Factors Influencing Airport Technology Selections in Each Service Touchpoint of Suvarnabhumi Airport, Thailand

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Abstract

Vividly, technology has enhanced the world citizen's lifestyle especially in tourism industry where technology engages in almost every journey's touchpoint. In airports, technology does not only assist the travellers prior their airport arrivals, it also significantly provides the travelers tremendous convenience during and even post airport experience. It can be said that technology makes travel digitally extraordinary among the technological aids that smoothen passengers' journey. The Corona Virus Decease (COVID-19) has forever changed the air travelling behaviors. Therefore, technology becomes a crucial tool to facilitate travelers, avoiding infectious risks from close contacts during the travelling journey. Amid COVID-10 situation, airport passengers do not only demand purely on service quality provided by airport and airline staffs, but the demand for beneficial technological facilities, in terms of safety and security, during their airport journeys is rather significant. This article examined the factors influencing airport technology selections in each service touchpoint of Suvarnabhumi Airport based on the survey of 400 airport users employing structured questionnaires. The literature reviews together with the quantitative data were statistically analyzed to interpret the results. Finally, the results indicated 9 factors significantly influencing airport technology selections namely price, rapidness, convenience, culture differences, self-image, trust, airline information provision, environmental negative impact, and technological knowledge.

Keywords:. Airport Technology, Technology Selection, Airport Service Touchpoint, Airport Passenger Journey, Suvarnabhumi Airport

1. Introduction : Today, technology helps global citizens in almost every aspect of their daily lives. In the travel industry, travel technology allows travelers to make direct travel bookings, such as hotels and flights, through websites or applications. Technology transforms an ordinary travel experience into an extraordinary one from the early planning stage to the post travel experience. It is undeniable that travelers expect a smooth journey and technology-based facilities exemplarily fulfil their needs (Fodness and Murray, 2007).

Unsurprisingly, airports are commercially benefitted from the use of various travel-related technologies to support airport operations as well as passengers' satisfaction. Technology assists airport managers to seasonally forecast numbers of passengers and accurately design flows of passengers to create joyful moments. In view of demand side, passengers feel more confident in selecting their airports when technologies are well-equipped. At this modern age, technology involves passengers in almost every stage, including pre, during, and post stage. Passengers usually feel worried-free when technologies are in place and effectively useable.

Suvarnabhumi Airport is recognized as the primary hub yet the largest Thailand's airport where accommodated total passengers of 65,424,564 in 2019 **(AOT, 2020)**. Suvarnabhumi Airport also functions as the main hub, connecting the country's spokes include Laos, Cambodia, Vietnam, and Myanmar. Among six airports under Airport of Thailand's supervision, Suvarnabhumi Airport is highly focused on technological assistances to facilitate passengers' journey. During the peak seasons, the overcrowding issue at some service touchpoints, for examples check-in hall, immigration hall, is the major concern. Technology is therefore believed to be an effective tool to tackle this problem.

The Corona Virus Disease 2019 (COVID-19) has permanently altered travel behavior since early 2020. The disease transmission creates an anxiety in air travelling. Airport executives seek diverse solutions to ensure the highest hygienic protocols to create public trust. Following the COVID-19 crisis, the Amazing Thailand Safety and Health Administration, known as SHA, has been launched by Tourism Authority of Thailand (TAT) to certify tourism destinations and venues. There are some international measurements that establishments must strictly follow before requesting for inspections. Hence, this certification does not only boost confidence in international and domestic eyes, but tourists are trust-built in terms of the standards of hygiene and cleanliness **(TAT, 2021)**. Besides being certified by SHA, Suvarnabhumi Airport executives implement technological devices to lessen human engagement between passengers and service staffs. 'New Normal Tourism' become a common term at these days. Airports are known as a tourism gateway connecting travelers across the globe. Technology-based airport facilities, thereby, generally used intensively at each service touchpoint nowadays for these supportive reasons.

