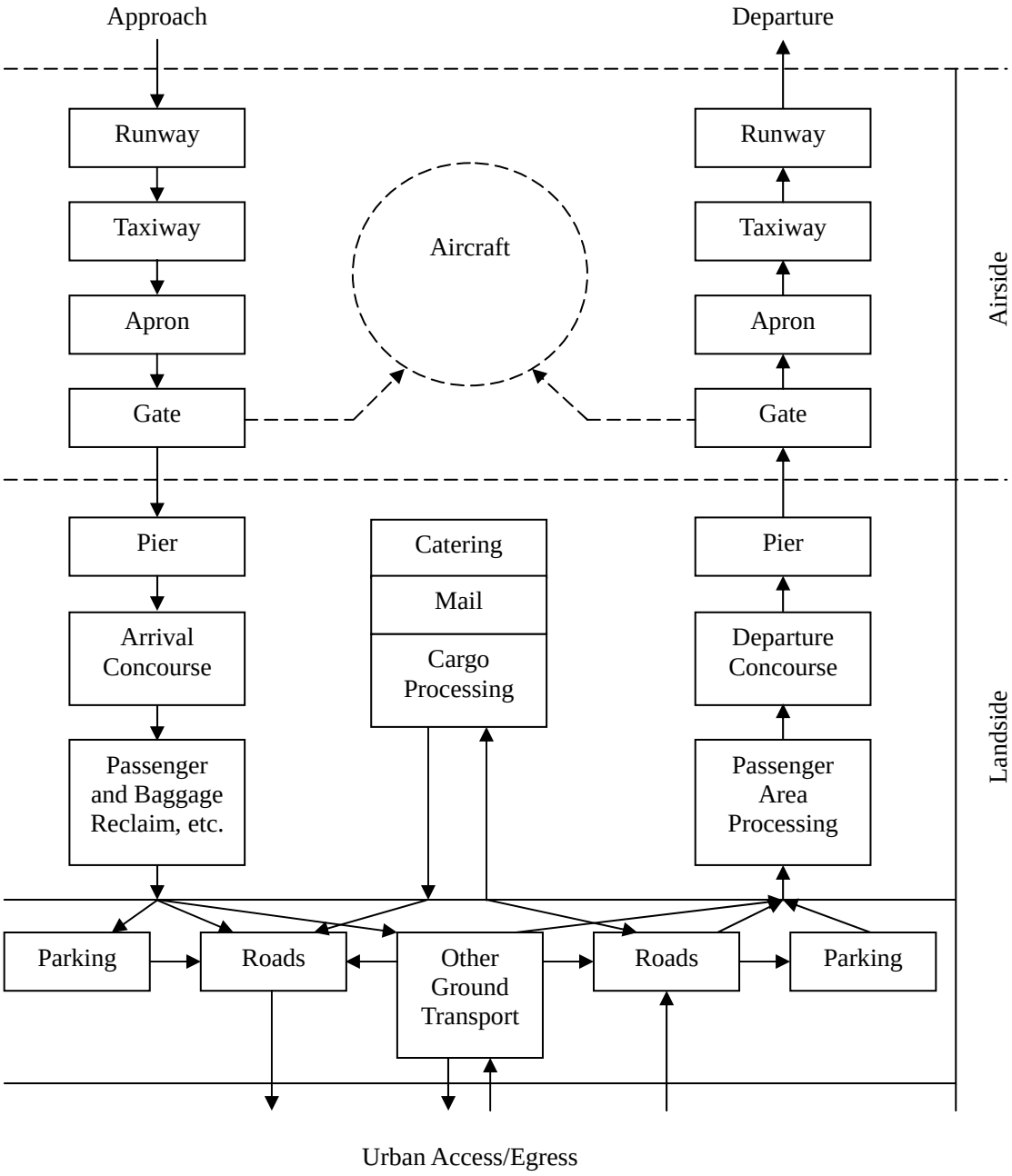

Figure 1: The Airport System (Ashford, 1997)

In addition to being divided between airside and landside, airports can also be divided based on the hardware and software. In this instance, "hardware" can be considered as the facilities and

equipment that is offered by the airport while the “software” can be considered as the services offered by airport or the airport staff. For example, hardware may include facilities, such as duty-free stores, restaurants, airline lounges, public seating areas, prayer rooms or silence rooms, smoking areas, restrooms, and signage and information. On the other hand, software may include the information desk, roaming service agent or staff, self check-in kiosks, flight information monitors, digital applications (e.g., smartphone applications), and luggage services. In order to maintain competitiveness, airports often have to continuously update and innovate on their offerings to the passengers.

2.1.2. Evolution of the Airport

Around a century ago, the first commercial airports began to be established in various countries around the world. At first, these airports were nothing more than just grass fields offering a place for aircrafts to take-off and land. However, airports eventually developed the facilities, services, and operational procedures to handle larger aircrafts through the years. Now the role of airport managers has “changed from the purveyor of infrastructure to the dominant manger over the process of getting people and goods out of land vehicles into air vehicles” (deCota, 2011).

In the beginning, airports and airlines were often established by a government or with the support of a government, resulting in a regulated aviation industry. During the latter half of the 20th century, this situation began to change as governments began to privatize their aviation assets, as seen in some examples provided in Table 1. Through the act of privatizing airports, the government has allowed airports to begin operating freely in the market economy, ideally making these airports more responsive to market forces. As a result, airports have had to become more competitive in order to survive under the new unregulated circumstances. This has had a particularly dramatic effect in areas with airport systems where the government regulated flight routes in airports among co-existing airports. For example, Tokyo’s airport system was managed in such a way that international routes were flown primarily into Narita International Airport while domestic routes were flown primarily into Haneda International Airport. With the deregulation of the aviation industry, these airports were no longer controlled by a central entity but were free to determine their

own portfolio of flights, leading to inter-airport competition for lucrative flights. In Tokyo's case, Haneda International Airport began to bid for international routes, thus encroaching upon a market previously monopolized by Narita International Airport.

Type of Privatization	**Examples**
Share flotation or IPO	BAA (1987), Vienna (1992), Copenhagen (1994), Rome (1997), Auckland (1998), Malaysia Airports (1999), Beijing (2000), Frankfurt (2001), Paris (2006); Incheon (2010)
Trade Sale	Liverpool (1990), East Midlands (1993), Belfast International (1996), Birmingham (1997), Naples (1997), Brisbane/Melbourne/Perth (1997), Dusseldorf (1998), South Africa (1998), Wellington (1998), Hamburg (2000), Sydney (2002), Malta (2002), Budapest (2005), Luebeck (2005), Kosice (2006), Xi'an (2007), Mukhino (2007)
Concession	Barranquilla (1997), Caratagena (1998), La Paz/Santa Cruz/Cochabamba (1997), Luton (1998), South East Mexican airports (1998), Pacific Mexican airports (1998), Argentinean airports (1998), main Dominican republic airports (1999), Montevideo (1999), San Jose (1999), North Central Mexican airports (2000), Lima (2001), Montega Bay (2003), Delhi/Mumbai (2006), Antayla (2007), St Petersburg (2009)
Project Finance	Athens (1996), JFK international arrivals terminal (1997), Ankara (2003), Hyderabad/Bangalore (2004), Tirana (2005), Larnaca/Paphos (2005), Varna/Burgas (2006), Amman (2007)

Table 1: Examples of Different Types of Full or Partial Airport Privatizations (Graham, 2011)

Deregulation has also forced airports to innovate product offerings that are provided to both airlines and passengers. In particular, airports have had to focus on service quality in order to attract passengers, many of whom are used to airports with increasingly better service offerings. Furthermore, in an effort to enhance their visibility among passengers, airports have also differentiated their product offerings to cater to the diverse needs of these passengers. While in the past, differentiation may be confined primarily to improved check-in, waiting, and lounge areas, recent airport innovations are beginning to spread into a series of technological enhancements. These

enhancements include not only passenger-facing improvements such as self check-in kiosks and smartphone applications, but also in processing improvements such as check-in procedures, security, and border control.

2.1.3. Emergence of Airport Systems

Airport systems that include more than one airport began to emerge in large population centers around the world in response to primarily capacity constraints in existing airports. In other words, when older airports approach or surpass their designed traffic capacity, the government often develops plans to either expand the existing airport or build a completely new airport to relieve traffic at the original airport or take over operations completely. In his study, Bonnefoy identifies 59 airport systems around the world at the time of his research, with 25 in Europe, 18 in North America, 8 in Asia-Pacific, 5 in Latin America, and 3 in the Middle East (Bonnefoy, 2008). More specifically, the eight airport systems in Asia-Pacific include Tokyo, Osaka, Shanghai, Hong Kong, Taipei, Seoul, Bangkok and Melbourne. Many of the airport systems in existence came about through one of two methods: 1) an existing small airfield was converted or gained enough traffic to become a full-fledged airport, or 2) a new airport was constructed with partial or total transfer of traffic to the new airport. In cases of total transfer of traffic, such as in Denver and Oslo, the original airport was closed (Bonnefoy, 2008). However, in cases of partial transfer of traffic, such as in Tokyo and Seoul, the original airport was demoted to a secondary airport status while the new airport was assigned as the primary airport and gained a majority of the international traffic.

Bonnefoy further identified three primary factors influencing the evolution of these airport systems: “(1) the availability of existing airport infrastructure, (2) the entry of low-cost carriers at under-utilized airports and (3) regulatory and political factors” (Bonnefoy, 2008). Europe and North America both have high numbers of existing airfields within proximity of large population centers, which meant that these centers had existing infrastructure that could be easily adapted or expanded into full airports. In contrast, the Asia-Pacific and Latin America regions had few existing infrastructures, which led to the necessity of building a completely new airport to serve the city center. This difference is obvious in Table 2, where 50% or more airport systems in the Middle East,

Latin America, and Asia-Pacific consisted of a newly constructed airport.

World Region	Emergence of Secondary Airport Through the Use of an Existing Airport	Construction of a New Airport
Europe	81%	10%
North America	81%	19%
Middle East	50%	50%
Latin America	20%	80%
Asia/Pacific	10%	90%

Table 2: Frequency of Observation of Mechanisms Governing the Evolution of Multi-Airport Systems Across World-Regions (Bonnefoy, 2008)

Airport systems are also stimulated when low-cost carriers (LCCs) enter an under-utilized airport, thus stimulating the market at the airport and also attracting other carriers to fly routes into that airport. This phenomenon is known as the "Southwest effect", a term coined from Southwest Airlines' role of developing the emergence of numerous smaller airports in the United States.

The final factor, one which is perhaps most pertinent to the Northeast Asian airport systems, is the regulatory and political factors surrounding the construction of new airports. In a few cases, the older airport may be closed completely. However, in all three of the cases studied in this thesis, the government ordered the construction of a new airport away from the city center and generally forced airlines to switch to the new airport, keeping the older airport open for a limited number of domestic traffic. This situation was originally intended to keep airports within airport systems from direct competition; however, deregulation has created a new environment in which these airports may now directly compete with one another.

Section 2. ASIAN AIRPORT CIRCUMSTANCES

Asia is an interesting region to focus on the development of airports and airport systems because of the rapid growth experienced in the region. Not only is Asia the leading region in aviation

traffic (30% of the world's revenue passenger kilometers), but it is home to 41% of the world's middle class (Clayton, 2014). Furthermore, the liberalization of Asian economies coupled with the lifting of travel restriction has provided ripe circumstances for the surge in air traffic in the Asian region during the recent decades. To cope with the already overburdening capacity strains, Asian cities have looked into many ways of expanding capacity to meet expected future demands. One of these ways is to construct multiple airports near a city, thus creating an airport system. According to Clayton, airport systems are capable of "delivering airport infrastructure that is cost-effective and efficient…providing airport accessibility to a larger percentage of the population…[and] improving the quality of travel and reducing congestion and delays" (Clayton, 2014).

City	Metropolitan Area			Main City Area		
	Population (Thousands)	Area (km^2)	Density (Persons/km^2)	Population (Thousands)	Area (km^2)	Density (Persons/km^2)
Beijing	20,186	16,411	1,230	12,014	1,368	8,780
Berlin	3,502	892	3,927	3,502	892	3,927
London	8,302	1,572	5,281	8,302	1,572	5,281
Seoul	10,442	605	17,254	10,442	605	17,254
Taipei	2,673	272	9,835	2,673	272	9,835
Tokyo	13,277	2,189	6,066	9,050	622	14,550
Washington DC	3,720	2,460	1,512	632	159	3,976

Table 3: Basic Statistics of Selected Cities (Di, 2013)

As can be seen in Table 3, the three selected Asian cities offer unique locations for this study because of their large population size and/or density compared to many other capitals in the world. Furthermore, while the other capital cities listed also have airport systems, they serve either a smaller population or a city center that is less dense than that of the three selected Asian cities. In addition, the three Asian cities selected also have several airports listed among the "World's Top 100 Airports" in 2015, according to the Skytrax ranking as shown in Table 4.

Ranking	Airport	Ranking	Airport
1	Singapore Changi	11	Vancouver Intl Airport
2	Incheon Intl Airport	12	Kansai Intl Airport
3	Munich Airport	13	Frankfurt Airport
4	Hong Kong Intl	14	Narita Intl Airport
5	Tokyo Intl Haneda	15	Auckland Intl Airport
6	Zurich Airport	16	Copenhagen Airport
7	Central Japan Intl	17	Taiwan Taoyuan
8	London Heathrow	18	Helsinki-Vantaa
9	Amsterdam Schiphol	19	Kuala Lumpur
10	Beijing Capital	20	Brisbane

*Gimpo Intl Airport is ranked 41 in this list

Table 4: The World's Top 100 Airports - 2015 (Skytrax, 2015)

Another interesting point to note is that the airports in the three selected Asian cities also rank within the top 10 of many other Skytrax rankings, as shown in Table 5.

