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Passenger Experiences with Digital Technology in an Airport in Thailand

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ABSTRACT

Airports around the world are increasingly introducing digital technologies to improve passenger services and operational efficiency. Self-service check-in kiosks, mobile applications, and biometric systems have become more widely used, particularly after the COVID-19 pandemic encouraged the adoption of contactless services. Despite these developments, limited research has examined how passengers experience these technologies in regional airports in Thailand.

This study explored passenger experiences with digital technologies at an airport in Thailand. A qualitative approach was adopted using semi-structured interviews with passengers who had recently travelled through the airport and had experience using digital services such as self-service kiosks, mobile applications, or biometric identification systems. The purpose of the study was to understand how these technologies influence passengers' perceptions of convenience, usability, and efficiency during the check-in process.

The interview data were analyzed using thematic analysis to identify common patterns in passenger experiences. Several strategies were applied to strengthen the credibility of the research, including member checking and careful documentation of the analysis process. Ethical approval was obtained prior to data collection, and all participant information was treated confidentially.

The results indicate that digital technologies generally help improve convenience and efficiency during the airport travel process. However, the findings also show that passengers' experiences are influenced by factors such as system usability, clarity of information, trust in biometric technologies, and the availability of staff assistance. While many passengers appreciate the efficiency of digital systems, some users still rely on human support when encountering unfamiliar technologies.

Overall, this study provides insight into how passengers experience digital technologies in a regional airport context. The findings contribute to the application of the Technology Acceptance Model (TAM), SERVQUAL, and the Diffusion of Innovation (DOI) in understanding passenger perceptions of digital airport services. The results may also assist airport managers in improving the design and implementation of digital services to better support passenger needs.

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1. INTRODUCTION

Over the past decade, airports around the world have experienced significant changes because of technological development and increasing passenger expectations. Travelers today expect airport processes to be faster, safer, and more convenient, particularly when using air transport services. To respond to these expectations, many airports have introduced digital technologies such as self-service check-in kiosks, mobile applications, and biometric systems to improve operational efficiency and passenger

experience (Chua et al., 2021). The COVID-19 pandemic further accelerated the adoption of these technologies, as passengers became more concerned about physical contact during travel. According to IATA (2023), contactless services such as mobile boarding passes and facial recognition are no longer considered optional innovations but are increasingly viewed as necessary components of modern airport operations.

In Thailand, major international airports such as Suvarnabhumi and Don Mueang have implemented advanced digital systems, including automated gates and biometric boarding processes (Khajeh et al., 2022). However, regional airports often face different conditions. They typically operate with more limited budgets, smaller infrastructure, and fewer technological resources. Despite these limitations, regional airports still play an important role in supporting domestic transportation, tourism development, and local economic growth (Nguyen and Dao, 2021). Because of these differences, the impact of digital technologies in regional airports may not be the same as in larger international airports, and passenger perceptions in these environments need to be better understood.

Previous studies have mainly focused on large international airports where technological investment and operational capacity are relatively high. In comparison, fewer studies have examined how digital technologies influence passenger experience in smaller or regional airport settings, where financial and human resources may be more limited (Wang et al., 2020). An airport in Thailand has recently introduced several digital services, including self-service check-in kiosks, a mobile application, and biometric check-in systems. However, there is still limited understanding of how passengers perceive these services in practice. It remains unclear whether these technologies are easy to use, whether they reduce waiting time, and whether they genuinely improve the overall travel experience from the passenger perspective.

Without a clear understanding of passenger experience, airport management may invest in technologies that do not fully meet user needs, which could lead to inefficient resource allocation or low adoption rates. The study aims to explore how digital technologies influence passenger experiences at an airport in Thailand, with particular attention to self-service kiosks, mobile applications, and biometric check-in systems. The findings are expected to provide useful insights for airport decision-makers and contribute to academic knowledge related to digital service adoption in regional airport contexts.

The objective of this study is to explore passenger perceptions and experiences of digital technologies at an airport in Thailand. Specifically, the study aims to examine passengers' perceptions of self-service check-in kiosks, their experiences when using the airport's mobile application during the travel process, and their perceptions of biometric check-in technologies in terms of convenience and trust. In doing so, the study seeks to understand how these digital systems influence passengers' overall experience, particularly in terms of usability, efficiency, and confidence in the check-in process.

