



International Passengers' Experience Management towards the Digital Transformation of Suvarnabhumi Airport, Thailand

Peerapat Kaewjaidee, Kullada Wongmarn, Supasinee Maruen and Phutthachon Anurak*

Institute of Aviation and Aerospace Technology, Rajamangala University of Technology Tawan-ok,
Chonburi, Thailand

*Corresponding author, E-mail: phutthachon_an@rmutto.ac.th

Abstract

Suvarnabhumi Airport is one of the major airports that is managed by The Airports of Thailand Public Company Limited (AOT) and located in the central region of Thailand. It is capable of serving a large number of domestic and international passengers and accommodating air freight transportation. Undoubtedly, the increased rivalry within the airport business has caused the airports' executive leaders to alter the equilibrium of power between passengers and airport operation by adopting digital and technological innovation to obtain the information and solutions to compete with their competitors and create passenger experiences. This research aimed to study international passengers' experience management towards the digital transformation of Suvarnabhumi Airport, Thailand, and to compare how Suvarnabhumi Airport manages its international passengers' experience. This study is based on a quantitative research method. 400 questionnaires were distributed to the passengers for data collection, focusing on the international passengers who traveled through Suvarnabhumi Airport. The analysis of this study has been carried out to determine the frequency, percentage, mean, standard deviation (S.D.), and hypothesis testing by t-Test and One-Way ANOVA (F-Test).

The results found that most of the respondents are male foreign passengers aged below 25 years old, hold a bachelor's degree level, and have an occupation as a company officer. Their travel frequency by air transportation via Suvarnabhumi Airport is once a year. The study of the international passengers' experience levels on the digital transformation management of Suvarnabhumi Airport revealed that the most experienced facilities are Self Service Kiosk, Boarding Pass Scanner, and Application Programming Interfaces (APIs) whereas the least experienced is Chatbot. The comparison of sample characteristic differences and international passengers' experience management on the digital transformation of Suvarnabhumi Airport also revealed that gender, age, educational levels, occupation, and visiting frequency of the respondents have no difference on the passengers' experience management of Suvarnabhumi Airport with a statistical significance.

Keywords: *Passenger Experience Management, Airport Digital Transformation, Suvarnabhumi Airport*

1. Introduction

The air transport industry plays a major role in being a contributor to the global economy, generating millions of jobs, accommodating trillions of passengers, and providing key connectivity to domestic, regional, and international transports. Regardless of recent challenges, the industry will continue to either integrate the future of aviation and find innovative solutions in the fields of safety, environment, and technology (The World Bank Group, 2020; NTS, 2019). In 2018, The International Air Transport Association or IATA revealed that there were approximately four billion passengers accommodated by global airlines, which traveled through almost 22,000 routes. IATA also forecasted that huge numbers of worldwide passengers will be 8.2 billion by 2037. Particularly, the Asia-Pacific region will be a significant area of increasing with greater than half of the total amounts of prospective passengers. This market is being enhanced by the combination of carrying on economic growth, rise in traveler incomes, and their satisfaction and demographic status (International Air Transport Association [IATA], 2018). Besides, an airport has long been recognized as a majority point of service delivery for travelers undertaking the seamless journey, which encompasses a wide variety of stages from origin to destination. (Amadeus, 2012). The airport also allows all the infrastructure necessary for enabling passengers and cargo to forward from the lateral to air mode of transport and for accommodating the airlines to take-off and landing (Graham, 2018). As the global economy is turning from conventional marketing to the fourth industrial revolution, the airport can implement an IT architecture that enables the seamless integration of content from different systems, with regards to the digital technology employed (Papagiannopoulos, 2017).