	Cleanest Airport	Best Airport Shopping	Best Airport Dining	Best Airport Immigration	Best Airport Security	Best Baggage Delivery	Best Airport Leisure Amenities
Narita	6		9	9	3	10	6
Haneda	2	10		5	1	6	7
Taoyuan		9		2	4	4	8
Songshan							
Incheon	1	6		4	7	5	2
Gimpo							

Table 5: Miscellaneous Skytrax Rankings (Skytrax, 2015)

Finally, a comparison of the scale of operation at each airport can be seen in Table 6. This

table shows the number of domestic and international routes that are flown into and out of each airport as of June 2015, as well as the number of airlines that use the airport.

	Number of Airlines	Number of Domestic Destinations	Number of International Destinations
Narita	84	17	101
Haneda	33	61	27
Taoyuan	71	0	161
Songshan	15	7	15
Incheon	88	2	182
Gimpo	14	6	6

Table 6: Airport Connections to Worldwide Cities (Narita International Airport Corporation, 2014; Japan Airport Terminal Co., Ltd., 2015; Taoyuan Airport Corporation, 2014; Taipei International Airport, 2014; Incheon International Airport Corporation, 2014 and 2015; "Flight Schedule", 2015)

Section 3. TOKYO AIRPORT SYSTEM

2.3.1. History of the Tokyo Airports

The Tokyo airport system consists of three airports: Narita, Haneda, and Ibaraki. However, Ibaraki Airport only serves a limited amount of flights and so will not be included in the scope of this study. Haneda Airport is located within the Tokyo city boundaries, at the mouth of the Tamagawa River relatively 15 kilometers away from Tokyo Station. Because it is surrounded by land on three sides and Tokyo Bay on the fourth side, expansion at Haneda Airport has been difficult but possible through land reclamation that has occurred throughout the decades. In order to relieve the strains in capacity at Haneda Airport, the Japanese government ordered the construction of Narita Airport in Chiba Prefecture, about 60 kilometers away from Tokyo Station. Because of opposition by local residents, conflicts resulted in continuous delays in opening parts of the airport, including a 24 years delay in the opening of the second runway. With the opening of Narita Airport, most

international flights into Tokyo were shifted from Haneda Airport to the new Narita Airport. However, conflicts continued until the 2000s, when further expansion was possible with the building of new terminals at the airport and runway extensions. This recent expansion has occurred concurrently with the expansion at Haneda Airport into becoming a full-fledged international airport again (Yamaguchi, 2013). Overall competition has increased between the two Tokyo airports, especially since 2011 with the capacity expansion at both airports, internationalization of Haneda Airport, and launch of Open Skies Agreements at Narita Airport (Kurono, 2012)

2.3.2. Narita International Airport (NRT)

Located in Narita, Chiba Prefecture, Narita Airport is the primary international airport serving the Tokyo Metropolitan region. It takes approximately 36 minutes to reach the airport by the Keisei Skyliner route and an hour by other methods of transportation, with up to 12 trains per hour when combining JR and Keisei rail services (Narita International Airport Corporation, 2014). However, Narita Airport offers connections to many major city centers around the world and has served as a major transit hub for trans-Pacific flights during the last few decades. The airport itself consists of three terminals, including a newly built LCC terminal, with service by over 55 airlines. More specific information about each of Narita Airport's terminals can be seen in Table 7.

	Terminal 1	**Terminal 2**	**Terminal 3***
Commission Date	May 20, 1978	December 6, 1992	April 8, 2015
Total Floor Space	455,000 m^2	405,900 m^2	around 66,000 m^2
Passenger Handling Capacity	25 million	17 million	7.5 million
Number of Contact Gates	34	28	around 14

* Information regarding Terminal 3 is tentative as it was not opened at the time of the publishing of Narita International Airport's annual report

Table 7: Narita Terminal Information (Narita International Airport Corporation, 2014)

Narita Airport is currently undergoing a 3-year plan that has been dubbed “Innovative Narita 2015” that is aimed at improving Narita Airport’s competitiveness. This plan focuses around three core strategies: endless pursuit of safety, creating an airport of popular choice, and building corporate strength (Narita International Airport Corporation, 2014). Of particular interest to passengers traveling through Narita Airport is the second goal within Innovative Narita 2015. Narita Airport is striving to improve the airport as a popular choice among passengers through four sub-focus areas: user-friendly airport, lower airport costs, improved comfort and convenience, and contribution to the local community.

With the expansion of the airport through construction of additional parking spots and also with the construction of Terminal 3 (a dedicated LCC terminal), Narita Airport is aiming to upgrade its international network of mid- and long-haul routes as well as to increase short-haul Asian routes. This would provide passengers with an even greater number of route choices to select from when planning trips. Furthermore, the original Terminals 1 and 2 are being refurbished and renovated in order to improve the comfort and ambience that passengers experience in these terminals.

However, much of the improvements for passengers traveling through Narita Airport may come from the various technological interfaces improvements and retail expansions that the airport has implemented. For example, there are now non-stop security gates at the entrances to the airport that will both improve security and remove the troublesome security checks that were once present at the airport. Wi-Fi areas have also been expanded and upgraded to provide visitors with more comprehensive Internet coverage. Finally, the airport has also been progressing in its “i-Airport” strategies, which have included releasing hospitality applications, augmented reality applications, and multilingual audio translation applications, as well as introducing video phone services and roving information agents (Narita International Airport Corporation, 2014). Narita Airport has also strived to expand and improve shopping areas within the three terminals to provide passengers with a greater selection of duty-free shopping. In addition, Narita Airport has opened a new capsule hotel for passengers requiring the usage of overnight accommodation for taking early morning flights.

2.3.3. Haneda International Airport (HND)

Located in Ota Ward within the Tokyo city boundaries and also within 16 kilometers of Tokyo Station, Haneda Airport is conveniently located in the city for many of the city's residents. It serves as the primary base for both of Japan's major airlines, Japan Airlines and All Nippon Airways, each of which runs out of separate terminals at the airport. Although Haneda Airport used to be Tokyo's primary international airport, it was relegated into a primarily domestic airport with the opening of Narita Airport in 1978. However, Haneda Airport has been expanding recently and has recaptured some of international routes such that it is effectively an international airport once again. The opening of an international terminal in 2010 has also bolstered its abilities to accept international flights, as has the opening of an additional runway built into Tokyo Bay.

Location	Ota-ku, Tokyo
Principal Use	International Airport Terminal, Parking
Owner	Tokyo International Air Terminal Corporation (TIAT)
Structure	Steel frame, reinforced concrete, steel framed reinforced concrete
Number of Stories	+5 (Parking Facility: +7 / Energy Supply Facilities: +3, +1 Penthouse)
Total Floor Area	153,581.29m2 (Parking Facility: 64,841.99m2, Energy Supply Facilities: 5,325.277m2)
Completion	July 2010
Grand Open	21st October 2010
Expansion	End of March 2014
Contact Gates	10~13 (depending on parking configuration) (+8 by new terminal expansion)

* Information regarding the recent International Terminal expansion at Haneda Airport is tentative as little information has been released about the new expansion at the time of this study

Table 8: Haneda International Terminal Data (Editorial Board Member, 2011)

Although Haneda Airport consists of two domestic terminals, the airport's new international terminal has made Haneda Airport a competitive force in the Northeast Asian aviation market, providing Haneda with a mean to effectively compete with other international airports. To attract

passengers, the terminal itself was designed to invoke the concept of sky and cloud within the departure lobby, while emphasizing the importance of "expression to the spatial sensibility, delicacy and human scale that are distinctive to Japan…[hoping] people will get a sense of the Japanese culture of hospitality" (Editorial Board Member, 2011). Basic information regarding the international terminal is shown in Table 8.

In recent years, Haneda Airport has striven to improve its offerings to passengers traveling through its airports. As seen in the airport's annual report, Haneda Airport has focused its efforts into expanding operations of duty-free shops, extending the international passenger terminal, and opening the "Royal Park Hotel THE Haneda" adjacent to the international passenger terminal (Japan Airport Terminal Co., Ltd., 2015). The airport hopes that these improvements would better help serve the passengers' needs during their travels through the airport. Furthermore, Haneda Airport is looking into improving passenger convenience by establishing a transfer facility between the domestic and international terminals as well as introducing baggage carts in gate lounges beyond security screening points. Overall, Haneda Airport is attempting to improve its competitiveness in preparation for the 2020 Tokyo Olympics and Paralympics Games.

Section 4. TAIPEI AIRPORT SYSTEM

2.4.1. History of the Taipei Airports

The Taipei airport system consists of two airports: Taoyuan International Airport and Songshan International Airport. Songshan Airport is located within the downtown Taipei area and is conveniently located for those that are looking to travel into and out of the immediate Taipei area. Taoyuan Airport, originally known as Chiang Kai-Shek International Airport, was built approximately 40 kilometers outside of Taipei and opened in 1979 to relieve traffic at the congested Songshan Airport. Prior to 1979, Songshan Airport was the primary link between Taiwan and other countries but was severely over-capacity even after a series of expansion. The urban area of Taipei had encroached around Songshan Airport, restricting its ability to further expand outside of its 213 hectares area (in comparison, Narita Airport has 1,090 hectares) (Taipei International Airport, 2014

and MLIT, 2015). After the transfer of traffic, Songshan Airport became primarily a domestic airport while Taoyuan Airport became an international airport hub for the Asia-Pacific region. In response to government policy changes and loss of domestic traffic due to the opening of the Taiwan High Speed Rail, Songshan has began to expand to better accommodate international travelers to Tokyo, Seoul, and mainland China. Taoyuan Airport is currently in the midst of its own renovations to update its facilities to modern standards, with a rapid transit system set to link the airport with Taipei city in the near future.

2.4.2. Taoyuan International Airport (TPE)

Located about 40 kilometers west of Taipei, Taoyuan Airport is the busiest airport hub in Taiwan, serving as the main international gateway into the country. The airport is also the main hub for the Taiwanese airlines China Airlines and EVA Air. After gaining most of Songshan Airport's international operations in 1979, Taoyuan Airport has gradually grown to become one of the major transfer airports in the Asia-Pacific region for trans-Pacific flights. Because of its distance from the city center, passengers need to take local ground transportation, such as cars or buses, for about an hour to reach Taoyuan Airport from the Taipei city center. There is currently a mass rapid transport connection currently planned for commencement in December 2015 that will allow travel between Taipei Station and the airport in 35 minutes, which will greatly improve the airport's convenience and competitiveness.

Taoyuan Airport's promise to passengers is its goal of "Connecting the World with Heart" (Taoyuan Airport Corporation, 2014). The airport is striving to provide passengers with innovative services, elegance/diversity of Chinese culture, and a sense of human touch as it rises to become a benchmark for airports worldwide. Taoyuan Airport has recently pursed and completed a few major projects that have increased its ability to handle increasing numbers of passengers while providing an increased level of service. The first of such projects was the completion of the Terminal 1 renovation, which was the remodeling of the 32-year old terminal and bringing it up to modern standards. Furthermore, the airport has also worked to upgrade its two runways to accept newer and larger aircrafts, providing passengers more choices in flight choices. At the current time, Taoyuan

Airport consists of two passenger terminals, with a third terminal in the planning stages. Table 9 provides some basic information about the existing terminals.

	Terminal 1	**Terminal 2**
Completion Date (Renovation Completion Date)	February 26, 1979 (June 2013)	July 29, 2000
Annual Capacity	15 million	17 million
Floor Area	182,796 m^2	316,643 m^2
Passenger Aprons	18	20

Table 9: Taoyuan Airport Terminal Information (Taoyuan Airport Corporation, 2014)

With all of Taoyuan Airport's improvements, the airport has concentrated on customer satisfaction. The airport has invested heavily in embedding Chinese culture and elegance into its new terminal designs, particularly in new theme waiting lounges that exhibit Taiwan's diversity. Furthermore, the airport has worked to implement innovative technologies. These have included automated check-in counters, streamlining the customs clearance process, and even an electronic parking space query system to help drivers find their vehicles in airport parking lots.

2.4.3. Songshan International Airport (TSA)

Conveniently located within the city limits of the Taipei city center, Songshan Airport is Taiwan's first international airport and major Taiwanese hub until Taoyuan Airport replaced Songshan Airport in handling international flights. Following the shift in focus, improvements in land transportation (e.g., the Taiwan High Speed Rail) caused domestic traffic to steeply decline. Songshan Airport only recently recovered with the emergence of Direct Cross-Straight Flights and Northeast Asia Golden Aviation Circle policies proposed in 2008 (Taipei International Airport, 2014). Although limited in international services, Songshan Airport has strived to become competitive against Taoyuan Airport on routes to cities designated in the Northeast Asia Golden Aviation Circle. As seen in Table 10, there is a significant difference between Songshan and Taoyuan Airports

(compare with Table 9). Therefore, this study aims at investigating Songshan Airport's competitiveness against Taoyuan Airport's competitiveness in the overlapping market (i.e., flights primarily to Japan, South Korea and China).

	Terminal 1	**Terminal 2**
Renovation Completion Date	October 28, 2010	March 29, 2011
Annual Capacity	3.8 million	2.8 million
Floor Area	59,518 m^2	18,115 m^2
Contact Gates	6	2

Table 10: Songshan Airport Terminal Information (Taipei International Airport, 2014; Staff Writer, 2010; China Post News Staff, 2011)

With the renovation of Terminal 1, Songshan Airport has enhanced its check-in hall and waiting lounges with various appealing flight-related imagery and themes. Furthermore, Songshan Airport has appealed further to travelers by introducing an observation deck overlooking the airport. The Taiwanese government has also set up an International Health Liaison Center at Songshan Airport to provide medical consultation and hospital contact for medical tourism passengers, as well as a massage station for stress relief services (Taipei International Airport, 2014). In terms of commercial facilities, Songshan Airport has established Fashion Avenue, an area within the airport laid out like a commercial street with international brands and duty-free shops lining the avenue.

In terms of new technological implementations, Songshan Airport has strengthened its role as a business airport by improving the free Wi-Fi service as well as electric charging stations. Furthermore, Songshan Airport has invested in using an electronic boarding-pass verification system to speed up check-in and boarding processing. To provide readily available information to passengers, Songshan Airport has also introduced Information Kiosks at various spots in the terminals. Though small, Songshan Airport is effectively trying to position itself as a prominent business airport in Taipei.