This study addresses the following research questions:

1. How do passengers perceive the use of self-service check-in kiosks at an airport in Thailand?
2. What are passengers' experiences when using the airport's mobile application for travel-related services?
3. How do passengers perceive biometric check-in technologies in terms of convenience and trust?

2. Literature Review

2.1. Digital Technologies in Airports

In the past few years, airports have increasingly introduced digital technologies to improve both operational efficiency and passenger experience. These technologies include self-service check-in kiosks, mobile applications, real-time information systems, and biometric identification tools. Such systems are expected to reduce waiting times, manage passenger flow more effectively, and create a smoother travel journey (Rejeb et al., 2023).

The COVID-19 pandemic also played an important role in accelerating the adoption of contactless technologies. Many passengers became more aware of physical interaction during travel, leading airports to implement digital solutions that minimize direct contact. According to IATA (2023), services such as mobile boarding passes and automated check-in processes are now considered essential features in modern airport operations.

While major international airports have adopted advanced technologies rapidly, regional airports often face different constraints. Limited budgets, smaller infrastructure, and fewer technical personnel may slow down the implementation process (Khajeh et al., 2022). Nevertheless, regional airports remain important for domestic transportation and tourism, which means that digital technology still has potential value in these environments.

2.2. Self-service Check-in Kiosks and Passenger Satisfaction

Self-service check-in kiosks allow passengers to complete check-in procedures independently,

including selecting seats and printing boarding passes. These systems can help reduce queues and provide passengers with greater control over their travel process. Research has shown that kiosks can improve passenger satisfaction when they are easy to use and supported by clear instructions (Chua et al., 2021).

However, not all passengers have the same level of familiarity with technology. Elderly travelers or infrequent flyers may experience difficulties when using kiosks, particularly if the interface is complicated or assistance is not readily available. In regional airports, kiosks may help reduce staff workload, but their effectiveness depends largely on usability and passenger confidence.

This study uses the Technology Acceptance Model (TAM) to examine perceived usefulness and ease of use, while SERVQUAL is applied to evaluate service reliability and responsiveness in kiosk services.

2.3. Mobile Applications and Passenger Convenience

Mobile applications have become an important part of travel management. Passengers frequently use applications to check flight schedules, receive notifications, access boarding passes, and obtain airport information. A well-designed application can reduce uncertainty and help passengers feel more confident throughout their journey (Nguyen and Dao, 2021).

The usefulness of mobile applications depends strongly on system quality. Applications that provide inaccurate information or are difficult to navigate may negatively influence passenger perceptions, whereas reliable and user-friendly applications can improve convenience and satisfaction (Suhartanto et al., 2022).

For regional airports, mobile applications may also serve as a practical solution to compensate for limited staff availability. In this study, TAM, SERVQUAL, and Diffusion of Innovation (DOI) theory are applied to understand how passengers adopt and evaluate mobile services in a regional airport context.

2.4. Biometric Systems and Check-in Efficiency

Biometric technologies, particularly facial recognition, are increasingly used in airports to enhance both efficiency and security. These systems allow identity verification without physical documents, which can shorten processing time during check-in and boarding (ICAO, 2021).

Although many passengers recognize the convenience of biometric systems, concerns related to privacy and data security remain important factors influencing acceptance. Some passengers may feel uncertain about how their personal information is stored or used, especially those with lower levels of digital familiarity (Wang et al., 2020).

In regional airport environments, biometric implementation presents both opportunities and challenges. Systems must be reliable and easy to operate, particularly when technical support resources are limited. DOI, TAM, and SERVQUAL provide useful perspectives for understanding passenger adoption and perceptions in this context.

2.5. Research Gap

Most previous studies have focused on large international airports with strong technological infrastructure and financial support. In comparison, fewer studies examine digital technology adoption in regional airports, particularly in developing countries. Regional airports often serve passengers with different levels of digital literacy, which may influence how technologies are perceived and used.

There is also limited research examining whether digital systems designed for large airports are equally suitable for smaller operational environments. This study attempts to address this gap by exploring passenger experiences with digital technologies in a regional airport context in Thailand.