The MIT Sloan School of Management defines digital transformation or DT as the use of technology to profoundly improve performance by transforming the business sector to take advantage of the feasibilities that new technologies provided, which its capabilities are centered on revisualizing customer experience, operational processes, and business models (Capgemini, 2017). Therefore, the digital transformation for the airport is processing and servicing integrated with existing and new technologies to transfer a better experience to all passengers and customers. In terms of introducing the Internet of Things (IoT), digital touchpoints began with creating new business models such as deploying commercialized Application Programming Interfaces (APIs) and providing some strategic aims for airport business successes (Airport Council Association [ACI], 2017). The challenges of initializing new technologies to govern the airport include targeting to create passenger perception and to manage experience by handling airport congestion, ensuring passengers' seamlessly journey through all steps of airport processes (Figure 1), building passenger experiences from the pre-travel process by adopting Chatbot, Check-in kiosk, and Automated border control such as security screening and passport control (The International Civil Aviation Organization [ICAO], 2016) to boarding and arriving process through biometric identification (SITA, 2019, IATA, 2018 & Kirk et al, 2014), and minimizing wasting time and maximizing passengers' dwelling time to spend inside the airport areas. (Zaharia and Pietreanu, 2018).

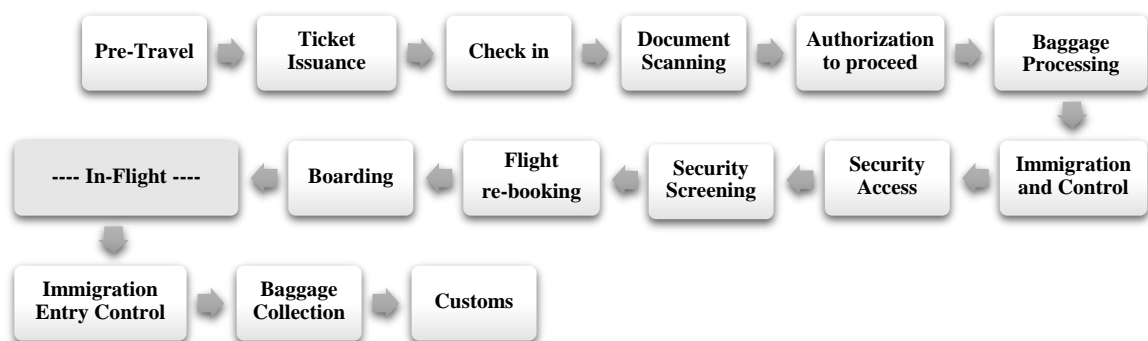


Figure 1 Passenger journey scenarios through steps of airport processes (IATA., 2018, p.10).

The Suvarnabhumi Airport is governed by The Airports of Thailand Public Company Limited or AOT. The organization is now initializing the concept of being the digital airport transformation. AOT anticipates that technologies and innovations can be implemented to facilitate its services for greater business opportunities and new customer experience delivery by the installation of self-service kiosks and automated immigration channels to facilitate domestic and international passengers (The Airports of Thailand Public Company Limited [AOT], 2018), similar with some countries like Singapore (The Singaporean Times, 2017) and Hong Kong Special Administration Region (SAR). The system will then accommodate more international passport holders in the coming future (The Tourism Authority of Thailand [TAT], 2018). Furthermore, The Living Airports software that had been developed by AOT has been launched to interlink the information technology systems. In terms of management, the software can also be used to support traffic control by providing real-time reports on the numbers of passengers at specific locations. The passengers will be able to advance access to flight information, rows of checking-in, public transportation services, retail shops and dining locations, as well as flight alerts. Ultimately, this progress is obedient to the Thailand Government's plan to make the country a leading hub of global aviation through digital transformation (The Nation Thailand, 2019).



2. Objectives

- 1) To study the demographic characteristics of international passengers who had been traveling through Suvarnabhumi Airport.
- 2) To examine the international passengers' experience levels towards the processes of digital transformation management of Suvarnabhumi Airport.
- 3) To compare the experiences of the international passengers on the Suvarnabhumi Airport's management processes through the digital transformation.

3. Materials and Methods

Quantitative research was carried out and cohered to the objectives of this study. Data collection was separated into two categories as follows.