To promote the usage of technology-based facilities at airport, there are numerous factors that influence the travelers' decisions. Therefore, this paper aims to figure out the factors influencing airport technology selections in each service touchpoint of Suvarnabhumi Airport. The 400 samples were collected from airport users using questionnaires with few screening questions to ensure that all data is reliable. Before starting the survey, airport users must consent. More importantly, they must have arrived and departed international routes and experienced the technology-based facilities at Suvarnabhumi Airport.

2. Reviews of Literature

Demand of Passenger for Technology

There are currently eight technology trends to focus on in terms of aviation technological trends which are 1) biometrics, 2) self-service and automation, 3) artificial intelligence (AI), 4) blockchain, 5) cybersecurity, 6) onboard connectivity, 7) robotic assistants and 8) Smart Ground Transportation (Cui and Lee, 2015). Significantly, self-service and automation appear to be extremely advantageous to airport passengers. Meanwhile, for supply side as airport operators, the technology greatly saves labor costs while increasing commercial moments due to shorter traveling processes.

According to **Gualandi et al. (2011)**, airport innovative technology enables airport operators to reduce the space of the check-in lounge while converting the space to a commercial field to earn more ancillary revenues. According to statistical data, airport innovative technology aids in the reduction of approximately 49 percent of total airport departure lounge space. Meanwhile, more than 87 percent of passengers are pleased with the self-check-in process, owing to its quick response time of around 50 percent of the regular transaction time **(Cui and Lee, 2015)**. However, airport operators must seriously invest at these facilities in order to gain a return of investment (ROI) in the coming years.

Factors Affecting Airport Technologies Choices

Technology assists the airport operators to lower costs while uplift the service quality. In a meantime, the technology enhances the efficiency, reliability and sustainability of airport operations as well as complies with the safety regulations at the utmost priority **(Ku and Chen, 2013)**. It is undeniable to admit that the technology has become a crucial part nowadays especially in the aviation industry. Plenty travel-related technologies are implemented to facilitate passengers in airports, for examples, self-service kiosks, biometrics, smartphone applications. These aim to develop the satisfied levels of services, increase revenues, enrich the airport operational efficiency to achieve the targets and goals **(Lee and Park, 2018)**. The literature reviews show that there are nine significant factors affecting the airport technologies selections including price, rapidness, convenience, culture differences, self-image, trust, airline information provision, environmental negative impact, and technological knowledge.

Price

Passengers are usually interested in adopting new technologies when it helps them. **Bottasso et al. (2019)** conclude that price-sensitive passengers prefer to make the transition from traditional methods to technological methods. Passengers like the lower prices because the airlines and airports can save their operational costs, resulting in lower selling prices. Passengers usually feel satisfied and valued when they receive lower-priced products and services, according to **Bogicevic et al. (2017)**. Quality is perceivable by passengers in the end regardless of the price paid.

Rapidness

Rapidness is crucial to the timely use of the technology for the time-sensitive passengers. When everything is organized at the lowest possible time, passengers feel superior. This illustrates the happiness passengers feel because it shortens the time it takes to travel, which allows them to more time to do things like shop at duty-free kiosks, rest, and eat in airport lounges. Also, passengers appreciate the airport's modern technology, which includes self-check-in machines, self-loading luggage machines, self-boarding gates, and etc. **(Wang & Namen, 2004)**. According to **Pitt et al. (2002)**, the businesspeople consider quickness to be the most important thing for airports, as it allows more time to handle business matters while on the go.

Convenience

Ease of use is very important for elderly people, who are not used to technology-based services. **Abdelaziz et al. (2010)** explains the ease of use with minimal complex functions with simple instructions. Therefore, the passengers can easily follow step-by-step instructions. Minor and elder passengers consider a convenience when selecting airport technology-based facilities, just like **Negri et al. (2019)** and **Ueda and Kurahashi (2014)** believe. Occasionally, the virtual staffs may be required by these people for use if they have difficulties operating the machines.

Cultural Differences

However, in specific regions, like the Middle East and Asia, a culture does play a critical role. Typically, norms, culture, and religions vary depending on various countries. **Leo and Lawler (2007)** indicate that a subculture's unique culture has a large impact. People get used to their usual surroundings and find it difficult to adopt new habits. Therefore, technology-based facilities should be designed to meet culture-sensitive people **(Haas, 2004)**. Touchless metal detectors allow the avoidance of direct contact with passengers because it is illegal in some countries to touch passengers.