2.6. Theoretical Framework

This study integrates three theoretical perspectives: the Technology Acceptance Model (TAM), SERVQUAL, and Diffusion of Innovation (DOI). TAM explains user acceptance based on perceived usefulness and ease of use (Davis, 1989). SERVQUAL evaluates service quality through dimensions such as reliability and assurance (Parasuraman et al., 1988). DOI explains how individuals adopt new technologies over time (Rogers, 2003).

Together, these frameworks provide a foundation for understanding passenger perceptions and experiences with digital technologies in a regional airport environment.

3. Methodology

3.1. Research Design

This study employed a qualitative research approach to explore how digital technologies influence passenger experiences at an airport in Thailand. Qualitative design was considered appropriate because the objective of the study was to gain a deeper understanding of passengers' perceptions, feelings, and experiences rather than to measure relationships using numerical data. This approach allowed participants to describe their interactions with digital technologies such as self-service check-in

kiosks, mobile applications, and biometric systems in their own words.

3.2. Participants and Sampling

Purposive sampling was used to select participants who had experience using digital services at the airport. Ten participants were selected based on their direct experience with at least one digital service, including self-service check-in kiosks, mobile applications, or biometric identification systems.

The purpose of this sampling method was not to generalize findings to all passengers but to obtain meaningful insights from individuals who had directly interacted with the technologies under investigation. All participants were adults who had traveled through an airport in Thailand within the previous six months.

3.3. Data Collection

Data was collected through semi-structured interviews, which provided a balance between guided discussion and flexibility. This format enabled participants to share their experiences freely while ensuring that the conversation remained relevant to the research objectives.

Each interview lasted approximately 20–30 minutes and was conducted either face-to-face or through online video communication, depending on participant convenience. With participant consent, all interviews were audio-recorded and later transcribed for analysis.

The interview questions focused on passengers' experiences with digital technologies, their perceptions of convenience and usability, and any challenges encountered during the process. This approach helped capture both positive and negative aspects of passenger experience.

3.4. Data Analysis

The interview data were analyzed using thematic analysis following the framework proposed by Braun and Clarke (2006). This method involves identifying patterns and themes within qualitative data through a systematic process.

The analysis began with familiarization through repeated reading of the transcripts, followed by initial coding to identify meaningful segments of data. The codes were then grouped into broader themes, which were reviewed and refined to ensure consistency across the dataset. Finally, the themes were clearly defined and presented in the findings section to support the interpretation of results.

3.5. Ethical Considerations

Ethical principles were followed throughout the research process. Participants were informed about the purpose of the study before participation and provided consent voluntarily. Confidentiality was maintained by removing personal identifiers from transcripts and reports. Participants also had the right to withdraw from the study at any time without consequence.

3.6. Trustworthiness

Several strategies were applied to enhance the trustworthiness of the research. Credibility was supported through member checking, allowing participants to confirm the accuracy of interpretations. In addition, data saturation was achieved during the later interviews, where no new themes emerged.

Transferability was addressed by providing clear descriptions of the research context and participant characteristics. Dependability was strengthened by documenting the research procedures, while confirmability was ensured by linking findings directly to the data rather than researcher assumptions.

4. Results and Discussion

4.1. Introduction

This chapter presents the findings derived from qualitative interviews with passengers who had experience using digital technologies at a regional airport in Thailand. The data were analyzed using thematic analysis to identify key patterns in passenger experiences. The findings are organized into three main themes: perceived convenience and efficiency, usability and user confidence, and trust and acceptance of biometric technologies. These themes reflect how passengers interact with digital systems, including self-service kiosks, mobile applications, and biometric services. This chapter also discusses how the findings relate to relevant theoretical frameworks and previous studies.

4.2. Participant Profile

A total of ten participants were included in this study. All participants had experience using at least one digital service at the airport, such as self-service check-in kiosks, mobile applications, or biometric identification systems. The participants varied in age, travel frequency, and level of familiarity with digital technologies, allowing the study to capture a range of perspectives on digital service usage in an airport environment.