3.1 Primary Data

400 Questionnaires were utilized to obtain data from foreign passengers who had experienced with the passenger experience management on the digital transformation at Suvarnabhumi Airport from November 2019 to January 2020, concerning pre-travel before arriving at the airport, processes at the airport, and arrival processes at the airport. The samples were selected by a purposive sampling method. Descriptive statistics were used to describe the frequency distribution data and percentages of foreign passengers' demographic characteristics. The mean score and standard deviation were applied to analyze the statistical data of the international passengers' experience regarding the digital transformation management processes at Suvarnabhumi Airport. Additionally, inferential statistics, t-Test, and One - way ANOVA F-Test were used to examine hypotheses and analyze the comparison between the adoption of the digital transformation at Suvarnabhumi Airport and its passengers' journey experience through the airport.

3.2 Secondary Data

According to the accumulated data related to this study, the researchers have examined concepts, theories, and relevant research from different sources concerning pre-travel processes (chatbot and application programming interfaces), processes at the airport (self-service kiosk, automated bag drop, full-body scanner, e-passport gate, automated border control, and boarding pass scanner), and arrival processes (radio frequency identification: RFID and electronic customs declaration gate system).

4. Results and Discussion

4.1 Results

The study of International Passengers' Experience Management towards the Digital Transformation of Suvarnabhumi Airport, Thailand, aimed to examine the demographic characteristics of international passengers who had experienced the journey processes at the airport provided by the BKK Airport and to compare experiences of the international passengers on the Suvarnabhumi Airport's management processes through a digital transformation, including hypotheses testing. The study has accumulated information from both primary data and secondary data. The results of the quantitative data that have been retrieved from the questionnaires distributed to the international passengers consist of the following results.

4.1.1 Respondents' Demographic Data

The results showed that most of the respondents were male at 51.50 % or 206 persons and female at 48.50 % or 194 persons. 155 respondents or 38.75 % were younger than 25 years old, 150 or 37.50 % were between 26-35 years old, 45 passengers or 11.25 % were 46-55 years, 35 persons or 8.75 % & were older than 56 years, and 15 persons or 3.75 % were between 36-45 years. For the education, most respondents graduated with a Bachelor's degree (222 persons or 55.50 %), followed by lower or equal to Grade 12 (112 persons or 28.00 %), Vocational certificate/diploma (44 persons or 11 %), and Post-graduate level (22 persons or 5.50 %). Among all respondents, 159 of them or 39.75 % were company officers, 94 or 23.50 % were Students, 45 or 11.25 % were business owners, 38 or 14 % were service operators, 27 respondents or 6.75 % had other careers, whereas 26 were state enterprise officers (6.50 %) and 11 were government officers (2.75 %). Most



of the respondents' travel frequency through Suvarnabhumi Airport was once a year (211 persons or 52.75 %), had experienced traveling through BKK Airport more than 3 times (82 persons or 20.50%), twice a year (80 persons or 52.75 %), and thrice a year (27 persons or 6.75 %), respectively.

4.1.2 Respondents' experiences levels towards the adoption of digital transformation processes at Suvarnabhumi Airport

The international passengers' experiences managed by Suvarnabhumi Airport in terms of its digital transformation management concerns pre-travel processes (chatbot, application programming interfaces: APIs, self-service kiosk, and automated bag drop), processes at the airport (full-body scanner, e-passport gate, automated border control, and boarding pass scanner), and arrival processes (radio frequency identification: RFID and electronic customs declaration gate system). The data were analyzed into those aspects ordering from the most to the least mean. The results revealed that: the most experienced facility in the passengers' perspective was Self-Service Kiosk (Mean = 3.818, S.D. = 0.905), followed by Boarding Pass Scanner (Mean = 3.524, S.D. = 0.925), Application Programming Interfaces: APIs (Mean = 3.81, S.D. = 0.923), Automated Border Control (Mean = 3.535, S.D. = 0.772), Electronic Customs Declaration Gate (Mean = 3.535, S.D. = 0.905), Full Body Scanner (Mean = 3.535, S.D. = 1.029), Radio Frequency Identification: RFID (Mean = 3.535, S.D. = 0.784), e-Passport Gate (Mean = 3.53, S.D. = 1.122), Automated Bag Drop (Mean = 3.535, S.D. = 1.038), respectively, and the least experienced was Chatbot (Mean = 3.535, S.D. = 0.652). Therefore, the average of those passengers had had a moderate experience level (Mean = 2.893 S.D. = 0.414) on the digital transformation process. According to described data, Table 1 illustrates the study of international passengers' experience levels on the digital transformation management of Suvarnabhumi Airport, concerning each process and ordering by ranking.