Section 5. SEOUL AIRPORT SYSTEM

2.5.1. History of the Seoul Airports

Two airports exist in the Seoul airport system: Incheon International Airport and Gimpo International Airport. Gimpo Airport was the original airport in the Seoul area, located approximately 15 kilometers west of the central area of Seoul. Gimpo Airport was the primary gateway into South Korea through the latter half of the 20th century, but its limited ability to cope with the growing traffic through the airport led the Korean government to order the construction of a larger international airport in Incheon, about 48 kilometers away from the Seoul city center. In 2001, Incheon Airport was opened for service and received most of Gimpo Airport's share of international traffic. As a result, Gimpo Airport became primarily responsible for domestic routes and Incheon Airport was responsible for international routes. However, in subsequent years, Gimpo Airport reestablished several international routes to Japan, China and Taiwan. Although not very competitive in the international market due to limited route availabilities, Gimpo Airport is becoming competitive against Incheon Airport in terms of these few routes to Japan, China and Taiwan. In the meanwhile, Incheon Airport has grown significantly to becoming one of the world's preeminent airport, receiving numerous international awards from Skytrax (see Table 5).

2.5.2. Incheon International Airport (ICN)

Incheon Airport, located in a satellite city of Seoul, is one of the world's busiest airports in terms of international passengers. Located some distance away from Seoul, Incheon Airport can be accessed from the city center by bus or by the A'REX train within an hour. Incheon Airport was envisioned originally as a relief for Gimpo Airport's traffic but soon became a destination within itself as many entertainment and resort facilities were built into the airport. Furthermore, Incheon Airport is still in the midst of expanding its operations and is currently building an additional terminal (Incheon International Airport Corporation, 2015). Statistics about the current terminal and the planned expansion are shown in Table 11. Incheon Airport also serves as the main hub for three of Korean airliners: Korean Air, Asiana Airlines, and Jeju Air.

	Terminal 1	Concourse	Terminal 2
Commission Date	March 2001	June 2008	2017 (expansion by 2025)
Total Floor Space	496,000 m^2	166,000 m^2	around 378,000 m^2 (expand to 663,000 m^2)
Passenger Handling Capacity	30 million	14 million	18 million (expand to 46 million)
Number of Contact Gates	44	30	37 (expand to 72)

Table 11: Incheon Airport Terminal Information (Rahn, 2008 and 2009; "Incheon International Airport", 2015)

Incheon Airport focuses its strategy on serving the people through four main strategies: ensure safety and convenience, strengthen hub network, expand new infrastructure, and gain and respect as public corporation (Incheon International Airport Corporation, 2014). In addition to continuing its accident-free reputation since its opening, Incheon Airport has also redeveloped itself as a "culture-port" by providing displays and performances of Korean cultural culture within the airport itself. The Millenium Hall, designed as the centerpiece of Incheon Airport, reflects "the marriage of form and function that is the dominant theme of the IIA [Incheon International Airport]" (Jung, 2001). Furthermore, the airport has developed a "Korean Cultural Street" that reproduces traditional Korean buildings for passengers to tour as they traverse the airport. Incheon Airport also ranks as the world's top duty free shop in terms of sales, with over 500 brands being offered to travelers and additional expansions underway (Incheon International Airport Corporation, 2014).

2.5.3. Gimpo International Airport (GMP)

Gimpo Airport is located about 15 kilometers west of Seoul and is Korea's third most busiest airport, being surpassed by Incheon International Airport and Jeju International Airport. Although it began as a Japanese military landing strip in 1939 Gimpo Airport was upgraded into an international airport in 1971 and served in that role for three decades before passing it on to Incheon Airport

("Beautiful Flying", 2015). However, Gimpo Airport has recently been slightly renovated and modernized to include the "Sky City", which offers a place of culture, leisure and shopping. Furthermore, Gimpo Airport also has a shopping outlet inside the international passenger terminal with over 250 brands, along with a movie theater and wedding hall ("Gimpo Airport Outlet", 2015). Various Skytrax customer reviews have noted that although Gimpo Airport is conveniently located to Seoul and an efficient airport, it is somewhat outdated due to lack of significant renovations and modernizations ("Seoul Gimpo Airport", 2015). Current plans for the airport include "strengthening competitiveness as a Biz-Port" through the improvement of business communication infrastructure and immigration procedures (Korea Airports Corporation, 2014).

Section 6. RELATED LITERATURE REVIEW

2.6.1. Selection of Data Type

When passengers decide on a trip that they would like to embark on, they encounter a myriad of choices. Each of the passenger's choices inevitably leads to another choice, as shown in Figure 2. However, Figure 2 shows only the basic scenario where only the most obvious dependencies were analyzed. Hess goes into more detail in her study about the chain of choices that a passenger makes, with one choice obviously limiting future choices. For example, a passenger has already limited his or her choice by selecting air travel to the chosen destination. After a passenger has made a choice, he or she is then confronted with a series of other choices, which Hess investigates in a further discussion about revealed preference (RP) and stated preference (SP) (Hess, 2010).

It is often difficult to perform an analysis of the many different factors of the choice process using RP data. In an RP survey, the data focuses on observations of what a respondent has chosen to do, while SP data represents direct responses from a respondent as to what he or she would have done when presented with a situation. SP data allows respondents to more definitively choose factors and reasons as to their choice, but the downside to SP data is that respondents have only a limited subset of choices modeled. Hess believes that SP data is more successful in determining significant factors for passenger choices (Hess, 2010). Another of Hess's research also backs this claim up since

she further states that “studies using RP survey data often fail to recover a meaningful fare coefficient” (Hess, 2007).

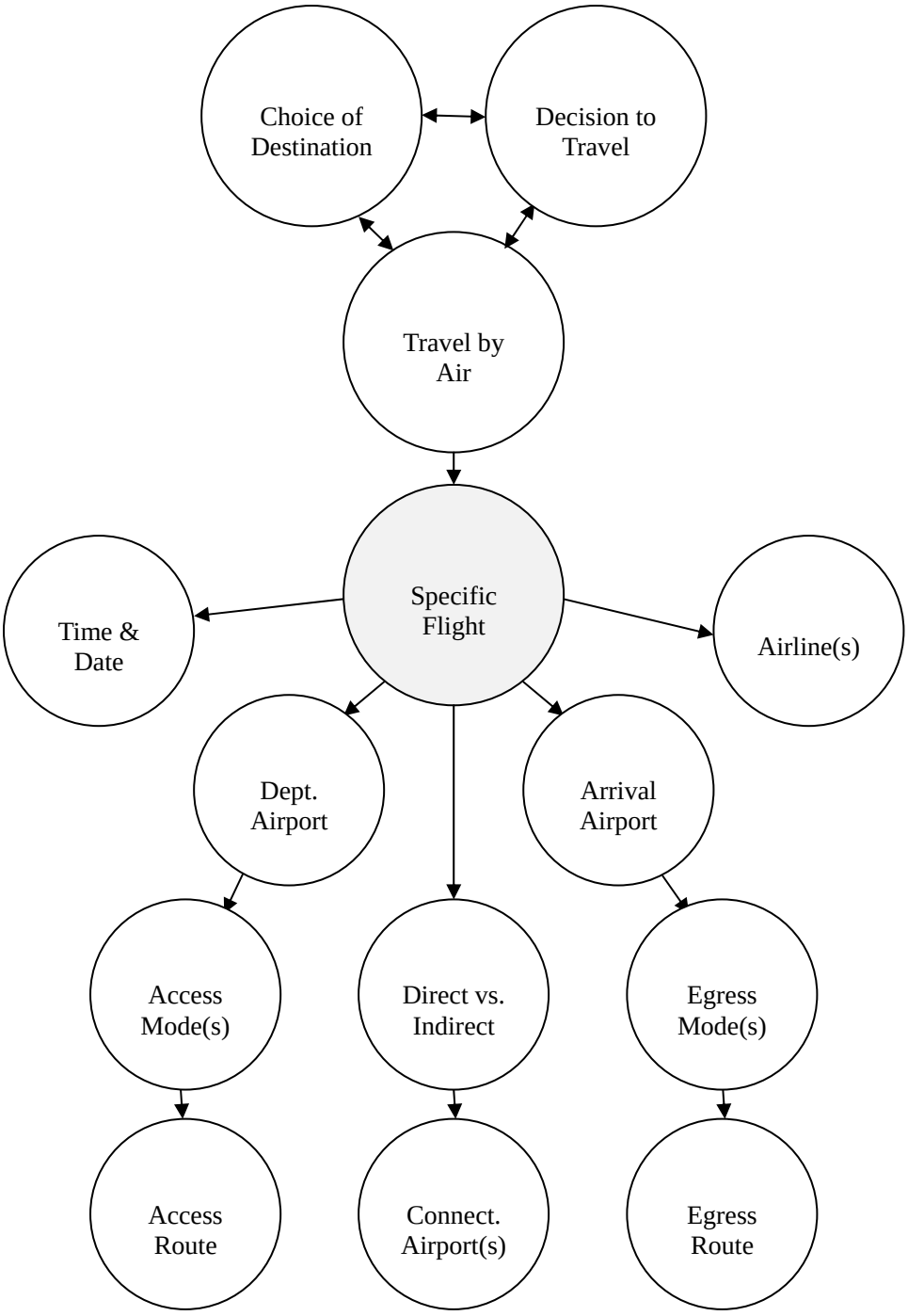

Figure 2: Main Choice Processes of an Outbound Air Journey (Hess, 2010)

2.6.2. Use of SP Data and Introduction to Nested Logit Models

Another one of Hess's research focuses on demonstrating the usefulness of SP survey data in analyzing airport and airline choice behavior (Hess, 2007). RP data may not contain adequate or detailed information related to the factors that influence respondents' choices, which leads to unreliable data for analysis. To justify this statement, Hess collects both RP and SP survey results. Variables that Hess considers included frequent flier information, flight connections/transfers, aircraft-type and on-time performance. However, a major downside of Hess' study with consideration to the current study is that Hess focuses primarily on the price sensitivity and access time acceptability for different types of passengers, from business travelers to holiday travelers to travelers visiting friends and relatives (VFR travelers) (Hess, 2007). While Hess does a thorough job in analyzing a passenger's preferences in terms of flights chosen, she does not look directly into various airport factors influencing a passenger's choice in airports in airport systems.

Using specialized software, Hess is able to construct linear and non-linear models of the data correlations in line with a Multinomial Logit structure for her research. However, Hess notes that nesting structures are not applicable because of the nature of the data set, a limitation which may be applicable to this study's survey results as well (Hess, 2010). Furthermore, Nested Logit models can only be used for one dimension of choice, with multi-level Nested Logit model being used for multiple dimensions of choice. Although ideal for determining various dimensions of choice, the structures and models have a major downside in that it is only able to correlate along N-1 dimensions, where N is the total number of dimensions. In other words, Nested Logit model is can correlate one less than the maximum number of dimensions, where the lowest nested level becomes obsolete.

A research by Yang is more related to the Northeast Asian airports that are selected as part of the current study. Yang researched the interdependence of airports and flight routes using a two-level Nested Logit model (Yang, 2014). While this study is significant in that it deals with the same region's airports as the current study, Yang chooses to model the dimensions of joint airport and route choices using an SP design. This is different than the current study in that the current study explores airport choice, not route choice from each airport. However, factors that Yang considers

were also utilized in the current study's survey, specifically questions about socioeconomic characteristics as well as air fare, flight frequency and access times, which were what Yang found to be more influential in affecting airport choice.

2.6.3. Direct Survey Analysis for Passengers' Airport Satisfaction

The Civil Aviation Authority (CAA) carried out an extensive assessment of three London Airports: Heathrow, Gatwick and Stansted. Overall, it uses "data obtained from the CAA Passenger Survey in order to analyse the extent to which an airport's passengers may be willing and able to switch away from that airport, the possible reasons why passengers choose a particular airport, and their price responsiveness" (Civil Aviation Authority, 2011). Because of the related nature of this working paper to the current study, many aspects of the study are replicated in the current study for researching Northeast Asian airports. Furthermore, the CAA study also utilizes SP data. Some of the CAA study involves asking passengers about airports that they have used in the recent years, as well as any other airports that were considered as alternative airports. The results are organized into the top five reasons that leisure passengers, business travelers, and VFR travelers chose a specific airport. An example of the organization is shown in Table 12. These results are also organized according to flight duration.

Rank	UK		Foreign	
1	Nearest to Home	31%	Cost	36%
2	Third Party Decision	27%	Third Party Decision	17%
3	Route Network	18%	Nearest to Leisure	17%
4	Cost	15%	Route Network	15%
5	Timing of Flights	4%	Nearest to Home	7%

Table 12: Top 5 Reasons for Airport Choice by Leisure Passengers at the Four Major London Airports (Civil Aviation Authority, 2011)

The CAA study goes further than the current study in investigating the passengers' responsiveness to change prices. CAA was able to accomplish this through including a hypothetical

SP question that asked passengers to respond to an increase in the airfare from their departure airport. These increases are of set amounts ranging from £5 to £50 for short to long haul flights. The results show that business travelers, particularly at Heathrow, are not likely to switch away from their airport compared to other types of travelers.

A second study relating to service quality and customer satisfaction with an airport was conducted by Bezerra on Guarulhos International Airport in Brazil. The study focuses on attributes related to the passenger terminals and uses both exploratory factor analysis and ordinal logistic regression models to analyze relationships between various aspects of the airport with the passengers' overall satisfaction (Bezerra, 2015). Although this study does not directly connect with the current study, a passenger's satisfaction in an airport can easily be correlated to the possibility that the passenger will select that airport repeatedly, particularly if the airport is part of an airport system. The survey probes dimensions such as check-in, security, ambience, basic facilities, prices, convenience, and mobility. The study found that although passenger characteristics had no significant effect, frequent flyers may not present high levels of satisfaction. In addition, the study found that restaurants and stores "may be considered dissatisfiers for passenger satisfaction, which mean that an increase in their quality should not have greater impact in creating satisfaction, but a decrease should create dissatisfaction" (Bezerra, 2015). Other conveniences, such as food facilities, stores, banks/ATMs/exchanges, and courtesy and helpfulness of staff were found to be mainly dissatisfiers as well. Ambience, however, was found to be the dimension with the highest effect on customer satisfaction.

