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Passengers' Behavioural Intention to Use Airport Self-Service Technologies at KLIA2: The Influence of Perceived Ease of Use

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ABSTRACT

The current study examines the role of PEOU in shaping passengers' behavioural intention towards the adoption of Industry 4.0 self-service technologies (SSTs) at the Kuala Lumpur International Airport Terminal 2 (KLIA2). Using a quantitative correlational design based on the Technology Acceptance Model (TAM), the study analysed 362 valid responses obtained through convenience sampling, with passengers aged 50–64 years (58.3%) dominating the sample. Reliability analysis confirmed strong internal consistency for both PEOU ($\alpha = 0.902$) and behavioural intention ($\alpha = 0.874$). Correlation analysis showed that there was a strong positive correlation between PEOU and behavioural intention ($r = 0.657$, $p < 0.001$). Regression analysis further showed that PEOU significantly predicted behavioural intention ($B = 0.756$, $\beta = 0.657$, $p < 0.001$), explaining 43.1% of the variance in intention ($R2 = 0.431$). PEOU, therefore, emerges as a significant variable in accelerating SST adoption at KLIA2 by incorporating age variations in package and interface elements to simplify operations and demonstrate optimal efficiency in line with the vision for user acceptance.

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1. INTRODUCTION

Airports are increasingly implementing Industry 4.0 through self-service check-in kiosks, biometric identification, and operations supported by analytics. They are supposed to increase throughput capacity and lower waiting times. However, the operational advantage will materialize only when the passengers can adequately navigate their way through the workstations without confusion. Disoriented passengers who find SSTs difficult to utilize often choose to return to staffed counters for assistance, thus decreasing overall efficiency (Wongyai et al., 2024b; Chaiwan et al., 2025).

The IATA Global Passenger Survey (2024) states that 70% of travelers expect to be able to get to the gate in 30 minutes. However, with this demand for speed, many find interfaces effort-intensive, thus creating uncertainty in time-sensitive travel. At KLIA2, these challenges are magnified during peak traffic; Malaysia Airports reported that KLIA passenger traffic reached 63.3 million in 2025 (Malaysia Airports, 2026). Hence, there is a need for empirical evidence of SST use perceptions at KLIA2, specifically because the airport's large number of travelers necessitates the need to predict future behavioral intentions based on usability perceptions.

Moreover, the operational challenges at Kuala Lumpur International Airport Terminal 2 (KLIA2) become apparent when there is an increase in passenger traffic, since the situation compels the passengers to make use of the self-service touchpoints, which aid in sustaining the airport operations. December 2025 was the most operationally demanding month, according to Malaysia Airports, with 10 million passengers handled throughout the network. KLIA recorded 6.1 million passengers in December 2025, and total KLIA passenger traffic was 63.3 million in 2025 (Malaysia Airports, 2026). Self-service systems will face serious problems because they will create more queues when equipment fails or customers abandon self-service points, given that employees can only serve a limited number of passengers.

From a research point of view, perceived ease of use is one of the most actionable determinants for airport managers since it can be enhanced through interface design, process simplification, guidance, error recovery, and layout and signage that support the customer. Hence, the aviation SST research field continues to study passenger adoption and acceptance and has demonstrated that the perceived ease is a vital element that influences passenger outcomes (Wongyai et al., 2024b). Recent work also points to the need for human interaction as a conditioning factor in adoption pathways, meaning usability gains may be enhanced when airports combine intuitive design with targeted facilitation at the point of use (Kamran et al., 2026). This study explores the role of perceived ease of use on the behavioral intention to use self-service technology among passengers at KLIA2 airport.

1.1 Problem Statement

The rapid deployment of Industry 4.0 self-service technologies (SSTs) at KLIA2 is frequently viewed purely as an operational fix to handle the increasing passenger numbers, which have reached 63.3 million in 2025. Yet, the choice of interaction channels continues to reflect a disabling "adoption gap" as passengers systematically shun the automated channels in favor of the staffed counters. This increases operational friction at critical points, leading to a combination of service time probabilities that can only be characterized as a worst-case scenario, resulting in inflated labor costs and interrupted service delivery that

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throttles the total processing capacity. Systematic evidence indicates that such non-adoption necessitates a reversion to manual processing, which causes additional operational costs and channel allocation destabilization. Therefore, passenger non-adoption significantly militates against the anticipated efficiency of smart airport infrastructures (Chaiwan et al., 2025).