Table 1 International passengers' experience levels towards the adoption of digital transformation processes at Suvarnabhumi Airport.

Airport Process	International passengers' experience levels towards the adoption of digital transformation	Maen	S.D.	Experience Level	Ranking
Pre-Travel	Chatbot	1.954	0.652	Least	10
	Application Programming Interfaces (APIs)	3.215	0.923	Moderate	3
	Self Service Kiosk	3.818	0.905	High	1
At Airport	Automated Bag Drop	2.226	1.038	Low	9
	Full Body Scanner	3.024	1.029	Moderate	6
	e-Passport Gate	2.626	1.122	Moderate	8
	Automated Border Control	3.205	0.772	Moderate	4
	Boarding Pass Scanner	3.524	0.925	High	2
At Arrival	Radio Frequency Identification (RFID)	3.205	0.784	Moderate	7
	Electronic Customs Declaration Gate	3.095	0.905	Moderate	5
Total		2.893	0.414	Moderate	

4.1.3 Analysis of Hypotheses Testing

For the analysis of the hypotheses testing, inferential statistics, t-Test, and One-way ANOVA F-Test were used to examine the comparison of the relationship between the international passengers' demographic characteristics, regarding their gender, age, education, occupation, frequency of service uses, and obtained experiences on different processes (pre-travel processes, processes at the airport, and arrival processes) of digital transformation at Suvarnabhumi Airport. Thus, it is hypothesized that:

H₀: There is no difference in the international passengers' demographic characteristics related to receiving experience in the digital airport transformation processes.

H₁: There is a difference in the international passengers' demographic characteristics related to receiving experience in the digital airport transformation processes.



Table 2 Comparison of the relationship between the international passengers' demographic characteristics and received experience on digital transformation processes at Suvarnabhumi Airport.

Hypothesis	T	Sig. (2 - tailed Value)	Decision	Justification
H1: There is no difference in gender of the international passengers related to receiving experience on the digital airport transformation processes.	-0.904	0.367	Accepted	Overall, there is no significant relationship between gender and experience on the digital airport transformation processes. Hypothesis 1 is accepted
Hypotheses	F	Sig.	Decision	Justification
H2: There is no difference in age of the international passengers related to receiving experience on the digital airport transformation processes.	1.710	0.147	Accepted	Overall, there is no significant relationship between age and experience in the digital airport transformation processes. Hypothesis 2 is accepted
H3: There is no difference in the education of the international passengers related to receiving experience on the digital airport transformation processes.	0.835	0.475	Accepted	Overall, there is no significant relationship between education and experience in the digital airport transformation processes. Hypothesis 3 is accepted
H4: There is no difference in the occupation of the international passengers related to receiving experience on the digital airport transformation processes.	0.588	0.740	Accepted	Overall, there is no significant relationship between occupation and experience in the digital airport transformation processes. Hypothesis 4 is accepted
H5: There is no difference in the frequency of service uses of the international passengers related to receiving experience on the digital airport transformation processes.	0.178	0.157	Accepted	Overall, there is no significant relationship between frequency of service uses and experience in the digital airport transformation processes. Hypothesis 5 is accepted

Note: Significance at $p < 0.05$

Table 2 reveals the relationship between the international passengers' demographic characteristics regarding their gender, age, education, occupation, frequency of service uses, and obtained experiences in the different processes (pre-travel processes, processes at the airport, arrival processes) of the digital transformation at Suvarnabhumi Airport. In all main processes, the state of the null hypothesis is that there is no difference in the international passengers' demographic characteristics related to the obtained experience in the digital airport transformation processes of Suvarnabhumi Airport.