2.6.4. Performance Evaluation for Airports

Although not directly related to the analysis of airport choice by passengers, there are a few studies based on an evaluation of airport performance. While these researches themselves cannot be directly used in this study, some of the factors that were analyzed prove to be of use in determining factors for passenger choice. The first research by Chang analyzed the performance of international airports in East Asia, specifically at Narita International Airport (Tokyo), Kansai International Airport (Osaka), Incheon International Airport (Seoul), Beijing International Airport (Beijing),

Hongqiao International Airport (Shanghai), Changi Airport (Singapore), Chek Lap Kok International Airport (Hong Kong), CKS International Airport (former name of Taoyuan International Airport in Taipei), Bangkok International Airport (Bangkok), and Manila International Airport (Manila) (Chang, 2003). The researchers in this study utilized the Gray Statistic method combined with TOPSIS and Fuzzy Synthetic Decision approaches to determine the ranking of airport performance. Although these statistical methods are not used in the current study, the current study does utilize the concept of dividing "passenger quality into two parts: facilities as a hardware criteria and service quality as a software criteria…the hardware items cover the whole process when a passenger entering an airport until the end of leaving…software items are all about satisfaction" (Chang, 2003).

Composition	Evaluation Criteria
Supply	Earnings-Price Ratio
	Employee Performance
	Airport Size
	Ground Transportation Service
	Potentials of Passenger Demand
Airline Demand	Size of Airside Field
	Distribution of Landing and Take Off
	Regulated Degree of Airport
Passenger Demand	Congestion Degree
	Waiting Time
	Walking Distance
	Comfortableness
	Availability of Service
Supervision	Navigation Facilities
	Environment Protection
	Flight Safety

Table 13: Final Evaluation Criteria of Airport Operating Performance (Chang, 2003)

In selecting evaluation criterions from Table 13 for the current study, the author evaluated several of the criterions used by Chang in his study and incorporated some aspects into the survey

distributed to respondents regarding the East Asian airports. In Chang's research, the airports were ranked based on their ability to satisfy each of the four composition sections. These results are shown in Table 14.

Ranking	Supply Side	Airline Demand Side	Passenger Demand Side	Government Supervision Side
1	Chek Lap Kok International Airport	Changi International Airport	Changi International Airport	Kansai International Airport
2	Beijing Capital International Airport	Manila International Airport	Kansai International Airport	Narita International Airport
3	Changi International Airport	Kansai International Airport	Chek Lap Kok International Airport	Chek Lap Kok International Airport
4	CKS International Airport	Beijing Capital International Airport		

Table 14: Results of Chang's Research (Chang, 2003)

Another analysis on the measuring and benchmarking airport efficiency was performed by Diana in his study. Although various methods of analysis, which included Data Envelopment Analysis (DEA) and Stochastic Frontier Analysis (SFA), were used, these methods were not applicable for determining passenger preferences in airlines since these analysis strategies are utilized primarily for determining performance indices. Furthermore, the data that Diana uses as input into the DEA and SFA are primarily statistical estimations, not survey results. However, different model variables that Diana uses were considered when generating the survey for the current study. These included average minutes of gate arrival delay, average minutes of gate departure delay, average minutes of taxi-out delay, average minutes of taxi-in delay, percent of the airport's total available capacity utilized, airborne delay, and block delay (Diana, 2011).

CHAPTER 3. RESEARCH AND DATA ANALYSIS

Section 1. SURVEY BACKGROUND

3.1.1. Respondents

In order to acquire information about passenger preferences from respondents, a survey was developed and distributed online over the span of two weeks from June 2, 2015 to June 15, 2015. After two weeks, 101 anonymous survey responses were collected via the online form. Of the 101 respondents, 50 are male and 50 are female, with one person declining to state. More details about the demographics of the respondents are listed in Table 15.

Age Range (years)		**Primary Occupation**		**Nationality**	
Under 20	4	Employed Full-Time	32	Japan	31
20 to 29	64	Self-Employed	4	Taiwan	22
30 to 39	27	Employed Part-Time	4	South Korea	14
40 to 49	4	Student	62	China	3
Above 49	0	Other	1	Thailand	6
				United States	11
				Other	9

* Other nationalities: Australia, Bulgaria, France, India, Indonesia, Mongolia, Peru, and Sri Lanka

Table 15: Demographics of Survey Respondents

From the demographics shown in Table 15, a majority of the respondents are between the ages of 20 and 39 and are either employed full-time or students. While this may seem like a potential skew in the possible responses, the demographics of the respondents are actually representative of travel site visitors, as shown in Figure 3. These Internet users are most likely the ones influenced by airport performances and conditions since airport and airline information travels primarily through the Internet in the modern age. Furthermore, elderly individuals are more likely to stay with their

preferred airport, making them a static consumer group that is not available to competing airport groups to try to attract. Because part of the purpose for this survey is to give an insight to airports on how to be more competitive in attracting passengers and for passengers to know which airport is more preferred by others, surveying an elderly population may not provide as meaningful of information as the current survey.

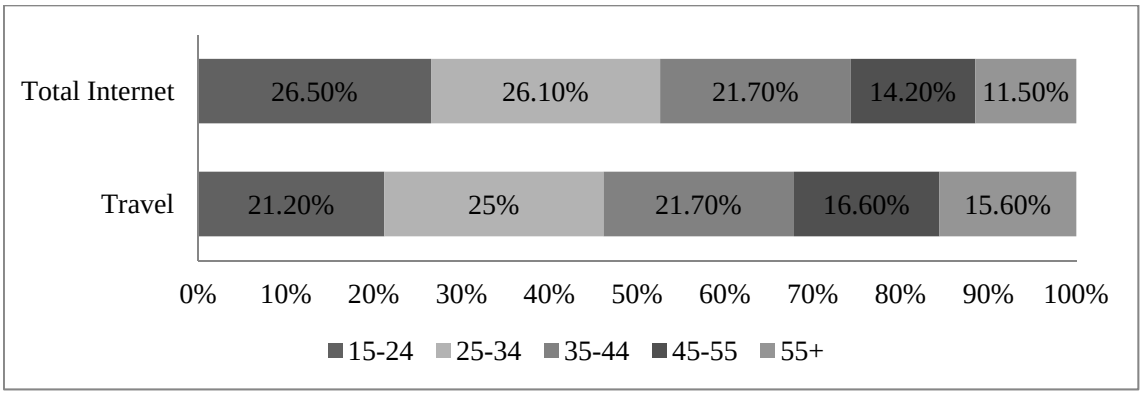

Figure 3: Percent Composition of Visitors by Age to Travel Sites Globally (ComScore, 2011)

As shown in Table 16, a large proportion of the respondents traveled through the six selected airports for the purpose of sightseeing, which constituted about 53.1% of the total number of responses. This is followed by 30.7% of respondents who traveled for family visits, and then by 8.6% who traveled for business purposes. There are also about 7.6% of respondents that traveled for other purposes, which included returning home, studying abroad, transits/transfers, and layovers. The constitution of the respondents has implications on the scope of the data analysis since the results are more representative of leisure travelers rather than business travelers. However, some information may still be extracted about business traveler preferences.

Travel Type	Tokyo – Narita	Tokyo - Haneda	Taipei - Taoyuan	Taipei - Songshan	Seoul - Incheon	Seoul - Gimpo	Total
Business	6	9	0	1	6	3	25
Family Visit	29	24	16	13	5	2	89
Sightseeing	47	32	24	11	28	12	154
Others	11	6	0	1	4	0	22

* Others include returning home, study abroad, transits/transfers, and layovers

Table 16: Breakdown of Travel Purposes by Respondents

3.1.2. Survey Questions Overview

The survey is separated into nine primary sections. Each of these sections targets a different area of interest. For some sections, particularly the airport questions section, the respondent is allowed to skip the section if he or she does not have any experience traveling through the airport. Furthermore, the respondent is also given the choice of not filling in an answer as well.

The first section is the background questions section. This section is to determine what are most important and least priorities for the respondent when he or she chooses an airport. A series of suggestions are given, but the respondent is also free to respond freely by selecting “other” and filling in the blank. Other questions in this section ask the respondent which airports he or she most often uses and also which one he or she would most like to use. The final question in this section asks what the respondent’s overall impression of each airport is.

The second through seventh sections are the airport questions sections. Each of these sections asks a set of identical questions but is directed at a different airport among the six airports that are investigated in the current study. At the start of each section, respondents are asked if he or she has traveled through the airport of interest. If the respondent responds affirmatively, he or she proceeds to answer the following questions related to the airport. If the respondent responds negatively, he or she skips the airport’s section and is presented with the next airport’s questions.

Each of the airport questions section is divided into six subsections relating to the

respondent's experience with the airport. The first subsection is background and asks the respondent whether he or she has used the airport before, how many times, and for what purpose. The second subsection asks questions relating to airport access (i.e., ground transportation to the airport). The third, fourth and fifth sections ask questions regarding the respondent's opinions about the facilities, services, and formal procedures at the airport, respectively. In specific, facilities that are mentioned in the survey include duty-free stores, restaurants, airline lounges, public seating areas, prayer/silence rooms, smoking areas and restrooms. Services mentioned include information desk, roaming service agent/staff, self check-in kiosks, flight information monitors, digital applications, and luggage services. Formal procedures mentioned include check-in, security check, immigration (exiting), boarding, disembarking, transfer to connecting flights, immigration (entering), baggage claim, and customs. The sixth subsection asks questions relating to the flights that are available at the airport.

After the airport questions section, respondents are presented with the eighth section of the survey that relates to airport and airport system comparisons. This section is aimed at determining what the respondent's preferences are regarding integrated airport hubs versus airport systems. The demographics section follows the airports comparisons section. Respondents are asked a series of brief questions about their personal background before finishing the survey.

Section 2. DATA ANALYSIS

3.2.1. Background Section

Some of the first questions in the background section focus on which airports in the current study respondents have used and were more inclined to use if given the chance. Because there were a large number of respondents that have not visited Taipei or Seoul (or had no preference as to which airport to use in the cities), respondents that have no visited an airport are not displayed in Figure 4 and Figure 5 under the corresponding airport in order to compare results more easily.

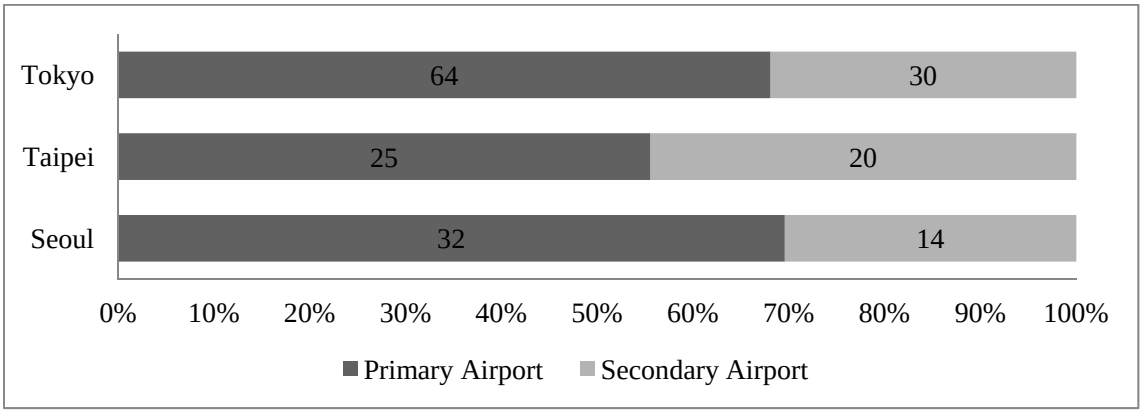

Figure 4: Number and Percent of Respondents that Travel Through Each City's Airport

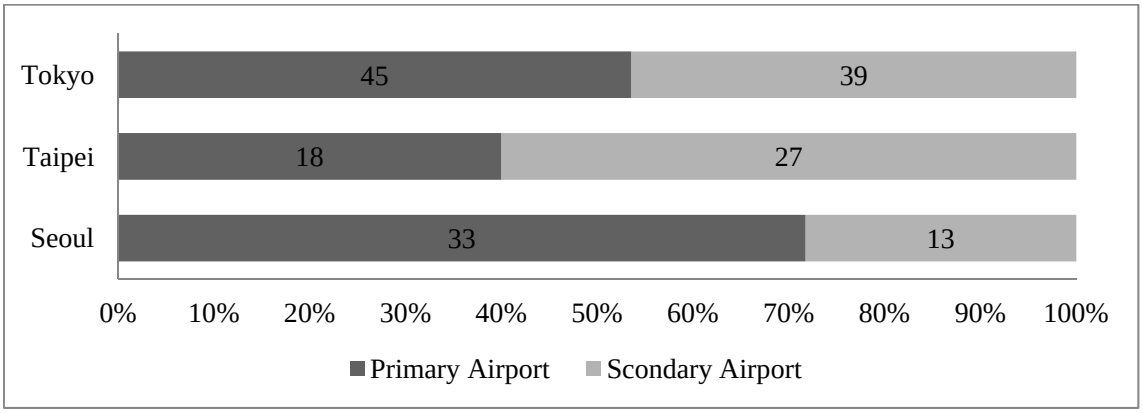

Figure 5: Number of Percent of Respondents that Prefer to Travel Through Each City's Airport

As seen in Figure 4, a majority of respondents use the primary airport in each airport system, with the percentage being between about 55% and 70% depending on the city. This is reasonable since many of the respondents most likely often fly international routes when traveling, and primary airports offer more international flights. When asked which airport respondents would ideally like to travel through, the percentage of respondents that would travel through the primary airport drops by about 15% for Tokyo and Taipei airport systems, while Seoul's airport system's ratio stays relatively the same. The 15% drop seems logical since passengers would probably prefer to fly from the airport closer to the city center when given the freedom of choice, perhaps due to the airport's convenience.