While the Technology Acceptance Model (TAM) has highlighted Perceived Ease of Use (PEOU) as a fundamental determinant of adoption, there is a lack of empirical evidence on how this relationship pans out in the high-pressure, multi-generation use environment of KLIA2. Most of the literature relies upon the conventional adoption evaluation mechanism of isolated technology, like kiosks. However, a more contextualized series of evaluation tests is more appropriate in modern airport environments to match specific operational needs and various technology touchpoints (biometrics, mobile processing, etc.) (Wongyai et al., 2024a). The theoretical and practical gap is addressed through this study by investigating whether PEOU remains the primary "gatekeeper" variable for behavioral intention within a high-traffic terminal, where there is a majority of older travel populations with specific usability needs that are often the seeds of success or failure in Industry 4.0 implementations.

2. LITERATURE REVIEW

2.1 Technology Acceptance Model

The Technology Acceptance Model (TAM) explains technology adoption through users' cognitive beliefs, particularly perceived ease of use (PEOU) and behavioural intention (Davis, 1989). PEOU is the "degree to which a person believes that using a particular system would be free from effort", while behavioural intention is a person's propensity to flock to a given kind of technology (Davis, 1989). In this respect, TAM carries strong relevance in airport settings because passengers may use various unfamiliar SSTs under time pressure and with little previous knowledge or experience (Venkatesh & Davis, 2000). Therefore, perceived usability forms a significant cognitive determinant in passengers' acceptance of automated airport services.

Recent aviation studies consistently underscored PEOU as a salient hallmark of SSTS adoption and user engagement within SMART airport realms (Wongyai et al., 2024b; Kamran et al., 2026). SST adoption is higher among passengers where systems are simple and intuitive, and the users are guided by clear instructions and a means to expedite error recovery. PEOU, apart from its theoretical relevance, also has practical value to airport operators in terms of improving system interfaces, standardizing task workflows, supporting multilingualism, and developing passenger-operator assistance mechanisms to optimize the SSTs' efficiency and experience.

2.2 Passengers' Behavioural Intention to Use

Behavioural intention is a commonly used term to denote an individual's readiness or intention to perform a given behaviour and has been widely held to be a key predictor of actual system usage (Ajzen, 1991; Davis, 1989; Venkatesh et al., 2003). In the case of airport SSTs, it means passengers' readiness to engage with the automated self-check-in kiosks, biometric systems, and mobile airport applications.

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Behavioural intention is crucial in predicting technology readiness in airports since passengers tend to use the technologies under constrained time and varying knowledge of technology.

Previous technology adoption studies have consistently singled out behavioural intention as a key outcome variable since it explains the mode of transition of users from cognitive belief variables and perceptual variables into actual behavioural usage variables (Davis, 1989; Venkatesh et al., 2003). Thus, behavioural intention has been the predominant behavioural variable used in aviation scholarship to ascertain passenger acceptance of SSTs, as collecting actual usage data is limited by operational constraints and the fragmentation inherent in airport service delivery systems (Wongyai et al., 2024b). Even more recent findings indicate that passengers are more willing to adopt SSTs if they perceive the technologies to be time-efficient, manageable, and able to support independent task completion during time-sensitive travel operations (Kamran et al., 2026).

At the operational level, passengers' intention to use SSTs is largely associated with airport efficiency and the performance of services. Low adoption intention may increase passengers' reliance on staffed counters, causing congestion, service delays, and operational cost increases (Chaiwan et al., 2025). In sum, behavioural intention is still a suitable construct to measure passenger acceptance and assess the effectiveness of usability enhancements in the smart airport context.

2.3 Perceived Ease of Use

Perceived ease of use (PEOU) stands as a core component of the Technology Acceptance Model (TAM) and encapsulates users' perception regarding the extent to which a system can be navigated with minimal exertion (Davis, 1989). TAM literature indicates that technologies that are perceived to be easy to understand and use have a higher tendency to influence behavioural intention positively with regard to unfamiliar or arduous tasks (Venkatesh & Davis, 2000). Airport passengers interact with SSTs while facing time constraints and limited experience, so usability is a critical consideration for technology adoption.