4.2 Discussions

The study of international passengers' experience management towards the digital transformation of Suvarnabhumi Airport, Thailand, can be discussed as follows.

4.2.1 The study of the respondents' demographic showed that most of the sample passengers were men because male passengers seemed to willingly respond to the questionnaires, as a research tool for collecting data, more than female passengers. Most of the foreign passengers who traveled through Suvarnabhumi Airport and completed the questionnaires had an age range of 25 years old and younger. As for the passengers' educational background, most of the respondents are holding a Bachelor's degree, and they have been working as company officers. Most of the international passengers included in this study have had experienced travel through Suvarnabhumi Airport once a year. The previous study on a causal model of passenger service quality factors at Suvarnabhumi Airport found that most of the sample passengers were male and had had a frequency of air travel through Suvarnabhumi Airport once a year. (Bunluesintu, 2015)

4.2.2 According to the study on the international passengers' experiences offered by Suvarnabhumi Airport regarding its digital transformation management in terms of pre-travel procedures,



Chatbot is the technology that the passengers have experienced least because Chatbot cannot answer passengers' inquiries and cannot support multi-language. On the contrary, the previous studies about the design and implementation of an airport chatbot at Venice Airport are coherent with the finding by Carisi et al. (2019), who suggested that the chatbot allows simply and immediately support for customers by implementing five languages such as English, Italian, German, Spanish, and Chinese and has a potential to decrease language barriers through the use of automatic translator system; however, it is unable to solve their problems and incapable to provide useful information such as flight information/status and airline office locations. The application programming interfaces or APIs have a modern design and multi-language supported, and passengers can send and receive photos or videos via the airport's APIs such as the airport application, website, or Facebook, which its function is accessible to the information of the transportation or the airport map.

The previous studies about the future airport terminals as new technologies promising capacity gains are coherent with the finding by Kalakou et al. (2015) that the installation of the self-service kiosks at Suvarnabhumi Airport allows the passengers to decrease their checking-in time, and the number of kiosks has sufficiently provided to accommodate the passengers' needs. The automated bag drop machines are also capable of shortening the sample passengers' check-in queuing and increasing dwelling time before departure. Our finding is agreeable with the recent study on the acceptance of biometric technology in airport check-in. The method the passengers are typically using to check in is online check-in. The passengers who had already checked in via the internet tend to use the biometric check-in as it is likely to be faster and more functional using of technology process (Negri et al., 2019). In addition to the BKK Airport's procedures, the airport security checkpoints are also implemented with technologies. The passengers have had satisfying experiences with full-body scanners that could decrease queuing for the security formality process. The number of BKK airport's e-passport gates is adequately installed and ready to serve the passengers' needs but there have too few ranges of international languages to accommodate most foreign passengers. In terms of automated border control machines, the BKK Airport has installed the machines to verify the identity of the passengers by using technologies such as facial recognition, fingerprints, and iris scanning system, which allow the passengers to journey through the airport smoothly. Prior to the boarding process, the passengers have highly experienced the adoption of global boarding scanners of Suvarnabhumi Airport that allow the passengers to use their smartphone to present a digital boarding pass to the airline staff. On the arrival procedures, the airlines who operate flights at BKK Airport attach a baggage tag with a barcode that is compatible with the radio frequency identification system or RFID so the passengers can conveniently check their baggage in case of loss. For electronic customs declaration gates, the international passengers have noticed that the airport has had installed the global standard electronic customs declaration gates and its system to scan the passengers' belongings when they are walking through the airport's customs checkpoint.