4.3. Overview

The thematic analysis identified three main themes related to passenger experiences with digital technologies at the airport: perceived convenience and efficiency, usability and user confidence, and trust and acceptance of biometric technologies. These

themes reflect how passengers interact with digital systems, including self-service kiosks, mobile applications, and biometric check-in technologies, as well as the factors influencing their overall experience.

4.4. Detailed Findings

4.4.1. Perceived Convenience and Efficiency

Participants generally reported that digital technologies improved convenience during the travel process. Self-service check-in kiosks and biometric systems were perceived as effective tools in reducing waiting time and enabling passengers to complete procedures more quickly. These systems allowed passengers to manage their travel steps independently, which increased their sense of control and flexibility, especially during less crowded periods.

In addition, mobile applications were considered useful for accessing real-time flight information and updates. This helped passengers manage their time better and reduced uncertainty during travel. The availability of digital tools enabled passengers to navigate airport processes more efficiently without relying entirely on staff.

Overall, these findings suggest that digital technologies play an important role in enhancing both convenience and efficiency, while also supporting passenger autonomy in the airport environment.

4.4.2. Usability and User Confidence

Despite the benefits of digital technologies, several participants experienced usability challenges that affected their confidence in using these systems. Factors such as unclear instructions, complex interface design, and occasional system errors were identified as barriers to effective use. These issues were particularly evident among passengers who were less familiar with digital technologies.

Ease of use was found to be an important factor influencing user confidence. When systems were intuitive and easy to understand, passengers felt more comfortable using them independently. However, when difficulties occurred, users were more likely to feel uncertain and hesitant.

The presence of airport staff also played a significant role in supporting user confidence. Assistance from staff helped reduce confusion and ensured that passengers could complete the check-in process successfully. This indicates that usability and human support are closely connected in shaping a positive passenger experience.

4.4.3. Trust and Acceptance of Biometric Technologies

Trust emerged as a key factor influencing passengers' acceptance of biometric technologies. While many participants recognized that systems such as facial recognition could improve efficiency and reduce the need for repeated document checks, concerns about data privacy and security were still evident.

These concerns were more common among passengers who had limited experience with digital technologies. Uncertainty about how personal data is collected, stored, and used affected their willingness to fully adopt biometric systems.

On the other hand, passengers who were more familiar with digital services tended to show higher levels of trust and acceptance. The findings suggest that clear communication about data protection and system transparency is essential for building user confidence and encouraging wider adoption of biometric technologies.

4.5. Discussion

The findings of this study highlight the role of digital technologies in shaping passenger experiences at a regional airport in Thailand. Based on the three identified themes, the results show that perceived convenience and efficiency, usability and user confidence, and trust and acceptance of biometric technologies are key factors influencing how passengers interact with digital systems during the travel process.

First, the findings related to perceived convenience and efficiency support the Technology Acceptance Model (TAM), which suggests that perceived usefulness plays a significant role in technology adoption. Digital systems such as self-service kiosks, mobile applications, and biometric technologies were seen as helpful tools that reduce waiting time and allow passengers to manage their travel process more independently. These results indicate that when passengers perceive digital technologies as useful, they are more likely to have positive experiences and be willing to use them.

Second, usability and user confidence were identified as important factors influencing passenger experience. This is consistent with the concept of perceived ease of use in TAM, as well as service quality dimensions in the SERVQUAL framework, particularly reliability and responsiveness. When digital systems are easy to understand and operate, passengers feel more confident and are more likely to use them without assistance. However, usability challenges such as unclear instructions and system errors may reduce confidence and limit adoption. This

suggests that improving system design and providing adequate support are essential for enhancing user experience.

Third, trust and acceptance of biometric technologies were found to influence passengers' willingness to adopt advanced digital systems. This finding is consistent with the Diffusion of Innovation (DOI) theory, which explains that individuals adopt new technologies at different rates depending on their familiarity and perceived risk. Concerns about data privacy and security may reduce trust, particularly among less experienced users. In contrast, passengers who are more familiar with digital systems tend to show higher levels of acceptance. This indicates that transparency, clear communication, and data protection measures are important in building trust and encouraging adoption.