Studies in the aviation sector consistently indicate that usability critically influences passengers' willingness to use airport SSTs, including self-check-in kiosks, the self-bag drop, and mobile airport services (Taufik & Hanafiah, 2019; Wongyai et al., 2024a). Systems that offer clear instructions, intuitive navigation, and means for efficiently completing particular tasks are more likely to promote continued usage and alleviate the strain on staffed counters. As airports' operations increasingly rely on automated service processes, ease of use remains an important factor supporting passenger adoption and Industry 4.0 technologies' effective implementation in smart airport environments (Chaiwan et al., 2025).

2.4 Evidence Linking Perceived Ease of Use to Passengers' Behavioural Intention in SSTs

Perceived ease of use (PEOU) is consistently recognised as an important factor that influences passengers' intention to use airport self-service technologies (SSTs) in time-sensitive environments, where travellers are expected to complete tasks independently and efficiently (Davis, 1989; Venkatesh & Davis, 2000). Perceptual ease of use (PEOU) has been perpetually recognised as a key factor for influencing passengers' self-service technologies (SSTs') behavioural intention, especially in a time-constrained

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environment where travellers are mandated to hastily complete designated tasks by themselves (Davis, 1989; Venkatesh & Davis, 2000). Thus, in airport environments, usability elements in terms of interface designs, procedure ease, instructions, and task completion are important to support passengers' behavioural intention to use automated services (Kamran et al., 2026).

Existing evidence also indicates that usability challenges remain a major barrier to SST adoption within smart airport environments (Chaiwan et al., 2025). This is especially true in studies involving biometric airport technologies, which show that passengers are more likely to have positive intentions to use such technologies if the systems are operationally convenient and exert less effort on their part during the travel process (Kim et al., 2023). Similarly, the study at Kuala Lumpur airports revealed that perceived ease of use had a significant influence on the passengers' adoption behaviour towards the self-check-in kiosks, indicating the relevance of perceptions about service usability within the airport setting (Taufik & Hanafiah, 2019). Previous studies also indicate that older travellers tend to face difficulties when interacting with digital technologies, suggesting that ease of use is crucial in supporting technology adoption among multi-generational passenger groups (Harvey, 2019).

Overall, prior studies consistently demonstrate that passengers are more likely to adopt airport SSTs when the technologies are deemed simple, understandable, and manageable to use. Therefore, PEOU remains a formidable predictor of the behavioural intention of passengers and their level of engagement with Industry 4.0 airport technologies.

2.5 Conceptual Framework

Thus, the research comes up with a simple model that depicts how passengers perceive self-service technology as easy to use, based on perceived ease of use as an independent variable to predict and forecast passengers' intention to use self-service technologies at KLIA2.

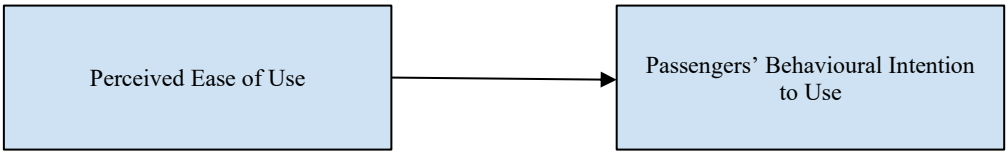

Fig. 1. Conceptual Framework
Source: Author's own data

Figure 1 presents the proposed conceptual framework, where perceived ease of use is hypothesised to influence passengers' behavioural intention to use self-service technologies (SSTs) at KLIA2.

2.6 Hypothesis Development

Drawing from the Technology Acceptance Model and prior empirical findings, this study proposes the following hypothesis:

H1: Perceived ease of use has a significant influence on passengers' behavioural intention of using self-service technologies (SSTs) at KLIA2.

3. METHODOLOGY

This study conducted a quantitative correlational study to look at the relationship between perceived ease of use and passengers' behavioural intention to use Industry 4.0 self-service technologies (SSTs) at KLIA2 (Sekaran & Bougie, 2013; Salkind, 2014). A structured questionnaire consisting of respondent demographic items and validated measures of the study constructs was used for data collection, as shown in Table 1. Convenience sampling was done at Level 3 Departures Hall near the self-check-in zones, where passengers were sampled based on their convenience and willingness to participate during the time the data was being collected. All respondents were required to be adults, at least 18 years old, and have first-hand exposure to airport SSTs, either through use or observation. Thus, 362 questionnaires were distributed, returned, and deemed usable for further analysis, amounting to 100% of usable questionnaires, as shown in Table 2. The questionnaires were administered and collected immediately after completion. Data analysis was done using SPSS Version 30, including descriptive statistics, reliability analysis, correlation analysis, and simple linear regression.