Self-Image

Influenced by teenagers and middle-aged passengers who have prior experience with technology-based facilities **(Chen et al., 2014; Habibi, 2008)**. This group of passengers typically feels impressive when they can use the technology-based facilities because others perceive them favorably. The lives of those who enjoy social interactions and social media are typically reflected in their own self-image. Their lifestyles reflect their self-images in the social media and interactions.

Trust

Security is confidence and accuracy that passengers have when using technology-based facilities **(Schwaninger, 2006)**. This extends to the security and privacy of passengers when using technology-based facilities, as well. Gigantically, technologies facilitate passengers in providing high data accuracy, saving processing time, and offering privacy **(Kierzkowski & Kisiel, 2017)**. To maximize data privacy, technology-based facilities must provide accuracy data. According to global practices, the passengers' data must be kept confidential **(Hofer & Wetter, 2012)**.

Airline Information Provision

Additionally, the airline information influences passengers when using the technology-based facilities. the benefit is that passengers typically follow with airline announcements that they might receive **(Marintseva, 2014)**. Additionally, some airlines promote using kiosk check-in, which results in faster queuing time at the airport. It is a good example of the online check-in encouragement that benefits low-cost carrier passengers, who do not have heavy bags because they can process online check-in and gain QR boarding passes **(Wittmer, 2011)**.

Environmental Negative Impact Reduction

It is a fact to admit that the major influence on passengers' decisions is the potential of the technology to avoid negative impacts to the environment while also offering choices that lead to the more desirable outcomes **(Baxter et al., 2019)**. Take the boarding passes as a case study. **Lloyd (2003)** proved that the mobile boarding pass is able to save on the paper purchase, leading to less deforestation. Many airlines favor the use of electronic tickets and boarding passes to help save money while promoting a more environmentally friendly image.

Technological Knowledge

One's level of knowledge has a direct correlation to one's actions. Technology knowledge would thus lead to a decision to deal with all technologies. Approximately 75% of airports use airport technologies in operations. The survey by **Moeller (2013)** shows that many passengers are interested in applying technological assistances, based on their level of knowledge of the technologies. The data from **Llord (2003)** shows that Gen Y, who is technologically-savvy, is a good fit for airport operations which utilize technology. The level of knowledge on technologies may influence passengers to select airport technology-based facilities.

3. Method

Suvarnabhumi Airport, Thailand's primary international airport, located in Samutprakarn has been selected as the location of study. Fully managed by Airport of Thailand, the Thai-nationality state-owned airport operator, Suvarnabhumi Airport is chosen because of its position as the leading smart airport hub in Southeast Asia.

The quantitative research methodology is employed to study the factors influencing airport technology selections in each service touchpoint of Suvarnabhumi Airport. The purposive sampling as a nonprobability sampling technique is employed to select only airport users who have experienced all airport service touchpoints both arrival sector and departure sector as samples.

Respondents

The four-hundred international airport users at Suvarnabhumi Airport are chosen as the population for this research study according to the sample size calculation formula by **Taro Yamane (1973)**. Few screening questions were asked prior beginning the questionnaire to ensure that all data is reliable and valid. First, respondents must consent to complete the questionnaire. Second, respondents must have flown international routes both arrival and departure at Suvarnabhumi Airport. Third, respondents must have experienced the technology-based facilities both arrival and departure at Suvarnabhumi Airport. Importantly, all respondents were informed of confidential use of data and verified of the purposive qualifications before completing the questionnaires.

Instruments

A questionnaire was employed as the primary tool of the quantitative research. The questionnaires were distributed to the chosen respondents. The questionnaire is divided into 3 significant parts; Part I: Demographic Profiles, Part II: The Actual Demands in Selecting Technological Choices, Part III: Factors influencing airport technology selections, and Part IV: Open-ended Question to Explore Recommendations for Designing the Model of Technology-based Airport Customer Journey Management of Suvarnabhumi Airport. Both close-ended and open-ended questions are prepared to ensure that sufficient answers are obtained.