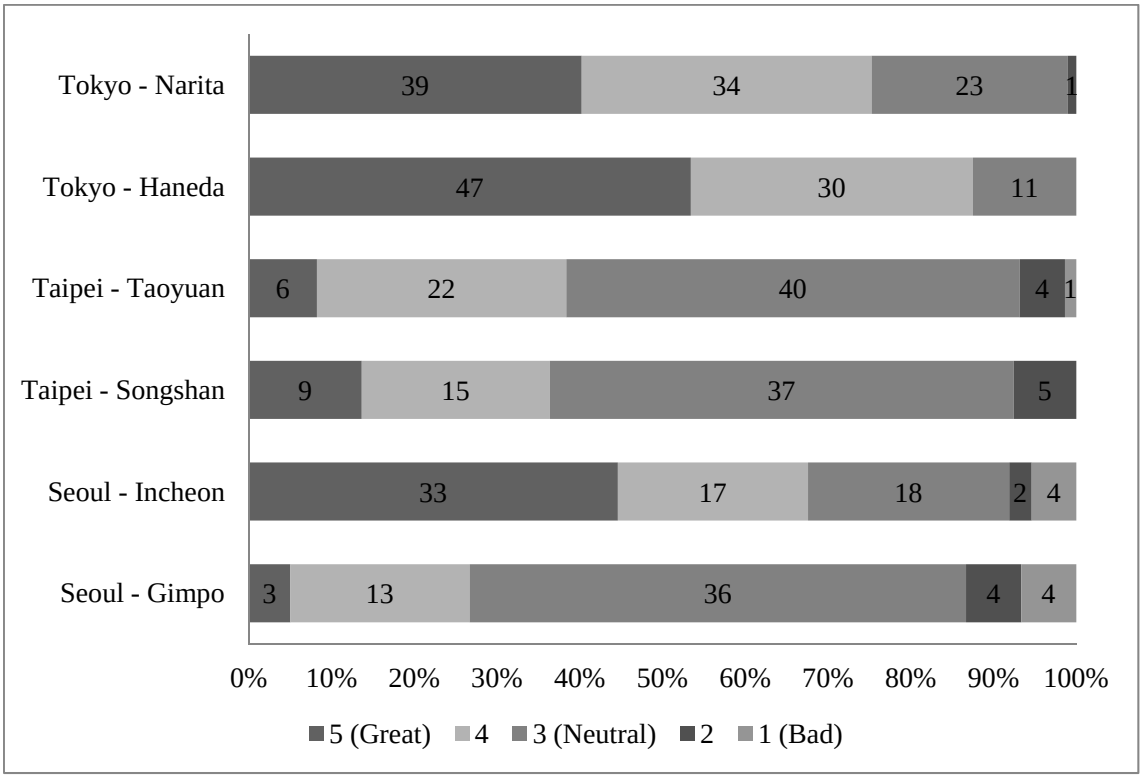

Figure 6: Rating of Overall Impression Regarding Airports

Figure 6 shows the overall impression that respondents had of each airport in the current survey. From these results, both Tokyo's airports as well as Incheon Airport were highly rated by a number of respondents. However, Taipei's airport and Gimpo Airport were more ambiguous because of the large number of respondents that perhaps were not familiar with the airports and thus responded with a neutral response. Using primarily the percentages of 5's and 4's that were given by respondents, Haneda Airport and Incheon Airport are clearly the higher rated airports in the Tokyo and Seoul airport systems. This is perhaps due to the recent renovations and upgrades at Haneda Airport as well as Incheon Airport being built as a world-class airport. Gimpo Airport has also not been renovated recently and is also not as well known as Incheon Airport, both factors which could have contributed to its lower rating relative to its counterpart airport. The results for the airports in the Taipei airport system are too close to clearly differentiate which is the more highly rated airport. However, by averaging the different respondents' overall impression ratings for each of the airports,

the following results are obtained:

- Narita Airport: 4.14 Haneda Airport: 4.41
- Taoyuan Airport: 3.38 Songshan Airport: 3.42
- Incheon Airport: 3.99 Gimpo Airport: 3.12

These averaged values show a much clearer picture of the overall impression ratings that the respondents provided for each airport. From these results, respondents seem to have a higher impression of Haneda Airport, Songshan Airport and Incheon Airport. However, Taoyuan Airport and Songshan Airport's results are very similar and the difference is actually statistically insignificant, as shown in Appendix 1. Haneda Airport and Incheon Airport's higher overall impression ratings can be easily seen as Haneda Airport leads Narita Airport by about 0.27 and Incheon Airport leads Gimpo Airport by 0.87.

To investigate deeper into the behavior of passengers' choices when selecting airports within airports, the survey also asks respondents to select their most and least important priorities when considering airports. The results for these questions are shown in Figure 7 and Figure 8. In Figure 7, out of the 101 respondents, about 45% of the respondents chose cost of airfares as a predominant factor when choosing airports, followed by 19% of respondents who chose ground access time to airport and 17% of respondents who chose suitable flight times. These results demonstrate that the respondents in general are more cost-considerate when choosing an airport to fly into or out of, which would support the earlier observation that a majority of respondents use primary airports. Primary airports typically, though not always, have flights with cheaper airfares compared to flights at secondary airports.

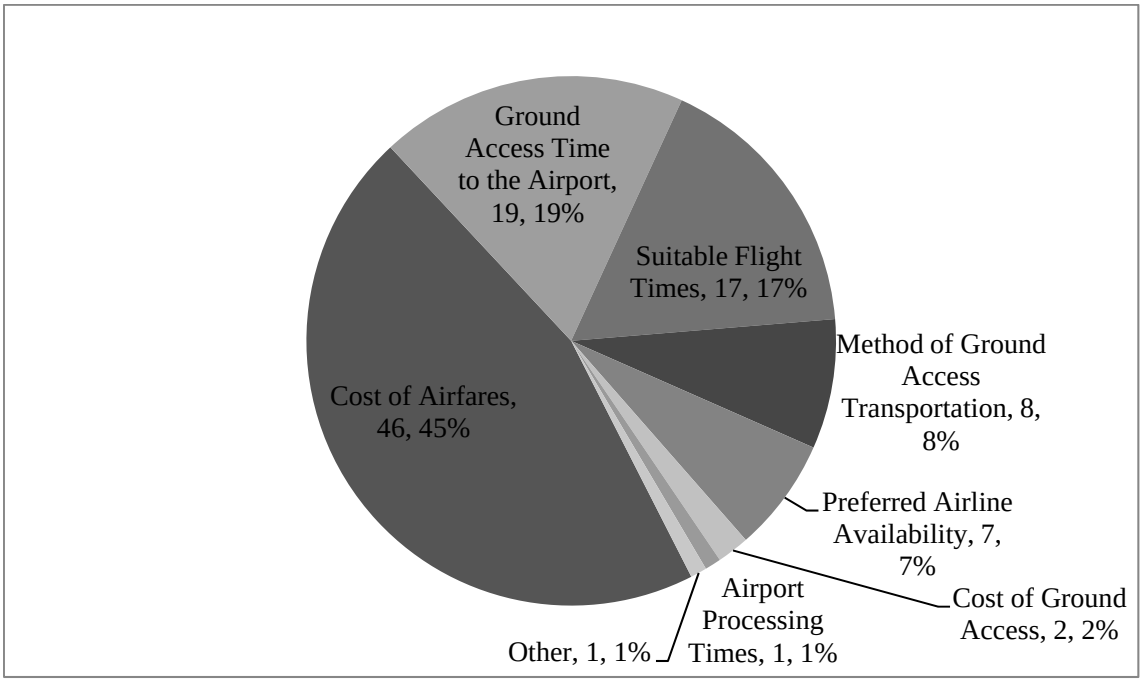

Figure 7: Respondents' Most Important Priority When Considering Airports

Figure 8 shows the respondents' least important priorities according to survey results. 38% of the respondents stated that the overall reputation of the airport is not very important when choosing an airport, followed by 24% of respondents who chose airport facilities as not that important and 12% of respondents who chose airport processing times. These results imply that respondents do not consider much about the condition or the quality of the airport as long as there are suitable airfares, ground access and flight times. Therefore in the respondents' eyes, what the airport itself offers in terms of facilities and services may not be as important as the kinds of flights that are operating out of the airport. This result is surprising since airports are constantly trying to innovate and upgrade their facilities and services, though these improvements do still indirectly affect flight offerings since improvements in airports help to attract airlines to the airport.

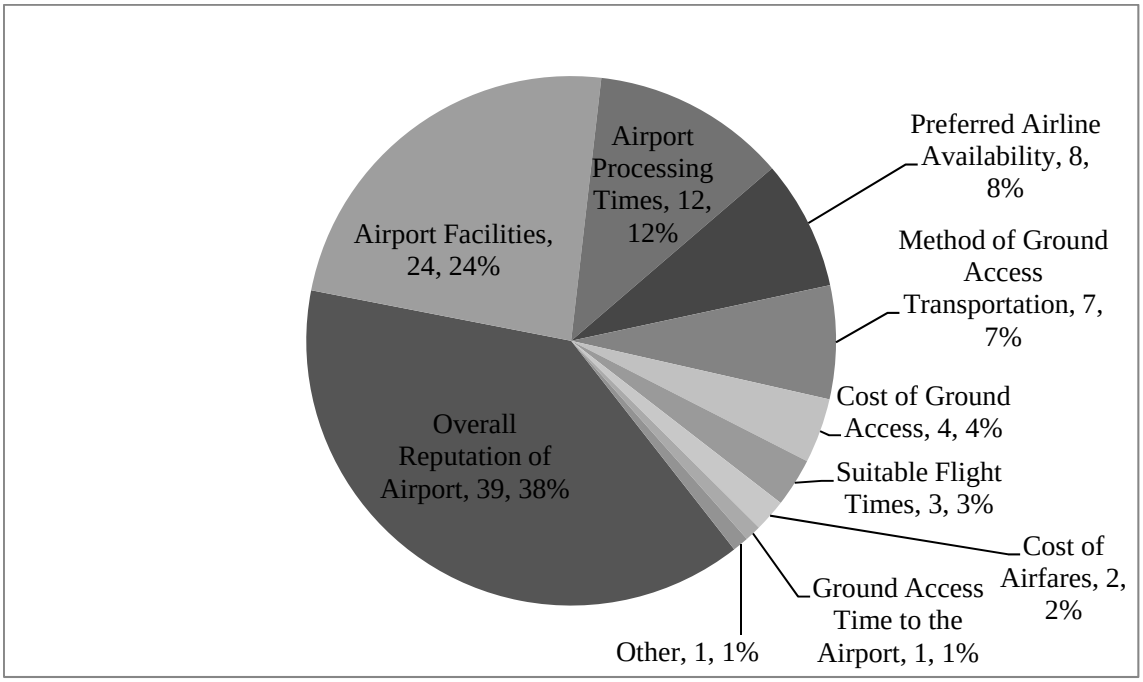

Figure 8: Respondents' Least Important Priority When Considering Airports

3.2.2. Airport Ground Access, Facilities, Services, Procedures, and Flights

The second section of the survey asks respondents specific questions regarding each of the six airports. If respondents did not have experience in traveling through an airport or could not remember much about the airport, he or she would skip that airport's set of questions and move on to the next airport's set of questions. Each airport's set of questions were identical so that the results are comparable. The overall results from the respondents are shown in Table 17.

		Tokyo		Taipei		Seoul	
		Narita	**Haneda**	**Taoyuan**	**Songshan**	**Incheon**	**Gimpo**
Cost of Ground Access	**Average Cost (yen)**	2481	1071	791	365	1259	782
	Samples	79	62	30	20	32	13
Time for Ground Access	**Average Time (minutes)**	88	54	61	23	71	63
	Samples	83	66	35	23	36	13
Airport Facilities	**Average Rating**	3.94	4.12	3.42	3.20	4.33	3.54
	Samples	762	535	312	207	340	122
Airport Services	**Average Rating**	3.92	4.08	3.53	3.61	4.18	3.76
	Samples	452	320	179	127	171	68
Airport Procedures	**Average Rating**	3.89	4.19	3.45	3.60	4.10	4.25
	Samples	746	517	307	171	316	119
Time for Procedures to Leave Airport	**Average Time (minutes)**	28	26	30	21	26	18
	Samples	76	56	30	21	38	15
Airport Flights	**Average Rating**	3.52	3.67	3.44	3.48	3.65	3.57
	Samples	431	323	170	121	202	74

* Ratings are between 1 (low rating) and 5 (high rating)

** Results that are statistically insignificant via a t-test (see Appendix 2) are boxed in bold

Table 17: Respondents' Results of Ground Access and Airport Ratings

Because of the increased distance primary airports are from the city center compared to secondary airports' distance from the city center, it is logical that respondents have to pay more time and money in order to reach primary airports in order to take flights. As seen in Table 17, the

difference can be over double the cost it takes to go to a secondary airport, such as Narita Airport's average of 2481 yen to Haneda Airport's average of 1071 yen. The time difference to travel to the airport is something in particular to note, especially since respondents ranked ground access time as the second most important factor in choosing an airport. The time difference for Tokyo's airport system is about 17 minutes, Taipei's airport system is about 38 minutes, and Seoul's airport system is about 8 minutes. For some travelers, particularly business travelers, saving a few minutes could mean significantly.

However, ground access results for Seoul's airport system are shown to be statistically insignificant for both the cost and time of ground access. While 63 minutes and 71 minutes can be considered as not significantly different, especially compared to the other airport systems, the cost difference deserves a more in-depth look. The difference between traveling to Incheon Airport and traveling to Gimpo Airport is almost 500 yen, which is a significant difference considering Incheon Airport's cost of ground access is 1259 yen on average. The statistically insignificant result determination may be explained by the low number of respondents for Seoul's airport system, particularly Gimpo Airport. As a result, a higher variance could have resulted in a lower t-stat value (see Appendix 2). More samples at Seoul's airport system may be needed to improve these results.