Table 1. Instruments Used in the Study

Variables	Statements	Source
Perceived Ease of Use	1. It is easy to understand how the self-service technologies (SSTs) at KLIA2 work. 2. Interacting with the self-service technologies (SSTs) at KLIA2 does not require much mental effort. 3. It is easy for me to obtain the information I need from the self-service technologies (SSTs) at KLIA2. 4. The instructions provided for the self-service technologies (SSTs) at KLIA2 are clear and easy to understand.	Adapted from Taufik and Hanafiah (2019), based on TAM measures (Davis, 1989).
Passengers' Behavioural Intention to Use	1. I intend to use the self-service technologies at KLIA2 whenever they are available. 2. I plan to use the self-service technologies at KLIA2 in future trips. 3. I predict that I will use the self-service technologies at KLIA2 rather than request staff assistance when I have the option.	Adapted from validated behavioural intention measures in UTAUT and TAM3 (Venkatesh et al., 2003; Venkatesh & Bala, 2008).

Source: Author's own data

Table 2. Survey Response Rate

Questionnaires Distributed	Questionnaires Collected	Percentage of Returned (%)	Number of valid questionnaires	Percentage valid (%)
362	362	100.0	362	100.0

Source: Author's own data

4. RESULT AND DISCUSSION

This section reports the respondent profile and the statistical results for reliability, correlation, and regression. Descriptive statistics are presented to contextualise the sample, followed by reliability evidence for the measurement consistency and inferential analyses that test the proposed hypothesis.

4.1 Demographic Profile of Respondents

Table 3 is a summary of the characteristics of the total sample of respondents who participated in the study. There were 64.6% males against 35.4% female respondents in the sample. The age group 50-64 years constituted the majority in the sample with 58.3 per cent, followed by the 35-49 years age group with 24.3 per cent. This shows that the majority of passengers represented in this study are older people, implying the need to consider usability and ease of interaction in engaging factors influencing the adoption of airport self-service technologies at KLIA2.

Table 3. Demographics of Respondents (n=362)

No.	Demographic	Frequency	Percentage (%)
1.	**Gender**		
	Male	234	64.6
	Female	128	35.4
2.	**Age**		
	< 20	18	5.0
	21-34	32	8.8
	35-49	88	24.3
	50-64	211	58.3
	>65	13	3.6
3.	**Occupation**		
	Employed	276	76.2
	Unemployed	56	15.5
	Student	30	8.3
4	**Nationality**		
	Malaysian	336	92.8
	Non-Malaysian	26	7.2

Source: Author's own data

4.2 Reliability Analysis

Internal consistency reliability was assessed to ensure that the items in each construct measure the same latent construct. Cronbach's alpha is the most common method for this purpose and provides 0.700 as a minimum value for scales in research. The statistics in Table 4 are a reliability analysis between perceived ease of use and passengers' behavioural intention to use.

Table 4. Cronbach's Alpha Score (n = 362)

Variables	Number of Items (N)	Cronbach's Alpha
Perceived Ease of Use	4	0.902
Passengers' Behavioural Intention to Use	3	0.874

Source: Author's own data

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The results in Table 4 show that the scales exhibit a high level of internal consistency across their measurements. The Cronbach's alpha for perceived ease of use scored 0.902, while the passengers' behavioral intention to use scored 0.874, both of which exceeded thresholds for measuring behavioral reliability. It is shown that all items in each construct have strong reliability, making them appropriate to test further hypotheses.

4.3 Correlation Analysis

The study applied correlation analysis to ascertain the effect of perceived ease of use on passengers' behavioral intentions to use their service. The perceived ease of use and behavioral intention relationship was measured using Pearson's correlation coefficient (r), which established the strength of the link between the two factors but did not prove causation directly.