4.2.3 The comparison of the relationship between the international passenger's demographic characteristics regarding their gender, age, education, occupation, frequency of service uses, and obtained experiences in different processes (pre-travel processes, processes at the airport, and arrival process) of the digital transformation at Suvarnabhumi Airport. Overall, there is no significant relationship between gender, age, educational levels, occupation, and visiting frequency of the respondents and the experience management on digital airport transformation processes, regarding the pre-travel processes, processes at the airport, and arrival processes at Suvarnabhumi Airport, with a statistical significance.

5. Conclusion

This paper presents a digital transformation of the Suvarnabhumi Airport, concentrating on leveraging its operations and innovation to enhance the passengers' experience while they are journeying through the airport. According to the study, Suvarnabhumi Airport has initially implemented digital and technology to transform its operation and create passengers' experience during the airport's processes such as the pre-travel processes and the processes inside the airport concerning departure and arrival. Though the international passengers have had experience in using Chatbot, an application programming interface, to make a decision to travel via several airports, BKK Airport has just started to develop its Chatbot and APIs



system. Nonetheless, Suvarnabhumi Airport is currently adopting digital systems and technologies to accommodate the passengers by adopting check-in kiosks, automated bag drop, full-body scanners, e-passport gates, automated border controls, and boarding pass scanners. Despite the implementation of those technologies, the electronic passport gate and automated border control are now available for some nationalities' passport holders. On the arrival hall, the passengers have to pass the airport processes that serve inbound travelers using the airport radio frequency identification system. In case of lost baggage, the passengers are able to track and trace their baggage using BBK Airport's application which can link to the RFID tracking. Ultimately, the electronic customs declaration gates are partly digitalized operating with the customs personnel, not a fully transformative process. Following the findings, Suvarnabhumi Airport is able to adapt and apply key information from this paper to develop its passenger experiences regarding their demographic profiles and solutions to compete with its rivals by adopting digital and innovative technologies.

6. Acknowledgements

I would like to thank all the people without whom this research would never have been feasible. Especially, Mr. Peerapat Kaewjaidee, Ms. Kullada Wongmarn, and Ms. Supasinee Maruen. They are bachelor students of an aviation management program at the Institute of Aviation and Aerospace Technology, Rajamangala University of Technology Tawan-ok, Chonburi, Thailand. They have advocated for the research in particular ways and for that, I would like to give them special thanks. My colleagues have also encouraged me to accomplish this research. Importantly, Airports of Thailand Public Company Limited of Suvarnabhumi Airport attached great importance as a host for completing the study.

7. References

- Airport Council Association. (2017). Airport digital transformation, best practice, digital transformation is about business transformation in a digital world. Retrieved September 5, 2019 from [https://aci.aero/Media/aabcf490-613e-44ab-b98c-339377de0cd0/ki_0Cg/Publications/2017/Digital %20IT%20Transformation/Airport_Digital_Transformation.pdf](https://aci.aero/Media/aabcf490-613e-44ab-b98c-339377de0cd0/ki_0Cg/Publications/2017/Digital%20IT%20Transformation/Airport_Digital_Transformation.pdf)
- Amadeus. (2012). Reinventing the airport ecosystem. Retrieved September 15, 2019 from http://www.amadeus.com/airlineit/resources/reinventing_the_airport_ecosystem/downloads/amadeus-reinventing-the-airport-ecosystem-2012-en.pdf
- Bunluesintu, C. (2015). A causal model of passenger service quality factors at Suvarnabhumi Airport. (Doctoral dissertation, National Institute of Development Administration, Bangkok, Thailand). Retrieved December 28, 2019 from <http://gscm.nida.ac.th/uploads/files/1536031955.pdf>
- Capgemini Consulting. (2017). Digital transformation, a roadmap for billion-dollar organizations. Retrieved October 12, 2019 from https://www.capgemini.com/wp-content/uploads/2017/07/Digital_Transformation__A_Road-Map_for_Billion-Dollar_Organizations.pdf
- Carisi, M., Albarelli, A., Luccio, L. L. (2019). Design and implementation of an airport chatbot. *Proceedings of the 5th EAI International Conference on Smart Objects and Technologies for Social Good*, 49-54. <https://dl.acm.org/doi/pdf/10.1145/3342428.3342664>
- Graham, A. (2018). *Managing Airports, An international perspective* (5th ed.). Abingdon, OX: Routledge.
- Kirk, P. J., Harrison, A., Popovic, V., Kraal, B. (2014). Deconstructing expected passenger experience in airports. In Lim, Y. K. & Niedderer, K. (Eds.) *Proceedings of the 2014 Design Research Society Conference*, 16-30. <https://eprints.qut.edu.au/82911>
- Negri, N. A. R., Borille, G. M. R., Falcao, V. A. (2019). Acceptance of biometric technology in airport check-in. *Journal of Air Transport Management*, 81, <https://doi.org/10.1016/j.jairtraman.2019.101720>
- NTS. (2019). The Future of Aviation. Retrieved October 25, 2019 from <https://www.nts.com/ntsblog/future-of-aviation>