In terms of airport facilities, there are varying results among the different airport systems. Although average ratings were similar in most cases, often varying by less than 0.2, t-tests show that the difference is statistically significant. In the Tokyo airport system, Haneda Airport has the higher rating with 4.12 to Narita Airport's 3.94. This result indicates that respondents considered Haneda Airport as having overall better facilities than Narita Airport, which is reasonable considering the overhaul Haneda Airport has performed over the last few years in constructing its international terminal. Much of Narita Airport's renovations has either been behind the scenes or too recent to be reflected in the respondents' answers. Contrary to the Tokyo airport system, the primary airports in both Taipei and Seoul were rated higher than the secondary airports, with Incheon Airport being rated significantly higher than Gimpo Airport. These results are also understandable since the secondary airports in these airport systems were originally not designed for full-scale international

operations in the modern era and so are somewhat aged, despite incremental renovations.

There are also varying results among the different airport systems regarding respondents' ratings of airport services. Haneda Airport, the secondary airport in the Tokyo airport system, is rated higher than Narita Airport by an average of 0.16, but Incheon Airport, the primary airport in the Seoul airport system, is rated higher than Gimpo Airport by an average of 0.42. Similar to the airport's situation regarding its airport facilities, respondents may have taken notice of Haneda Airport's recent improvements that seem to have boosted it to a higher standing compared to Narita Airport. In Seoul's airport system, Incheon Airport holds a strong lead over Gimpo Airport in terms of service, especially as Incheon Airport continues to try to attract more of traffic going through Northeast Asia. However, Songshan Airport's lead of 0.08 over Taoyuan Airport is deemed statistically insignificant, most likely because Songshan Airport has striven in recent years to improve its services to rival that of larger international airports as certain routes due to the influx of international passengers, despite the airport's small size. This improvement in service seems to have caused respondents to consider Taoyuan Airport's services and Songshan Airport's services to be on par with one another.

In most of the airport procedures average ratings comparisons, the results are statistically insignificant. A statistical difference materializes only in Tokyo's airport system where Haneda Airport leading Narita Airport by about 0.20. However, this difference was not due to the amount of time it took to complete procedures to leave the airport upon arrival, which is perhaps the time that passengers care most about when traveling through an airport. The average time difference between Narita Airport and Haneda Airport is only 2 minutes and is shown to be statistically insignificant. In both Taipei's airport system and Seoul's airport system, the secondary airport led by 0.15 in each case for respondents' average rating of airport procedures. In regards to the time for procedures, the secondary airports were often faster by 8 to 9 minutes, which may reflect the faster processing times possible at these airports due to their smaller sizes compared to the primary airports. Overall, these results show that although respondents were overall slightly more pleased with their experience at secondary airports in regards to airport procedures, but the overall difference is not significant except

in the Tokyo airport system's case. Time taken to leave the airport, while significant in some cases, does not seem to play an influential role in determining respondents' ratings of overall airport procedures.

The respondents' average ratings for airport flights for all three airport systems are all very similar to one another (varying by 0.15, 0.04, and 0.08) and were also deemed statistically insignificant. This is surprising since the primary airports in each airport system often have extensive flight connections (see Table 6) compared to the secondary airports. However, this result may have come around due to the use of convenience sampling since upon further inspection of the responses, it seems that most travelers often fly primarily on routes between the three cities that were investigated in this study, particularly the Tokyo-Taipei and Tokyo-Seoul routes. As a result, the supposed competitive advantage that primary airports have on international routes is diminished since the respondents sampled may be using primarily intra-Northeast Asian routes.

3.2.3. Airport System and Integrated Hub Airport Comparisons

Following the airports section, the survey proceeds to present respondents with different statements to which respondents are asked to what degree they agree or disagree with the given statement. These responses are used to understand the respondents' opinions of airport systems overall in relation to a few key factors, such as route choices and location convenience.

Figure 9 shows the respondents' responses to whether they would rather fly through airport systems or an integrated airport hub. Integrated airport hubs are cities where there is just one major airport and no other secondary airports in the vicinity, such as in Nagoya (Japan), Sydney (Australia), Singapore (Singapore), or Atlanta (United States). In contrast to airport systems, integrated airport hubs force all flight connections at a city to go through a single airport, increasing the likelihood of a convenient flight transfer but also increasing the probability of congestion at the airport. Furthermore, integrated airport hubs may result in a long ground travel time to or from the airport if the airport is located far from the passenger's place of departure or destination.

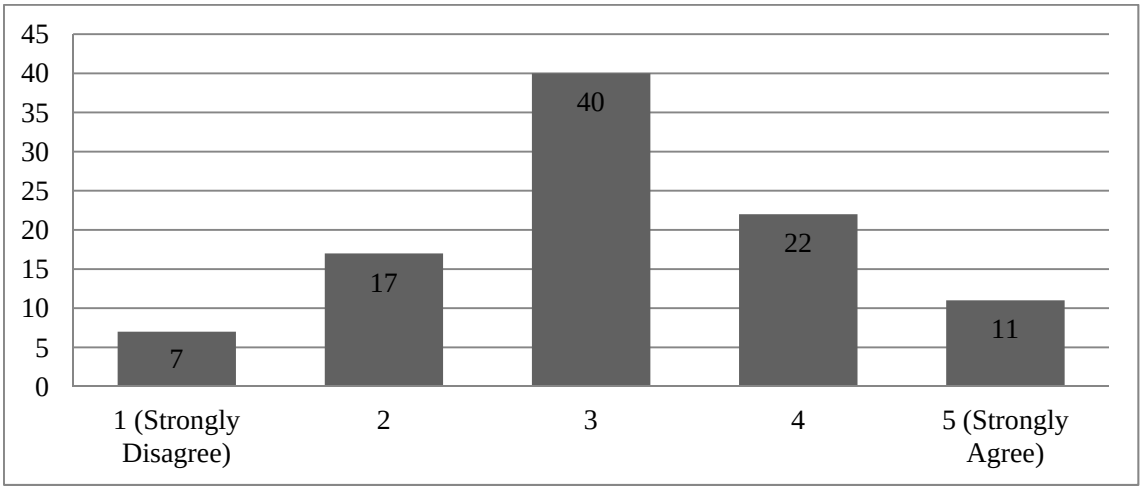

Figure 9: Number of Responses to the Statement "You would prefer to fly through cities with airport systems rather than into cities with an integrated airport hub"

From the responses shown in Figure 9, respondents seem indifferent to airport systems in comparison to integrated airport hubs, especially since the overall average of the responses is 3.13. One explanation for this may be that ground transportation systems between airports in an airport system are usually well-developed that airport systems considered as a single pseudo-integrated airport hub. For example, it is now often possible to have transfer flights arriving and departing from different airports in an airport system but booked on a single ticket. Another explanation may be that respondents already have a preferred airport regardless of whether it is an integrated airport hub or part of an airport system, so there is no difference in the two types. There is also the possibility that respondents simply do not have much experience with integrated airport hubs since although common in many places in the world, integrated airport hubs seem to be less common in Northeast Asia where many of the survey respondents tend to travel.

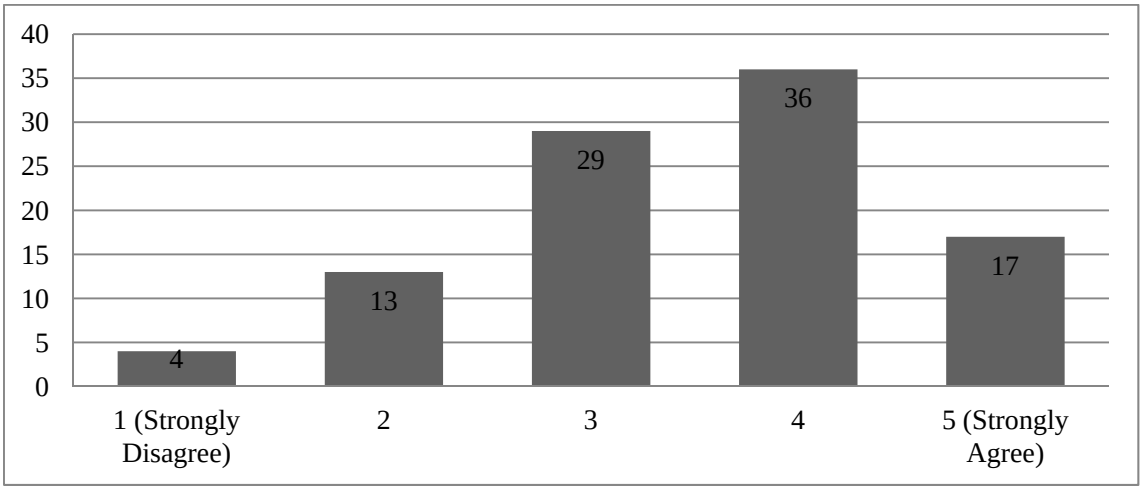

Figure 10: Number of Responses to the Statement "Airport systems offer more choices in terms of routes to choose from"

In Figure 10, respondents were slightly more biased towards the affirmative in responding to whether airport systems offered more choices in flight routes, with an overall average of 3.49. Because airport systems consist of more than one airport, respondents seem to indicate that there is a larger chance that there is a greater selection of flight connections among airports in an airport system than, for example, at an integrated airport hub. However, the difference is not too significant since integrated airport hubs may still have a competitive number of flight connections.

The responses in Figure 11 gauge the respondents' opinion regarding the convenience of airport locations in airport systems. From the appearance of the graph, it is obvious that the responses are skewed towards the affirmative, with an overall average of 3.82. This demonstrates that one of the benefits for passengers living near an airport system is the likelihood that at least one of the airports in the airport system is located near the passenger's place of departure or arrival. For example, residents in Tsukuba (approximately 70 kilometers northeast of Tokyo) would have to travel significantly farther to reach Haneda Airport than they would need to reach Narita Airport. Having a conveniently located airport increases the ease of ground access passengers need to undertake to travel to or from airports.

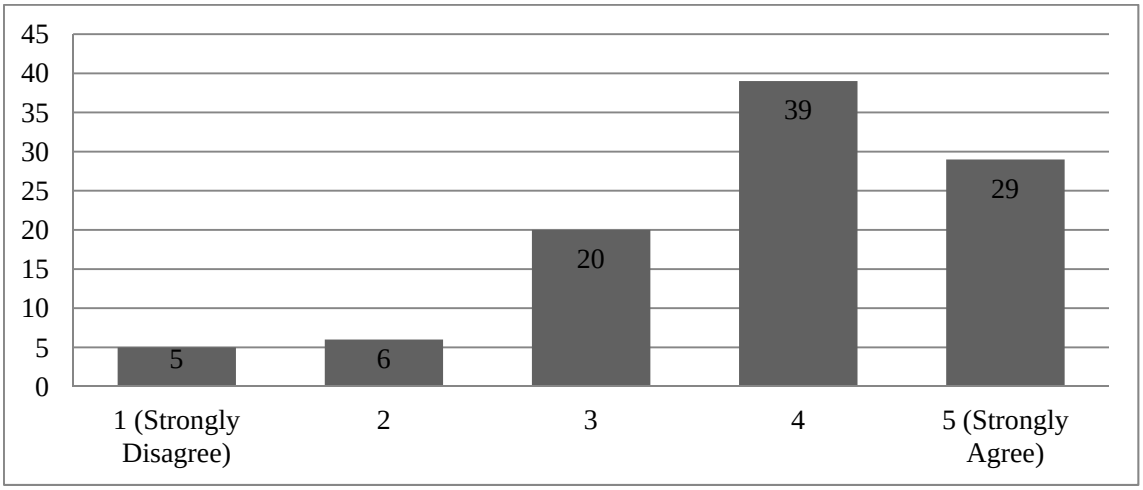

Figure 11: Number of Responses to the Statement "Airport systems offer a better chance of having an airport conveniently located to you"

CHAPTER 4. CONCLUSION

Section 1. HYPOTHESIS REVISITED

Returning to the initial set of hypotheses that set the focus of the current study, it becomes possible to digest the individual results presented in Chapter 3 as part of a complete picture. Various portions of those results are both interesting and surprising to see for the different airport systems. Furthermore, the results reveal some of the clear differences that emerged between different airport systems, despite the similarities with which the airports had initially evolved within their respective cities.

Hypothesis 1 is “travelers prefer to use secondary airports because of their ease of access from the city center”. This hypothesis is rejected by the results of the survey in two different ways. The main result that rejects this hypothesis is shown in Figure 7, where respondents indicate that the cost of airfare is actually their primary consideration in choosing an airport, not ease of access, which incidentally was their secondary consideration. Furthermore, Figure 4 shows that the vast majority of respondents travel through the primary airport during their travels. Even when given an idealistic case in Figure 5 where the respondent could choose which airport he or she prefers to fly out of, most respondents still chose the primary airport, though to a lesser degree in most cases. Taipei was an exception though, since most respondents would choose to fly out of the secondary airport when given the choice.

Hypothesis 2 is “travelers prefer the airport that has better facilities within an airport system”. By comparing the results of Figure 5 with Table 17, it becomes obvious that there are no clear correlations between a passenger’s choice in airport and the facilities at an airport, thus this hypothesis is rejected. Haneda Airport and Taoyuan Airport were both rated higher than their counterparts in the same airport system, and yet passengers would have preferred to travel out of Narita Airport and Songshan Airport. Incheon Airport, on the other hand, was both rated higher than Gimpo Airport and had more respondents choose to travel through that airport. However, this result may have simply come about because Incheon Airport outperforms Gimpo Airport in many

categories such that any advantages Gimpo Airport has may be overshadowed. The rejection of hypothesis 2 is further solidified with the results of Figure 8, which shows that airport facilities were second least important to respondents when they consider airport choices.

Hypothesis 3 is “travelers have a better impression of primary airports compared to their corresponding secondary airport”. This hypothesis is generally rejected, since Haneda Airport has a higher impression rating than Narita Airport and Songshan Airport has a higher rating than Taoyuan Airport. Haneda Airport has been undergoing many recent renovations to make itself more competitive against Narita Airport, which seems to have succeeded in shifting public impressions about the airport. The slight difference in results for Songshan Airport and Taoyuan Airport are statistically insignificant, so the two airports can generally be considered to have roughly the same impression rating. Incheon Airport, on the other hand, is clearly more recognized than Gimpo Airport, so Seoul is the only airport system studied that supports the hypothesis.