Table 5. Correlation Between Perceived Ease of Use and Passengers' Behavioural Intention to Use (n=362)

	Perceived Ease of Use
Passengers' Behavioural Intention to Use	0.657**
Sig. (2-tailed)	0.001

*** Correlation is significant at the 0.001 level (2-tailed)

Source: Author's own data

There is a strong positive relationship demonstrated by Table 5 between perceived ease of use and behavioral intention to use SSTs at KLIA2 ($r = 0.657$, $p < 0.001$). The research shows that usability perception contributes an overwhelming explanation of how passengers perceive their readiness to adopt products. According to TAM, when passengers perceive SSTs as simple and requiring minimal effort, their intention to use those systems increases because their cognitive and procedural burden decreases, especially during airport situations that demand quick decision-making and limited room for errors (Davis, 1989; Venkatesh & Davis, 2000). From an operational perspective, this shows that organizations that enhance system usability will lead to fewer operational interruptions and mistakes, and dedicated staff counters are in use, leading to better governance of passenger flow and a better queue monitoring system.

The result exists as a matching outcome to evidence from Kuala Lumpur, which demonstrates that users find it easier to operate self-check-in kiosks through their self-directed adoption process (Taufik & Hanafiah, 2019). The smart airport research results show that users need to perceive devices as simple to operate because their perceived effort needs to decrease for them to use advanced contactless systems (Kim et al. 2023). A recent aviation SST systematic review confirms that TAM-based usability beliefs, which include perceived ease of use, exist as the most vital factors that determine passenger acceptance of biometric systems and Industry 4.0 touchpoints, which airports use to expand their services (Wongyai et al. 2024b). The KLIA2 correlation exists as a theoretical and practical relationship that proves effective through specific usability solutions that create better instructions, decrease procedure steps, enhance error

recovery, provide multiple language support, and create visible assistance at points of high user difficulty (Taufik & Hanafiah, 2019; Kim et al., 2023; Wongyai et al., 2024b).

4.4 Simple Linear Regression Analysis

The study used simple linear regression to examine how perceived ease of use impacted passengers' intention to use the service. The analysis measures how much behavioural intention changes when perceived ease of use increases, and it determines the percentage of behavioural intention changes according to users' perception of usability.

Table 6. Cronbach's Alpha Score (n = 362)

Model	R	R Square	Adjusted R-Square	Std. Error of the Estimate
1	0.657[a]	0.431	0.430	0.660

a. Predictor: (Constant), Perceived Ease of Use
b. Dependent Variable: Passengers' Behavioural Intention to Use

Source: Author's own data

The model displays high explanatory power because it accounts for most of the passengers' intention to use SSTs, which researchers found to be 43.1% of the intention to use SSTs based on their perceived ease of use ($R^2 = 0.431$). The research field of behavioural and service studies considers this level of explanatory power as significant because usability functions as a direct usability measurement, which predicts user intentions to use KLIA2 services. Theoretical analysis through TAM becomes valid because user interface design decreases user effort and interaction uncertainty, which increases user motivation to adopt systems under operational conditions that require fast decisions and do not allow passengers to experiment (Davis, 1989; Venkatesh & Davis, 2000).

The current research supports earlier airport SST research, which showed that usability beliefs account for a substantial portion of acceptance results. The KLIA and KLIA2 kiosk study found that passengers perceived ease of use to be the only factor that explained 35.8% of their adoption behaviour ($R^2 = 0.358$). The study demonstrates that usability functions as a main predictor that determines passenger behaviour in airport self-service systems (Taufik & Hanafiah, 2019). Research conducted at smart airports and biometric environments provides additional support for this conclusion because travelers use airport biometric systems based on their perceived ease of use, while contactless technologies require less effort to operate. The R^2 values presented in Table 6 demonstrate that usability improvements from the KLIA2 interventions, which include step simplification and screen enhancement, and better multilingual support and error handling systems, will result in significant increases in passenger SST usage (Taufik & Hanafiah, 2019; Kim et al., 2023).

4.5 Regression Coefficient

Table 7. Regression Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
Model	**B**	**Std. Error**	**Beta**	**t**	**Sig.**
(Constant)	0.899	0.162		5.564	0.001
Perceived Ease of Use	0.756	0.046	0.657	16.526	0.001

Source: Author's own data

The results from Table 7 show that perceived ease of use is a crucial predictor of the behavioral intention of passengers to use SSTs at KLIA2 ($B = 0.756$, $\beta = 0.657$, $t = 16.526$, $p < 0.001$). The standardized coefficient is also positive and shows a strong effect of passengers finding Industry 4.0 airport technologies easier and less effortful on their behavioral intention to use the SSTs. It is the passenger's behavioral intention that is strongly influenced by the perceived ease of use, which is critical to adoption according to TAM (Davis, 1989).