Overall, the findings suggest that digital technologies can improve passenger experience in regional airports when efficiency, usability, and trust are effectively balanced. The results also highlight the importance of combining digital systems with appropriate human support to ensure that all passengers, regardless of their level of technological familiarity, can use these services with confidence.

4.6. Chapter Summary

This chapter presented the findings from the qualitative interviews, highlighting three key themes: perceived convenience and efficiency, usability and user confidence, and trust and acceptance of biometric technologies. The results showed that digital technologies improved efficiency and supported passenger independence during the travel process. However, usability and user confidence remained important factors influencing how effectively these systems were used. In addition, trust in biometric technologies played a significant role in shaping passengers' willingness to adopt digital services. The next chapter presents the conclusions and recommendations based on these findings.

5. Discussion, Conclusion, and Recommendations

5.1. Chapter Overview

This chapter discusses the findings presented in Chapter 4 by interpreting them in relation to the research objectives and the literature reviewed earlier. Rather than repeating the interview results, the discussion focuses on explaining what the findings mean and how they contribute to understanding passenger experiences with digital technologies in a regional airport context in Thailand.

The discussion brings together individual participant perspectives and the recurring themes identified during the analysis. Through this interpretation, the chapter provides a clearer picture of how digital technologies influence passenger experiences in practice, particularly in terms of perceived convenience, usability, trust, and the role of human support.

5.2. Discussion of Findings

5.2.1. Passenger Experiences with Digital Technologies

The findings show that digital technologies are now closely integrated into different stages of the airport journey and play an important role in shaping passenger experiences. Many participants described digital systems as helping to organize procedures more clearly and reduce uncertainty, which contributed to a smoother overall travel process. This observation supports the research objective of exploring how passengers perceive and evaluate digital technologies within a regional airport environment.

However, the results also indicate that passenger experiences are influenced not only by the presence of technology but by how individuals interact with it. Self-service check-in kiosks and mobile applications were generally seen as convenient tools, especially when passengers were familiar with their use. A sense of control over the travel process often emerged when passengers were able to complete procedures independently. At the same time, participants with less experience sometimes expressed hesitation during initial use, suggesting that perceived convenience depends strongly on user confidence and prior exposure to digital systems.

Emotional responses also appeared to be closely connected to technology use. Participants described feelings such as confidence, reassurance, or anxiety depending on how clearly systems provided instructions and how easily problems could be resolved. When digital systems were intuitive and reliable, the experience was smoother and less stressful. Conversely, unclear guidance or technical issues reduced confidence and increased reliance on staff assistance.

These findings highlight the contextual nature of adoption of digital technology in regional airports. Compared with large international hubs, regional airports often serve passengers with diverse travel frequency and varying familiarity with digital tools. As a result, the effectiveness of digital systems depends not only on technological capability but also on accessibility, clarity, and available support.

5.2.2. Usability and Information Clarity

Usability and clarity of information emerged as important factors influencing passenger experiences

with airport technologies. While most participants were able to complete digital procedures, the level of confidence varied depending on how easy the systems were to understand and navigate. Clear instructions and straightforward processes contributed to a more comfortable experience, whereas complicated interfaces or unclear messages sometimes created uncertainty.

The findings suggest that usability should be considered from a user-centered perspective rather than purely technical performance. Passengers evaluated systems not only by whether tasks could be completed, but also by how comfortable they felt during the process. Infrequent travelers appeared more sensitive to usability challenges because they required additional time to understand procedures.

Information clarity was also important. Participants emphasized the need for accurate and timely information, especially during unexpected situations such as delays or system errors. When information was unclear or inconsistent across different sources, passengers were more likely to verify details through multiple channels, which reduced confidence in the digital systems.

In a regional airport context, inclusive design becomes especially important because passengers may have different levels of familiarity with technology. Systems that prioritize simplicity and clear guidance are therefore more likely to support positive passenger experiences.

5.2.3. Human Support

The findings clearly indicate that human support remains essential even as digital technologies become more widely used in airports. Staff assistance was often perceived as a source of reassurance, particularly when passengers encountered unfamiliar systems or technical difficulties. This suggests that digital transformation does not eliminate the need for human interaction but instead reshapes its role within the service environment.