Procedures

First, the concentrated literature reviews were conducted to define the criteria and variables to apply with the research. Second, Item-objective Congruence Evaluation (IOC) by five professionals was completed to affirm the criteria and variables from the literature reviews. After the valid tool was formed, pilot testing for 30 samples at Suvarnabhumi Airport were collected to ensure that the data would be accurately interpreted using data statistical analysis. Then, the actual 400 questionnaire surveys were distributed to qualified airport users. All 400 samples were analyzed and interpreted showing the significant factors affecting airport technology selections at Suvarnabhumi Airport.

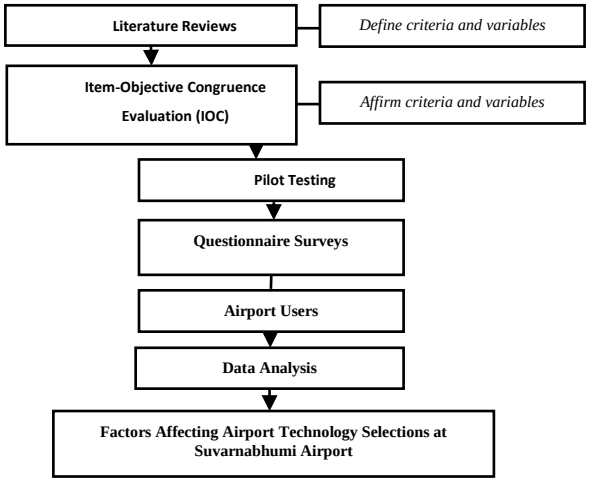

Figure 1 Research Processes

Analysis of Data

The data coding is used to analyze the quantitative data. As well, the numerical data is classified for each form and computerized by the SPSS Statistics program which widely known as the statistical analysis in social science. The program is used to interpret the descriptive statistics, bivariate statistics as well as predict for identifying groups in this research. The descriptive statistics represent the percentage, frequency, standard deviations, and means which are employed the data analysis.

4. Findings, Results and Discussions

After the data is computerized by the statistics program, the data reveals that all factors significantly influencing airport technology selections. The below table illustrates nine factors with the levels of airport users rating from very low to very high when asking about the factors indluencing airport technology selections.

Table 1

Frequency and Percentage on Factors Influencing Airport Technology Selections

Factors	Very High)5(	High)4(	Medium)3(	Low)2(	Very low)1(	$\bar{X}$	S.D.
1. Price							
1.1 The technology-based facility costs you none or less.	62)15.5(	245)61.3(	76)19.0(	15)3.8(	2)0.5(	3.88	0.725
1.2 The technology-based facility gives you a credit return.	59)14.8(	214)53.5(	106)26.5(	13)3.3(	8)2.0(	3.76	0.816
1.3 The technology-based facility saves your money pockets.	74)18.5(	198)49.5(	109)27.3(	17)4.3(	2)0.5(	3.81	0.799