The finding is also supported by empirical evidence at Kuala Lumpur airports. Taufik and Hanafiah (2019) show that passengers' adoption behaviour toward self-check-in kiosks is influenced by ease-of-use evaluations, indicating that passengers base their decision to use self-service on whether the process feels operationally convenient and manageable. Researchers of smart airports that use biometric systems demonstrate that biometric technologies are perceived to be easy to use among travelers, leading to the decision to use the technologies based on the perceived low effort when using advanced contactless identity systems (Kim et al., 2023). The failure to embrace airport self-service technologies leads to three operational consequences in practice, including disruptions in service delivery, resulting in operational inconsistencies between service channels and incurring staff and recovery process expenses. Therefore, usability enhancements are a strategic objective because they affect operational efficiency in the airport (Chaiwan et al., 2025).

4.6 Practical and Managerial Implications

The research findings demonstrate that airport managers must move beyond viewing SSTs as mere technical interfaces and instead treat usability as a strategic lever for operational performance. Since a significant majority of the respondents, more than 58%, fell within the 50-64 age bracket, a managerial top priority should be the fostering of Interface Simplicity for a multi-generational population. The organization's screen flows need to be standardized with microcopy for multiple languages, designed to significantly ease the cognitive load over time and the mental effort its 50-plus travelers have to exert to traverse Industry 4.0 touchpoints. Creating a seamless and simple user experience across kiosks and mobile channels will lessen the perceived complexity that forces travelers to abandon automated Industry 4.0 travel channels in favor of human-staffed counters.

Furthermore, the design of airport SSTs must give priority to robust Error Recovery mechanisms to minimize system abandonment. Operational data collected over the years suggests that passengers abandon self-service stations when they make mistakes, and these errors are not rectifiable, thus affecting passenger flow and increasing job demand among floor staff. To counter this, systems at KLIA2 should be engineered

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to enable users to self-correct errors through prompts in real time, offering clearly articulated, stepwise guidance without requiring instant staff intervention. The effectiveness of this self-correction and prompting features directly impacts perceived ease of use, which builds the necessary passenger confidence needed to complete time-critical tasks such as check-in and bag drop in a similarly critical environment.

Finally, maximum adoption requires a hybrid adoption strategy of Human-Facilitated Technology to close the gap between digital design and actual use. While designing intuitive interfaces is eminently requisite, passengers, mostly those favoring human contact and with high-difficulty wayfinding points encountered, require physical reassurance to complete their journey successfully. The "roving assistants" assigned to strategic placements of major touchpoints ensure that older or less technologically familiar passengers, such as first timers, have the physical guidance needed to overcome initial adoption anxiety. By coupling some minor design improvements, which are low-cost (such as wayfinding), and tangible human support, KLIA2 may best optimize its Industry 4.0 initiatives to guarantee operational security and superior user experience for the elderly and younger alike.

4.7 Theoretical Contributions

This study contributes to the Technology Acceptance Model (TAM) literature and evidence in the context of perceived ease of use in the operational environment of KLIA2, a high-traffic smart airport increasingly dependent on Industry 4.0 self-service technologies (SSTs). There is little evidence regarding the relationship between perceived ease of use and behavioural intention in the case of KLIA2 among passengers exposed to various touchpoints of the airport's SST, ranging from self-check-in systems to automated processing technologies, even though this relationship has been universally established by previous TAM work.

Additionally, the findings reaffirm perceived ease of use as an important determinant of passengers' behavioural intentions to use airport SSTs, particularly in the operational environment where passengers are required to complete tasks on their own, often under time-sensitive circumstances. In addition, it also indicates the significance of usability perceptions in a passenger population where the majority of users are older passengers who generally face a greater chance of interaction hindrance when using airport technologies.

Next, instead of creating a new theoretical model, the study attests to the continued relevance of TAM by providing an explanation of passenger technology adoption behaviour, especially in the context of modern smart airport environments. Besides, usability is still an important consideration in the implementation of Industry 4.0 airport technologies, including kiosks, mobile processing, and biometric technologies.

4.8 Limitations and Future Research

This study needs to be seen in light of several limitations. First, the study used convenience sampling at only one airport terminal, KLIA2, limiting the generalisation of findings to other airport environments and passengers. The study sample was mainly dominated by older travellers between 50 and 64 years.