Hypothesis 4 is “travelers prefer to travel into cities with airport systems rather than into cities with an integrated airport hub”. The results in Figure 9 are somewhat surprising as the responses produce a normal distribution, which thus rejects the hypothesis. This may imply that most of the respondents do not have a preference as to whether they travel through an airport system or an integrated airport hub, so long as they arrive at their destination. It may also be that the respondents that participated in this survey are not as familiar with integrated airport hubs as, for example, people in the United States who are used to only one giant airport hub near their homes compared to the variety of choices available to people in Asia.

Hypothesis 5 is “airport procedures and airport procedures time are not an important determinants for travelers in choosing between airports”. This hypothesis is supported by the results of the survey since according to Figure 8, airport processing times is the third least important priority when considering airport choices. This realization is further reinforced in Table 17, which shows that the average time to complete procedures and leave the airport are often statistically insignificant. It seems that airport procedure times at all six airports are roughly half an hour or less, which is comparably less than the time passengers most likely wait to board an airplane and fly to their

destinations, which makes a 12 minute difference (the largest difference in time between slowest and fastest airports analyzed in the current study) seem unimportant.

Hypothesis 6 is “airfare is an important determinant in choosing between airports for travelers”. This hypothesis is supported by the data obtained from the respondents. Figure 7 shows that about 45% of respondents consider airfare as the most important factor when considering airports, more than any other two factors combined. Unfortunately, more correlations cannot be performed between airfares and specific airports since airfare data often fluctuates depending on a variety of factors. As a result, it is difficult to indicate whether primary airports or secondary airports have cheaper airfares. However, an opinion to this question may be that primary airports have cheaper airfares than secondary airports, which may be the reason why many more respondents chose to travel out of primary airports. Furthermore, many LCCs tend to fly into and out of primary airports rather than secondary airports in order to save on their costs, which would result in lower airfares at primary airports.

Hypothesis 7 is “available flight times is an important factor for travelers deciding between airports”. This hypothesis is supported since availability of flight times is the third most important factor respondents consider when choosing airports, as shown in Figure 7. This suggests that perhaps the primary airports not only have cheaper airfares, but also better flight times than secondary airports. However, additional data may need to be collected regarding specific flight times in order to develop further conclusions.

Section 2. CONCLUSION ON AIRPORT SYSTEMS

Although the three airport systems investigated in the current study evolved from similar histories and along the same timelines, their respective governments and other entities decided to develop the airport systems along different routes. The airport systems in Tokyo, Taipei, and Seoul all initially relegated their secondary airports to being a domestic airport while shifting their primary airport into being an international airport, resulting in the primary airport attracting significantly more international traffic. Despite the recent shift to bring more international traffic into these

secondary airports, the results of the original intention is clear: many more international passengers still go through primary airports.

It is commonly heard that some people prefer secondary airports over the primary airport due to various convenience factors, such as faster or cheaper ground access, but the current study has found that passengers often respond best to cheaper airfares. A majority of the respondents surveyed as part of this study indicated that they often travel through the primary airports, and in most cases would still prefer to travel through the primary airport. These primary airports are most likely not the closest airport to where the respondents live, which means that perhaps the results are because of the availability of cheap airfares from primary airports. This is reasonable considering the presence of LCCs in these airports as well as the frequency of airfare promotions that airlines often use to entice customers into flying. Secondary airports often focus on business travelers, whom often need less of a financial incentive to travel. Thus, flying out of secondary airports is usually more expensive than flying out of primary airports. However, an unresolved issue that is brought up relates to leisure travelers versus business travelers. A majority of the respondents in this study were leisure travelers, which is a group that may base their flight decisions primarily on airfares. However, business travelers are often less sensitive to airfares, which is not obvious in the current results due respondents' ratio being skewed towards leisure travelers.

A somewhat surprising result from this study is that there is sometimes a disconnect between what the airport has to offer and the airport that a passenger eventually decides on. According to the results of this study, passengers have overall higher impressions of Haneda Airport, Songshan Airport and Incheon Airport. However, passengers more often travel through Narita Airport, Taoyuan Airport and Incheon Airport. While Incheon Airport remains the same among the two groupings, the airports in Tokyo and Taipei actually switch. In general, the secondary airports in Tokyo and Taipei have higher ratings than their corresponding primary airports. Thus, it would seem logical based on just these airport factors that passengers would prefer these secondary airports over the primary airport. However, this is not the case, which implies that there are other more important factors at play than just simply what an airport offers to the passenger. One prime example that was

iterated before is airfare. Thus, if these secondary airports want to capture more of the primary airports' traffic, they should attempt to lower airfares through indirect means, such as lower landing or parking fees.

Section 3. RECOMMENDATIONS FOR FUTURE RESEARCH

The current study only researched three airport systems in the Northeast Asia: Tokyo, Taipei, and Seoul. However, there is at least one other airport system in the region that was not analyzed: Shanghai. Shanghai's airport system consists of the primary airport Pudong International Airport and the secondary airport Hongqiao International Airport. These two airports were not included in the current study because of the difficulty obtaining publically available data on both airports as well as finding respondents who have experience in traveling through these airports. However, the Shanghai airport system, as well as other worldwide airport systems, would make for an interesting expansion to the current study.

A point that the current study failed to fully address is the affect business travelers may have on the results. Business travelers are known to often be less sensitive to airfare costs since time is an important factor for businessmen. The surveys distributed as part of this survey were completed by a few business travelers, but as seen in Table 16, there is an insufficient number of responses to accurately determine the effect that business travelers would have on the overall conclusion of this study. Further research should be conducted that focuses specifically on business travelers and to determine their preferences and opinions regarding airports within airport systems.

Another recommendation is to combine the usage of SP data, such as the survey results obtained during the course of this study, with flight databases and traffic databases to find concrete correlations between passengers' preferences with actual traffic numbers. The author was unable to obtain many of these traffic numbers since they are often published once a year by Airports Council International and is difficult to acquire. Exact flight and traffic numbers may also be obtained directly from airport management, but this data collection route may also require additional bureaucracy or connections in order to obtain the desired information. However, the additional

comparison of SP data with these databases would provide for an interesting research.

During the distribution of the survey, some respondents noted that the survey was significantly longer than what they were comfortable with. Although most of the respondents finished the survey, a few of the respondents stopped halfway through because the survey was simply too long. Thus, for future survey, it is advised to better design the survey such that more information can be obtained through a shorter survey. Another suggestion may be to redesign the layout of the survey so that it is less mentally taxing on the respondents to complete the survey.

These are only a few of the undoubtedly numerous possibilities of future research that can be extended from the current research.

Section 4. FINAL WORDS

The current study makes contributions not only to the aviation field, but also to the entities that are involved within the aviation fields, such as airports, airlines, and passengers. The results presented in this study provide a clearer picture of not only the thought processes that passengers undergo when choosing between various airports in an airport system, but also reveals how these same passengers perceive different airports. A passenger who perceives an airport highly may not necessarily decide to travel through that airport since he or she may have other considerations. Airports can take advantage of this study by being able to focus their attentions on critical points that will influence passengers in a major way that will improve competitiveness. Not every passenger may be influenced in the same way, but this study gives a general direction as to what aspects a passenger may consider to be important. Likewise, airlines may also use the study to analyze passenger behavior when choosing routes to fly and airfares to set. A large number of travelers are influenced primarily by airfares, which has been shown to be a major factor for these travelers on deciding which airport to fly into or out of. These travelers would often endure longer ground access times or more inconvenience in order to reach primary airports for flights as well. Finally, passengers themselves can utilize the results of this study to better understand their own decisions and to make informed choices in the future.

Airport systems are here to stay and will continue to develop into more complex systems in the future, which may result in different dynamics between primary and secondary airports. As can be seen in the Tokyo airport system, Haneda Airport has already begun its growth and is now challenging the dominance which Narita Airport had long held in the international market. This evolution of roles within an airport system stimulates airports innovate in order to stay competitive, which ultimately provides passengers with a better experience and hopefully better offers that appeal to them. As the importance of air travel continues to rise, and as more revolutionary aircrafts are developed, airport systems will also need to develop to stay competitive in the eyes of the passenger.

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APPENDIX 1. T-TEST RESULTS FOR BACKGROUND SECTION OF SURVEY RESPONSE

		Tokyo Airports	Taipei Airports	Seoul Airports
Overall Impressions	t Stat	-2.365940504	-0.298967359	5.016496749
	P(T<=t) two-tail	0.019029932	0.765431591	1.67785E-06
	t Critical two-tail	1.973011873	1.977961236	1.978238512

* Statistical significance is determined using 5% as a guideline

APPENDIX 2. T-TEST RESULTS FOR AIRPORTS SECTION OF SURVEY RESPONSE

		Tokyo Airports	Taipei Airports	Seoul Airports
Cost of Ground Access	**t Stat**	6.650659	2.814593	1.800993
	P(T<=t) two-tail	1.39E-09	0.007165	0.084832
	t Critical two-tail	1.983037	2.012896	2.068658
Time for Ground Access	**t Stat**	6.937377	7.380542	1.064723
	P(T<=t) two-tail	1.23E-10	2.79E-09	0.29497
	t Critical two-tail	1.97646	2.014103	2.036933
Airport Facilities	**t Stat**	-3.75091	2.667758	9.503971
	P(T<=t) two-tail	0.000185	0.007968	4.96E-18
	t Critical two-tail	1.961988	1.966327	1.971379
Airport Services	**t Stat**	-2.58615	-0.91746	3.608886
	P(T<=t) two-tail	0.009901	0.359705	0.000419
	t Critical two-tail	1.963278	1.968596	1.976013
Airport Procedures	**t Stat**	-6.43256	-1.5392	-1.85089
	P(T<=t) two-tail	1.83E-10	0.124649	0.065508
	t Critical two-tail	1.962015	1.966688	1.970659
Time for Procedures to Leave Airport	**t Stat**	0.706795	1.92882	2.321591
	P(T<=t) two-tail	0.481031	0.059556	0.024948
	t Critical two-tail	1.979439	2.009575	2.015368
Airport Flights	**t Stat**	-1.87117	-0.31319	0.584346
	P(T<=t) two-tail	0.061741	0.754413	0.560016
	t Critical two-tail	1.963378	1.970067	1.978671

* Statistical significance is determined using 5% as a guideline

APPENDIX 3. DISTRIBUTED SURVEY

The following survey was created using Google Forms and distributed via various online Social Networking Systems (SNS), forums relating to airports, as well as through word of mouth. Waseda Business School graduates of AY2014 Chendah (Davis) Lee and Hsien-Chu (Peter) Chow kindly helped with translating the English text into Japanese.

Page 1 – Airport Preferences Survey for Thesis

Thank you for participating in my thesis survey. I am researching into the factors that influence people's choices between different airports in cities with multiple airports. For this research, I am focusing on Tokyo (Narita and Haneda), Taipei (Taoyuan and Songshan) and Seoul (Incheon and Gimpo) airports. The survey will take about 5 to 15 minutes to complete, depending on the number of airports that you have traveled through.

All results of this survey will remain anonymous and will only be used for the purposes of my thesis. If you have any concerns or comments, please email me at benjamin.liu@toki.waseda.jp.

皆様、このアンケートをご回答いただきありがとうございます。私の研究テーマは「複数の空港を持つ都市の中で、空港を選ぶためにどの影響要素が人にとって重要なのか」であります。この研究の対象は東京(羽田、成田空港)、台北(桃園、松山空港)とソウル(インチョン、ギンポ空港)の空港を設定しております。アンケートは皆様経験した空港数によって、5 から 15 分ぐらいかかっております。

全てのアンケート･データは匿名で論文研究のためだけに使われております。もし不安や質問などがあれば、是非 benjamin.liu@toki.waseda.jp までメールしてください。よろしくお願いいたします。

Page 2 – Background Questions　背景質問

1-1. What are your priorities when considering a choice between airports in the same city (Select up to 3 choices)?　同都市内の空港を選ぶときに考える重要影響要素 (3 個まで)

- Ground Access Time to the Airport　空港までの時間
- Method of Ground Access Transportation　空港までの交通手段

- Cost of Ground Access　交通費 (空港まで)
- Cost of Airfares　航空券代
- Suitable Flight Times　フライトの時間スケジュール
- Preferred Airline Availability　特定航空会社の便数・アクセス
- Airport Facilities Available　空港のファシリティーズ
- Airport Processing Times　空港手続きにかかる時間
- Overall Reputation of Airport　空港の名声
- Other:

1-2. What is the MOST important priority for you?　一番重要な影響要素はどっちですか

- Ground Access Time to the Airport　空港までの時間
- Method of Ground Access Transportation　空港までの交通手段
- Cost of Ground Access　交通費 (空港まで)
- Cost of Airfares　航空券代
- Suitable Flight Times　フライトの時間スケジュール
- Preferred Airline Availability　特定航空会社の便数・アクセス
- Airport Facilities Available　空港のファシリティーズ
- Airport Processing Times　空港手続きにかかる時間
- Overall Reputation of Airport　空港の名声
- Other:

1-3. What is the LEAST important priority for you?　一番重要ではない影響要素はどっちですか

- Ground Access Time to the Airport　空港までの時間
- Method of Ground Access Transportation　空港までの交通手段
- Cost of Ground Access　交通費 (空港まで)
- Cost of Airfares　航空券代
- Suitable Flight Times　フライトの時間スケジュール
- Preferred Airline Availability　特定航空会社の便数・アクセス
- Airport Facilities Available　空港のファシリティーズ
- Airport Processing Times　空港手続きにかかる時間
- Overall Reputation of Airport　空港の名声
- Other:

1-4. Which airport in the following cities do you most often use?　一番よく使っている空港の都市はどこですか