- Papagiannopoulos, N. (2017). Airport digital transformation, Laying the foundations. Retrieved December 6, 2019 from <https://www.internationalairportreview.com/article/75631/airport-digital-transformation>
- SITA. (2019). 2025 Air travel for a digital age. Retrieved December 11, 2019 from <https://www.sita.aero/resources/type/white-papers/air-travel-for-a-digital-age>
- The Airports of Thailand Public Company Limited. (2019). Sustainable Development Report, Embracing Digital Transformation. Retrieved November 15, 2019 from <https://corporate.airportthai.co.th/wp-content/uploads/2019/01/Sustainable-Development-Report-2018-AOT.pdf>
- The International Air Transport Association. (2018a). Travel Communication, Passenger Journey Scenarios. Retrieved October 12, 2019 from <https://www.iata.org/contentassets/204c444a815b4e2b9251a6cda365d671/concept20paper20travel20communication.pdf>
- The International Air Transport Association. (2018b). Passenger Journey Scenarios through steps of airport processes. Retrieved November 15, 2019 from <https://www.iata.org/contentassets/204c444a815b4e2b9251a6cda365d671/concept20paper20travel20communication.pdf>
- The International Air Transport Association. (2018b). IATA Forecast Predicts 8.2 billion Air Travelers in 2037. Retrieved January 24, 2020, from <https://www.iata.org/en/pressroom/pr/2018-10-24-02>.
- The International Civil Aviation Organization. (2016). Automated Border Control. Retrieved October 16, 2019 from https://www.icao.int/Meetings/FALP/Documents/FALP9-2016/FALP9-WP14_Automated-Border-Control_IATA.pdf
- The Nation Thailand. (2019). AOT starts up 'Living Airports' at Suvarnabhumi. Retrieved November 17, 2019 from <https://www.nationthailand.com/business/30375124>
- The Singaporean Times. (2017). Singaporeans can now use automated gates at Bangkok's Suvarnabhumi Airport. Retrieved November 17, 2019 from <https://www.straitstimes.com/singapore/singaporeans-can-now-use-automated-gates-at-bangkoks-suvarnabhumi-airport>
- The Tourism Authority of Thailand. (2018). Hong Kong travellers can now use automated immigration channels to enter Thailand. Retrieved December 26, 2019 from <https://www.tatnews.org/2018/09/hong-kong-travellers-can-now-use-automated-immigration-channels-to-enter-thailand/>
- The World Bank Group. (2020). Air Transport. Retrieved January 24, 2020, from <https://www.worldbank.org/en/topic/transport/brief/airtransport>.
- Zaharia, S. E., Pietreanu, C. V. (2018). Challenges in airport digital transformation. *Journal of Transportation Research Procedia*, 35, 90-99. <https://doi.org/10.1016/j.trpro.2018.12.016>