Airport staff are increasingly viewed as facilitators who support passengers during their interactions with digital technologies. The presence of staff can reduce uncertainty and encourage passengers to use self-service systems with greater confidence. This role appears especially important for individuals with lower digital confidence or limited travel experience.

In addition, human support contributes to the emotional aspects of the passenger journey that technology alone cannot fully address. Feelings of comfort, reassurance, and trust are closely linked to the availability of staff, particularly in time-sensitive situations. In a regional airport context, where passenger familiarity with technology may vary, accessible staff support helps ensure that digital systems enhance rather than complicate the overall travel experience. This finding highlights that human support remains a critical component in achieving effective digital service implementation.

5.2.4. Trust and Acceptance

Trust emerged as a key factor influencing passenger acceptance of advanced technologies, particularly biometric identification systems such as facial recognition. While participants recognized the potential efficiency benefits of these technologies, concerns about personal data security affected their willingness to rely on them.

The findings suggest that trust is shaped not only by system performance but also by how transparently technology is communicated. Uncertainty about data collection, storage, and protection led to cautious attitudes among some participants. Acceptance appeared higher when passengers felt informed and reassured about data management practices.

Trust was also linked to perceptions of institutional responsibility. Participants associate confidence in technology with confidence in the organizations implementing it. Clear explanations and visible safeguards were therefore important in building acceptance. In regional airports, direct interaction with staff provides opportunities to strengthen trust through communication and support.

5.3. Contributions of the Study

This study contributes to understanding passenger experiences with digital technologies in a regional airport setting by focusing on perceptions, confidence, and emotional responses rather than only technical performance. The findings highlight the importance of usability, human support, and trust in shaping technology acceptance.

The research also contributes to the growing literature on digital transformation in aviation by emphasizing the passenger perspective within a regional airport context. While many studies focus on large international airports, this study provides insights into how digital technologies are experienced in smaller airport environments where passenger familiarity with digital systems may vary.

5.4. Limitations of the Study

This study has several limitations that should be considered when interpreting the findings. First, the research was conducted with a relatively small sample of participants, which is common in qualitative research but may limit the generalizability of the results. Second, the study focused on passenger experiences within a single airport context. As a

result, the findings may reflect the specific operational environment and passenger characteristics of that airport.

Despite these limitations, the qualitative approach allowed for in-depth exploration of passenger perceptions and experiences, providing valuable insights that may inform both future research and practical improvements in airport digital services.

5.5. Practical Implications

The findings suggest several practical implications for airport management and service design. Airports should prioritize user-friendly system design with clear instructions and simple interfaces to improve passenger confidence when interacting with digital technologies. Ensuring that information is communicated clearly across digital platforms can also reduce confusion and improve the overall passenger experience.

In addition, maintaining visible staff support near digital service points can help passengers navigate unfamiliar systems more easily. Staff training programs that focus on assisting passengers with digital technologies may therefore enhance the effectiveness of self-service systems.

Transparent communication regarding data privacy and the use of biometric technologies is also important. Providing clear explanations about how personal data are collected and protected can help build passenger trust and increase acceptance of advanced digital systems.

5.6. Recommendations for Future Research

Future research could expand the sample size to include a wider range of passenger profiles and travel experience. Comparative studies involving multiple airports may also help identify similarities and differences in passenger perceptions of digital technologies across different operational contexts.

Researchers may also consider using mixed method approaches that combine qualitative insights with quantitative data. Such approaches could provide a broader understanding of passenger experiences while maintaining the depth of qualitative analysis.

5.7. Conclusion

This study explored passenger experiences with digital technologies at a regional airport in Thailand using a qualitative approach. The findings indicate that digital systems contribute to clearer procedures, improved efficiency, and a more structured travel experience. However, the benefits are not experienced equally by all passengers.

Passenger experiences were shaped by the interaction between technological systems, user familiarity, and the availability of human support. While confident users often perceived digital systems as convenient, less experienced passengers sometimes experienced hesitation or uncertainty. Usability, information clarity, and trust also influenced how passengers evaluated digital technologies.

Overall, the study suggests that digital transformation in regional airports should be understood as a combination of technological and human elements. Effective implementation requires user-centered design, transparent communication, and continued staff support to ensure positive passenger experiences for diverse user groups.

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