Factors	Very High)5(	High)4(	Medium)3(	Low)2(	Very low)1(	$\bar{X}$	S.D.
2. Rapidness							
2.1 The technology-based facility reduces your airport procedures.	102)25.5(	202)50.5(	89)22.3(	7)1.8(	-	4.00	0.741
2.2 The technology-based facility gives you more relaxing time.	87)21.8(	204)51.0(	99)24.8(	7)1.8(	3)0.8(	3.91	0.772
2.3 The technology-based facility allows you to arrive airport later.	81)20.3(	188)47.0(	112)28.0(	17)4.3(	2)0.5(	3.82	0.817
3. Convenience							
3.1 The technology-based facility has a clear instruction and easy to use.	88)22.0(	212)53.0(	91)22.8(	9)2.3(	-	3.95	0.732
3.2 The technology-based facility smoothens your airport journey.	97)24.3(	210)52.5(	86)21.5(	7)1.8(	-	3.99	0.727
3.3 The technology-based facility is a user-centric or a self-service system.	74)18.5(	205)51.3(	113)28.3(	7)1.8(	1)0.3(	3.86	0.736
4. Culture Differences							
4. 1The technology-based facility exhibits the culture differences of particular destination.	69)17.3(	219)54.8(	98)24.5(	10)2.5(	4)1.0(	3.85	0.765
4. 2The technology-based facility is designed based on cultures and norms of particular destination.	61)15.3(	204)61.0(	104)26.0(	14)3.5(	3)0.8(	3.80	0.763
4. 3The technology-based facility serves people from different cultures from different nations.	78)19.5(	203)50.8(	111)27.8(	8)2.0(	-	3.88	0.734
5. Self-Image							
5. 1The technology-based facility uplifts your personal image.	51)12.8(	228)57.0(	105)26.3(	8)2.0(	8)2.0(	3.77	0.772
5. 2The technology-based facility boosts your personal confidence.	56)14.0(	222)55.5(	105)26.3(	11)2.8(	6)1.5(	3.78	0.774
5. 3The technology-based facility makes you feel superior.	69)17.3(	194)48.5(	115)28.8(	14)3.5(	8)2.0(	3.76	0.850
6. Trust							
6. 1The technology-based facility is safe and secure.	85)21.3(	203)50.8(	100)25.0(	11)2.8(	1)0.3(	3.90	0.766
6. 2The technology-based facility reduces the possible human errors.	77)19.3(	205)51.3(	106)26.5(	10)2.5(	2)0.5(	3.86	0.765
6. 3The technology-based facility is accurate and trustable.	64)16.0(	247)61.8(	82)20.5(	7)1.8(	-	3.92	0.655
7. Airline Information Provision							
7. 1The technology-based facility offers you extra airline miles.	54)13.5(	232)58.0(	90)22.5(	16)4.0(	8)2.0(	3.77	0.805
7. 2The technology-based facility gives you extra baggage weights.	67)16.8(	210)52.5(	106)26.5(	11)2.8(	6)1.5(	3.80	0.800
7. 3The technology-based facility	67	226	94	7	6	3.85	0.766

Factors	Very High)5(	High)4(	Medium)3(	Low)2(	Very low)1(	$\bar{X}$	S.D.
provides you fast track lanes to gates.	)16.8(	)56.5(	)23.5(	)1.8(	)1.5(		
8. Environmental Negative Impact Reduction							
8. 1The technology-based facility helps saving the environmental impacts.	69)17.3(	234)58.5(	85)21.3(	7)1.8(	5)1.3(	3.89	0.746
8. 2The technology-based facility makes you feel an 'eco-friendly' person.	69)17.3(	229)57.3(	88)22.0(	10)2.5(	4)1.0(	3.87	0.753
8. 3The technology-based facility reduces the carbon footprints.	64)16.0(	227)56.8(	95)23.8(	11)2.8(	3)0.8(	3.85	0.743
9. Technology Knowledge							
9. 1The technology-based facility supports people with strong IT knowledge.	67)16.8(	227)56.8(	87)21.8(	13)3.3(	6)1.5(	3.84	0.791
9. 2The technology-based facility has uncomplicated operational functions.	62)15.5(	238)59.5(	90)22.5(	10)2.5(	-	3.88	0.683
9. 3The technology-based facility is applicable to all types of age.	60)15.0(	232)58.0(	96)24.0(	9)2.3(	3)0.8(	3.84	0.724

The 9 factors that influence airport technology selections were mostly rated at level 4 of 'high'. There are 27 issues included in the 9 factors which can be summed as below.