Primary Airport (Tokyo-Narita, Taipei-Taoyuan, Seoul-Incheon) and Secondary Airport (Tokyo-Haneda, Taipei-Songshan, Seoul-Gimpo)　プライマリ空港（東京－成田、台北－桃園、ソール－仁川）とセカンダリ空港（東京－羽田、台北－松山、ソウル－金浦）

	Primary Airport　プライマリ空港	Secondary Airport　セカンダリ空港	Never Flew Here　使ったことない
Tokyo　東京	◯	◯	◯
Taipei　台北	◯	◯	◯
Seoul　ソウル	◯	◯	◯

1-5. Which airport in the following cities do you most like use?　どこの空港は一番使いたいですか

Primary Airport (Tokyo-Narita, Taipei-Taoyuan, Seoul-Incheon) and Secondary Airport (Tokyo-Haneda, Taipei-Songshan, Seoul-Gimpo)　プライマリ空港（東京－成田、台北－桃園、ソール－仁川）とセカンダリ空港（東京－羽田、台北－松山、ソウル－金浦）

	Primary Airport　プライマリ空港	Secondary Airport　セカンダリ空港	Never Flew Here　使ったことない
Tokyo　東京	◯	◯	◯
Taipei　台北	◯	◯	◯
Seoul　ソウル	◯	◯	◯

1-6. What is your overall impression of each airport?　空港における印象はどうですか

	5 (Great 良い)	4	3 (Neutral まあまあ)	2	1 (Bad 悪い)
Tokyo - Narita　東京－成田	◯	◯	◯	◯	◯
Tokyo - Haneda　東京－羽田	◯	◯	◯	◯	◯
Taipei - Taoyuan　台北－桃園	◯	◯	◯	◯	◯
Taipei - Songshan　台北－松山	◯	◯	◯	◯	◯
Seoul - Incheon　ソウル－仁川	◯	◯	◯	◯	◯
Seoul - Gimpo　ソウル－金浦	◯	◯	◯	◯	◯

Page 3 – Tokyo – Narita International Airport　東京－成田国際空港

2-1. What is your overall impression of each airport?　空港における印象はどうですか

- o　Yes　はい
- o　No　いいえ

2-2. If "Yes", how many times per year?　はいだったら、1 年間何回ぐらいですか

- 1 - 2 times　1－2 回
- 3 - 4 times　3－4 回
- 5 - 6 times　5－6 回
- 7 - 8 times　7－8 回
- 9 - 10 times　9－10 回
- More than 10 times　10 回以上

2-3. If "Yes", what purpose do you most often use this airport for?　この空港を使う主な理由は何ですか

- Sightseeing　観光
- Business　ビジネス
- Family Visit　帰省・親戚を訪れるため
- Other:

Page 4 – Tokyo – Narita International Airport　東京－成田国際空港

2-4. How do you often travel to/from this airport?　どの手段でこの空港へ行きますか

- Train　電車
- Bus　バス
- Taxi　タクシー
- Car (drive self)　車 (自分が運転する)
- Receive a Ride (from family/friends)　車 (他の人が運転する)
- Walk　徒歩
- Other:

2-5. About how much do you usually pay on average for transportation to this airport (in yen)?　この空港まで約何円ぐらいかかりますか

2-6. About how long does it take on average for you to get to this airport (in minutes)?　この空港まで約何分ぐらいかかりますか (分単位)

2-7. What do you use most often at this airport (select up to 2 choices)? この空港のファシリティーズの中でよく使っているのは何ですか (2 個まで)

- o Duty-Free Stores 免税店
- o Restaurants レストラン
- o Airline Lounges 空港ラウンジ
- o Public Seating Areas 公共座席
- o Prayer Rooms/Silence Rooms 祈祷室/サイレント・ルーム
- o Smoking Areas 喫煙所
- o Restrooms トイレ
- o Other:

2-8. How would you rate the facilities at this airport? この空港でのファシリティーズについて評価をあげてください

	5 (Great 良い)	4	3 (Neutral まあまあ)	2	1 (Bad 悪い)	N/A
Duty-Free Stores 免税店	◯	◯	◯	◯	◯	◯
Restaurants レストラン	◯	◯	◯	◯	◯	◯
Public Seating Areas 公共座席	◯	◯	◯	◯	◯	◯
Prayer Rooms/Silence Rooms 祈祷室	◯	◯	◯	◯	◯	◯
Smoking Areas 喫煙スペース	◯	◯	◯	◯	◯	◯
Restrooms お手洗い	◯	◯	◯	◯	◯	◯
Signage/Information 案内カウンター	◯	◯	◯	◯	◯	◯
Overall Ambiance 全体的な環境	◯	◯	◯	◯	◯	◯
Overall Cleanliness 清潔度	◯	◯	◯	◯	◯	◯
Other (If Indicated Above) その他	◯	◯	◯	◯	◯	◯

2-9. What do you think needs the most improvement at this airport? 一番改善するべきものは何でしょうか

- o Duty-Free Stores 免税店
- o Restaurants レストラン
- o Airline Lounges 航空会社ラウンジ
- o Public Seating Areas 公共座席

- o Prayer Rooms/Silence Rooms　祈祷室
- o Smoking Areas　喫煙スペース
- o Restrooms　御手洗い
- o Signage/Information　案内カウンター
- o Overall Ambiance　全体的な環境
- o Overall Cleanliness　清潔度
- o Other (If Indicated Above)　その他

2-10. What do you use most often at this airport (select up to 2 choices)?　この空港の中でよく使っているものは何ですか (2 個まで)

- o Information Desk　空港案内所
- o Roaming Service Agent/Staff　ローミング・スタフ
- o Self Check-In Kiosks　セルフ・チェックイン機
- o Flight Information Monitors　フライト・インフォメーション・モニター
- o Digital Applications (i.e., Smartphone Apps)　デジタル・アプリ (例えばスマートホン・アップ)
- o Luggage Services　手荷物サービス
- o Other:

2-11. How would you rate the services at this airport?　この空港でのサービスについて評価をあげてください

	5 (Great 良い)	4	3 (Neutral まあまあ)	2	1 (Bad 悪い)	N/A
Information Desk　空港案内所	○	○	○	○	○	○
Roaming Service Agent/Staff　ローミング・スタフ	○	○	○	○	○	○
Self Check-In Kiosks　セルフチェックイン機	○	○	○	○	○	○
Flight Information Monitors フライトインフォメーションモニター	○	○	○	○	○	○
Digital Applications (i.e., Smartphone Apps)　アプリ	○	○	○	○	○	○
Luggage Services　手荷物サービス	○	○	○	○	○	○
Other (If Indicated Above) その他	○	○	○	○	○	○

2-12. What do you think needs the most improvement at this airport? 一番改善するべきものは何でしょうか

- o Information Desk 空港案内所
- o Roaming Service Agent/Staff ローミング・スタフ
- o Self Check-In Kiosks セルフチェックイン機
- o Flight Information Monitors フライトインフォメーションモニター
- o Digital Applications (i.e., Smartphone Apps) アプリ
- o Luggage Services 手荷物サービス
- o Other (If Indicated Above) その他

2-13. How would you rate the airport processing at this airport? この空港での各手続きについて評価をあげてください

	5 (Great 良い)	4	3 (Neutral まあまあ)	2	1 (Bad 悪い)	N/A
Check-In チェックイン	○	○	○	○	○	○
Security Check 安全チェック	○	○	○	○	○	○
Immigration (Exiting) イミグレーション (離国)	○	○	○	○	○	○
Boarding 飛行機の搭乗	○	○	○	○	○	○
Disembarking 飛行機の離陸 (開始)	○	○	○	○	○	○
Transfer to Connecting Flight トランスファー	○	○	○	○	○	○
Immigration (Entering) イミグレーション (入国)	○	○	○	○	○	○
Baggage Claim 手荷物受け取り	○	○	○	○	○	○
Customs 税関	○	○	○	○	○	○

2-14. What do you think needs the most improvement at this airport? この空港一番改正すべきものは何ですか

- o Check-In チェックイン
- o Security Check 安全チェック
- o Immigration (Exiting) イミグレーション(離国)
- o Boarding 飛行機の搭乗
- o Disembarking 飛行機の離陸
- o Transfer to Connecting Flight トランスファー

- o Immigration (Entering) イミグレーション(入国)
- o Baggage Claim 手荷物受け取り
- o Customs 税関

2-15. What is the average time from disembarking to leaving this airport? この空港で、離陸開始から飛ぶまで何分ぐらいかかりますか

- o 0 to 10 minutes 0~10 分
- o 11 to 20 minutes 11~20 分
- o 21 to 30 minutes 21~30 分
- o 31 to 40 minutes 31~40 分
- o 41 to 50 minutes 41~50 分
- o 51 to 60 minutes 51~60 分
- o More than 60 minutes 60 分以上

2-16. Where do you often fly to from this airport? この空港からどこへよく行きますか

- o Japan 日本
- o Taiwan 台湾
- o South Korea 韓国
- o China 中国
- o Thailand タイ
- o United States 米国
- o Other:

2-17. This airport often has good airfares for the city that I want to fly to. この空港の便は他の空港より安い

	1	2	3	4	5	
Strongly Disagree 強く否定する	○	○	○	○	○	Strongly Agree 強く同意する

2-18. This airport has good departure/arrival times for the route that I want to fly on. 私が使っているルートについて、この空港が一番良い入国/離陸の時間帯を提供している

	1	2	3	4	5	
Strongly Disagree 強く否定する	○	○	○	○	○	Strongly Agree 強く同意する

2-19. This airport has a suitable selection of INTERNATIONAL flights for me.　私にとって、この空港で選択できる国際便が十分だと思う

	1	2	3	4	5	
Strongly Disagree 強く否定する	○	○	○	○	○	Strongly Agree　強く同意する

2-20. This airport has a suitable selection DOMESTIC flights for me.　私にとって、この空港で選択できる国内便が十分だと思う

	1	2	3	4	5	
Strongly Disagree 強く否定する	○	○	○	○	○	Strongly Agree　強く同意する

2-21. It is convenient to transfer at this airport.　この空港のトランスファーは便利です

	1	2	3	4	5	
Strongly Disagree 強く否定する	○	○	○	○	○	Strongly Agree　強く同意する

Page 5-6 – Tokyo – Haneda International Airport　東京－羽田国際空港

* Identical questions as Pages 4 and 5, except directed at Haneda International Airport

Page 7-8 – Taipei – Taoyuan International Airport　台北－桃園国際空港

* Identical questions as Pages 4 and 5, except directed at Taoyuan International Airport

Page 9-10 – Taipei – Songshan International Airport　台北－松山国際空港

* Identical questions as Pages 4 and 5, except directed at Songshan International Airport

Page 11-12 – Seoul – Incheon International Airport　ソウルー仁川国際空港

* Identical questions as Pages 4 and 5, except directed at Incheon International Airport

Page 13-14 – Seoul – Gimpo International Airport　ソウルー金浦国際空港

* Identical questions as Pages 4 and 5, except directed at Gimpo International Airport

Page 15 – Airport Comparisons　空港比較

For this section, the terms "airport systems" and "integrated airport hub" will appear.　このセクションの質問で「空港システム」「ハブ空港」の語彙が出ます。
"Airport systems" refers to cities with multiple major airports (i.e., Tokyo, Taipei, Seoul).　「空港システム」は一つの都市が複数の空港を持っている。
"Integrated airport hub" refers to cities with only one major airport (i.e., Singapore, Kuala Lumpur, Hong Kong).「ハブ空港」は都市が主要の空港を一つだけ持っている。

8-1. You would prefer to fly through cities with airport systems rather than into cities with an integrated airport hub.　私はハブ空港を持っている都市より空港システムを持っている都市の方が行きたい

	1	2	3	4	5	
Strongly Disagree 強く否定する	○	○	○	○	○	Strongly Agree　強く同意する

8-2. Airport systems offer more choices in terms of routes to choose from.　空港システムのルート数はハブ空港より多い

	1	2	3	4	5	
Strongly Disagree 強く否定する	○	○	○	○	○	Strongly Agree　強く同意する

8-3. Airport systems offer a better chance of having an airport conveniently located to you.　空港システムはハブ空港より身近な場所でも空港がある可能性を与えた

	1	2	3	4	5	
Strongly Disagree 強く否定する	○	○	○	○	○	Strongly Agree　強く同意する

8-4. Integrated airport hubs are more convenient for flight transfers.　ハブ空港で、トランスファーは空港システムよりもっと簡単にできる

	1	2	3	4	5	
Strongly Disagree 強く否定する	○	○	○	○	○	Strongly Agree　強く同意する

8-5. Integrated airport hubs are more convenient for choosing flights.　ハブ空港で航空便の選択は空港システムより簡単になる

	1	2	3	4	5	
Strongly Disagree 強く否定する	○	○	○	○	○	Strongly Agree　強く同意する

Page 16 – Demographics　基本情報

9-1. Gender　性別

- Male　男性
- Female　女性
- Decline to State　匿名
- Other:

9-2. Age　年齢

- Under 20 years old　20 代の以下
- 20 to 29 years old　20 代
- 30 to 39 years old　30 代
- 40 to 49 years old　40 代
- 50 to 59 years old　50 代
- Over 60 years old　60 代以上

9-3. Primary Occupation　主な職業

- Employed Full-Time in Public Sector (Government)　正社員 (公務員など政府機関で勤める方)
- Employed Full-Time in Private Sector　正社員 (私営企業)
- Self-Employed　自営業
- Student　学生
- Homemaker　家庭主婦 (主夫)
- Employed Part-Time　アルバイト
- Other:

9-4. Nationality　国籍

- Japan　日本
- Taiwan　台湾
- South Korea　韓国
- China　中国
- Singapore　シンガポール
- Thailand　タイ
- Vietnam　ベトナム
- United States　米国

- Other:

9-5. Who usually pays for your airplane tickets?　普通に誰が航空券を払ってくれますか

- Yourself　自分
- Family　家族
- Company　会社
- School　学校
- Other:

9-6. About how many times per year do you travel via airplane?　1 年に何回ぐらい飛行機に乗りますか