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Additionally, the cross-sectional design obtained passengers' perceptions at one point in time only, hence it could not provide causality.

Second, the study focused only on the direct relationship between perceived ease of use and behavioural intention. This approach, albeit matching the study objective, perceived ease of use, and airport self-service technology (SST) adoption, is likely to be influenced by other factors such as perceived usefulness, trust, privacy concerns, biometric security perceptions, and need for human interaction. Future research is necessary to incorporate these variables to explain passenger adoption behaviour within smart airport environments further.

Finally, this study used self-reported behavioural intention instead of the actual SST usage behaviour. Future studies may utilise longitudinal approaches, observational methods, or airport operational data to better examine passengers' actual interaction with SSTs over time. Future research may also compare the different SST touchpoints, like self-check-in kiosks and biometric gates, and look for moderating effects among the passenger segments, such as age group, digital literacy, and travel frequency.

5. CONCLUSION

The study investigated how perceived ease of use affects passengers who intend to use Industry 4.0 self-service technologies (SSTs) at KLIA2. The results show that usability is a major factor that drives behavior in this particular environment. The measurement system achieved perfect internal consistency while showing that perceived ease of use strongly correlates with behavioral intention, and the regression analysis demonstrated a significant positive predictive relationship, which explained most of the observed variance. The results show that passengers at KLIA2 display greater willingness to use technologies that they perceive as simple and clear, and requiring no more than minimal effort. Therefore, H1 is accepted.

The findings establish a practical solution that fills a contextual void in existing airport self-service technology research. Previous research established that airport self-service technologies require users to find them easy to operate based on the evidence from Kuala Lumpur airports, yet most available evidence either exceeds KLIA2 boundaries or concentrates on particular technologies, such as kiosks, instead of the complete Industry 4.0 touchpoints which passengers now experience throughout their travel.

The study demonstrates that a direct relationship between PEOU and behavioral intention, which exists in the KLIA2 environment, shows that usability serves as the main factor that determines passenger acceptance in a high-traffic self-service terminal which operates at KLIA2. The study established that a direct relationship between PEOU and behavioral intention exists within the KLIA2 environment. The study established two main relationships, which include a direct link between PEOU and behavioral intention and PEOU to the user experience connection at KLIA2.

KLIA2 should use its Industry 4.0 initiatives to measure usability as an essential operational KPI instead of treating it as a design choice. The main tasks require organizations to establish basic task processes that need less operational work, user-friendly instructions that remain consistent throughout the interface; methods that stop errors and help users recover, and systems that let users finish their work

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quickly at essential stations like check-in and bag drop, and identity verification. Real-time assistance prompts together with multilingual microcopy and consistent interface design between kiosks and mobile platforms create a better user experience, which reduces perceived effort and abandonment.

Future research should extend this model to improve explanatory coverage and strengthen inference. The addition of perceived usefulness, trust, privacy concerns, and facilitating conditions will lead to a better understanding of smart airport technology acceptance barriers that exist in current practices. Testing moderating effects across passenger segments, which include age group, travel frequency, language proficiency, and first-time versus repeat users, would clarify where usability improvements yield the greatest marginal gains and improve generalisability beyond KLIA2.

6. ACKNOWLEDGMENTS/FUNDING

The researchers funded their entire research project through their own financial resources. The researchers gratefully acknowledge the respondents who participated in the KLIA2 survey for their time and valuable contributions, which were essential to the completion of this study.

7. DECLARATION OF GENERATIVE AI IN THE WRITING PROCESS

The researchers used ChatGPT for generating ideas, which they used to create their draft material, and they employed Grammarly to check their writing grammar while improving its clarity. The researchers used these tools to develop their manuscript, which they controlled through all content decisions while taking responsibility for its accurate and original content, which remained protected throughout the publication process.

8. CONFLICT OF INTEREST

The researchers hereby declare that no conflicts of interest exist, including financial, personal, or professional ties, which could even appear to have influenced a research activity or its outcome.

9. AUTHOR CONTRIBUTIONS STATEMENT

Arjun developed the study concept through his research work while he helped the team gather necessary information. Alif prepared the problem statement together with the literature review section. Nasrullah designed the study while he managed data screening activities and performed data analysis and result interpretation tasks, and he verified facts and made essential changes to the work. Megat assessed the framework and methodology and the discussion content to improve their quality. The final manuscript received approval from all researchers after they conducted their review.