1. *Price factor* comprises of 1) the technology-based facility costs you nothing or very little (61.3%, $\bar{X}$= 3.88) 2) the technology -based facility earns you a credit return (53.5%, $\bar{X}$= 3.76), and 3) the technology-based facility saves you money (49.5%, $\bar{X}$= 3.81).
2. *Rapidness factor* comprises of 1) the technology-based facility reduces your airport procedures (50.5%, $\bar{X}$= 4.00), 2) the technology-based facility gives you more relaxing time (51.0%, $\bar{X}$= 3.91), and 3) the technology-based facility allows you to arrive airport later (47.0%, $\bar{X}$= 3.82).
3. *Convenience factor* comprises of 1) the technology-based facility has a clear instruction and easy to use. (53.0%, $\bar{X}$= 3.95), 2) the technology-based facility smoothens your airport journey. (52.5%, $\bar{X}$= 3.99), and 3) the technology-based facility is a user-centric or a self-service system (51.3%, $\bar{X}$= 3.86).
4. *Culture Differences factor* comprises of 1) the technology-based facility exhibits the culture differences of particular destination (54.8%, $\bar{X}$= 3.85), 2) the technology-based facility is designed based on cultures and norms of particular destination

(61.0%, $\bar{X}$= 3.80), and 3the technology-based facility serves people from different cultures from different nations (50.8%, $\bar{X}$= 3.88).

5. *Self-Image factor* comprises of 1) the technology-based facility uplifts your personal image (57.0%, $\bar{X}$= 3.77), 2) the technology-based facility boosts your personal confidence (55.5%, $\bar{X}$= 3.78), and 3) the technology-based facility makes you feel superior (48.5%, $\bar{X}$= 3.76).
6. *Trust factor* comprises of 1) the technology-based facility is safe and secure (50.8%, $\bar{X}$= 3.90), 2) the technology-based facility reduces the possible human errors (51.3%, $\bar{X}$= 3.86), and 3) the technology-based facility is accurate and trustable (61.8%, $\bar{X}$= 3.92).
7. *Airline Information Provision factor* comprises of 1) the technology-based facility offers you extra airline miles (58.0%, $\bar{X}$= 3.77), 2) the technology-based facility gives you extra baggage weights (52.5%, $\bar{X}$= 3.80), and 3) the technology-based facility provides you fast track lanes to gates (56.5%, $\bar{X}$= 3.85).
8. *Environmental Negative Impact Reduction factor* comprises of 1) the technology-based facility helps saving the environmental impacts (58.5%, $\bar{X}$= 3.89), 2) the technology-based facility makes you feel an 'eco-friendly' person (57.3%, $\bar{X}$= 3.87), and 3) the technology-based facility reduces the carbon footprints (56.8%, $\bar{X}$= 3.85).
9. *Technology Knowledge factor* comprises of 1) the technology-based facility supports people with strong IT knowledge (56.8%, $\bar{X}$= 3.84), 2) the technology-based facility has uncomplicated operational functions (59.5%, $\bar{X}$= 3.88),3) the technology-based facility is applicable to all types of age (58.0%, $\bar{X}$= 3.84)

5. Conclusion

Nine factors are concluded as significant factors in reference to the results namely, price, rapidness, convenience, cultural differences, self-image, trust, airline information provision, environmental negative impact reduction and technology knowledge.

1. In terms of price factor, the technology-based facility costs passengers nothing or very little is the most important consideration.
2. Among the rapidness factor, the technology-based facility gives passengers more relaxing time is much more important.
3. In view of the convenience factor, the technology-based facility has a clear instruction and easy to use is the main driver to select airport technology.
4. Whereas the culture differences factor reveals that the technology-based facility is designed based on cultures and norms of particular destination plays the key role in choosing Suvarnabhumi airport technology.
5. Despite that, self-image factor indicates the technology-based facility can greatly uplift personal image and followed by personal confidence.
6. Trust factor reveals that the technology-based facility is accurate and trustable seems much more favourable among the international passengers.
7. Beyond this, airline information provision factor includes the most significant reason for travelers to use airport technology which is the technology-based facility that offers them extra airline miles.
8. Environmental negative impact reduction factor affirms that the technology-based facility helps saving the environmental impacts according to the international respondents.
9. Technology knowledge factor pointed that the technology-based facility has uncomplicated operational functions that drive the passengers to use them.

As a consequence, the main research purpose is to find out the factors aim to provide some supervision thoughts for the airport authorities likes Airports of Thailand (AOT) and Department of Airport (DOA), as well as the private sectors in order to improve technological-based facilities.

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