10. DATA AVAILABILITY STATEMENT/SUPPLEMENTAL DATA

The study data used in this research remain inaccessible to the public because of confidentiality requirements for the participants. The corresponding author will supply the data to anyone who makes a valid request.

11. ETHICS STATEMENT

The research was conducted by researchers who followed established ethical guidelines that govern studies that involve human participants. The study required participants to choose whether to take part while the researchers provided them with details about the study objectives and their right to stop participating at any time before they finished the questionnaire. The researchers provided participants with complete anonymity and confidentiality protection, and they gathered no information that could identify individual participants. Participants who submitted their completed questionnaires gave their informed consent through this action.

12. REFERENCES

Abdul Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179–211. https://doi.org/10.1016/0749-5978(91)90020-TAntwi,

Chaiwan, C., Budd, L., & Ison, S. (2025). A systematic literature review of passenger non-adoption of airport self-service technologies: Issues and future recommendations. *Journal of the Air Transport Research Society*, 4, 100065. https://doi.org/10.1016/j.jatrs.2025.100065

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. M*IS Quarterly*, 13(3), 319–340. https://doi.org/10.2307/249008

Harvey, J. (2019). Increasing mobility for older travellers through engagement with technology. *Transportation Research Part F: Traffic Psychology and Behaviour,* 60, 172–184. https://doi.org/10.1016/j.trf.2018.10.017

International Air Transport Association. (2024, November 5). Key trends in passenger behavior: Insights from the IATA Global Passenger Survey 2024. IATA Knowledge Hub. https://www.iata.org/en/publications/newsletters/iata-knowledge-hub/key-trends-in-passenger-behavior/

International Air Transport Association. (2024, October 30). *Passengers want convenience and technology to improve processes*. IATA Pressroom. https://www.iata.org/en/pressroom/2024-releases/2024-10-30-01/

Kamran, M. A., Al Yaarubi, F., Atashfeshan, N., & Babazadeh, R. (2026). Airport self-service technologies: Are we fully engaged? A hybrid SEM-machine learning approach. *Computers in Human Behavior Reports*, 21, 100931. https://doi.org/10.1016/j.chbr.2026.100931

Kim, J. H., Song, W.-K., & Lee, H. C. (2023). Exploring the determinants of travelers' intention to use the airport biometric system: A Korean case study. *Sustainability*, 15(19), 14129. https://doi.org/10.3390/su151914129

Malaysia Airports. (2026, January 19). Strong 2025 passenger growth builds momentum for Visit Malaysia 2026. Malaysia Airports Corporate Newsroom. https://corporate.malaysiaairports.com.my/en/media-centre/news/1678

Salkind, N. J. (2014). Statistics for people who (think they) hate statistics (5th ed.). SAGE.

Sekaran, U., & Bougie, R. (2013). Research methods for business: A skill-building approach (6th ed.). Wiley.

Taufik, N., & Hanafiah, M. H. (2019). Airport passengers' adoption behaviour towards self-check-in kiosk services: The roles of perceived ease of use, perceived usefulness and need for human interaction. *Heliyon*, 5(12), e02960. https://doi.org/10.1016/j.heliyon.2019.e02960

Venkatesh, V., & Bala, H. (2008). Technology acceptance model 3 and a research agenda on interventions. *Decision Sciences*, 39(2), 273–315. https://doi.org/10.1111/j.1540-5915.2008.00192.x

Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. Management Science, 46(2), 186–204. https://doi.org/10.1287/mnsc.46.2.186.11926

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425–478. https://doi.org/10.2307/30036540

Wongyai, P. H., Ngo, T., Wu, H., Tsui, K. W. H., & Nguyen, T.-H. (2024b). Self-service technology in aviation: A systematic literature review. *Journal of the Air Transport Research Society*, 2, 100016. https://doi.org/10.1016/j.jatrs.2024.100016

Wongyai, P. H., Suwannawong, K., Wannakul, P., Thepchalerm, T., & Arreeras, T. (2024a). The adoption of self-service check-in kiosks among commercial airline passengers. *Heliyon*, 10(19), e38676. https://doi.org/10.1016/j.heliyon.2024.e38676