

INVESTIGATING PASSENGER ATTITUDES TOWARDS AUTOGATE ADOPTION: EXTENDING TAM

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ABSTRACT

Introduction/Main Objectives: This study explores passenger attitudes and intentions to adopt autogate systems at Indonesian international airports. The background is the need for efficiency, security, and comfort in passenger services and the growing implementation of autogates at Soekarno–Hatta.

Background Problems: The core issue is the limited clarity on which behavioral factors most shape attitudes and lead to intention to adopt autogates. Research question: Which factors in the TAM and DOI frameworks determine passenger attitudes, and how do those attitudes drive intention to adopt autogates?

Novelty: This research integrates and extends TAM and DOI in the context of autogates in Indonesia by testing the mediating role of attitude between DOI/TAM constructs and adoption intention, and by incorporating the need for social presence as an extended construct.

Research Methods: A quantitative design with 124 autogate users selected via purposive sampling; data were collected through an online questionnaire (5-point Likert scale) measuring perceived ease of use, service compatibility, relative advantage, need for social presence, attitude, and intention to adopt. PLS-SEM (SmartPLS) was used to evaluate both the measurement and structural models.

Findings/Results: Relative advantage and perceived ease of use have a significant positive effect on attitude; service compatibility and need for social presence are not significant. Attitude strongly influences intention to adopt autogates, indicating that perceived benefits and ease of use are the primary drivers.

Conclusion: Autogate adoption is primarily driven by perceived benefits and ease of use; service compatibility with habits and the need for social interaction are not key determinants. Key insight: strengthening perceived value and usability is essential to foster positive attitudes that, in turn, increase intentions for continued use.

Implementation Potential: Airport managers and system developers can: (1) emphasize relative advantages through interface design and point-of-service communication; (2) simplify flows and UI/UX (clear instructions, instant feedback, error recovery) to reduce learning effort; (3) prioritize functionality and convenience over heavy personalization or added human interaction; (4) provide brief, on-screen onboarding and signage that focus on a “first-time success” experience; (5) continuously monitor processing time and success rates as visible benefit metrics for users.

Keywords: Autogate; TAM; DOI; self-service technology; airport self-service technology

JEL Classification: M310

1. INTRODUCTION

Technological innovation in the aviation industry continues to grow rapidly along with the increasing need for efficiency, security, and comfort in passenger service, one significant advancement is the implementation of the autogate system. One of the airports in Indonesia that has adopted the autogate system is Soekarno-Hatta Airport located in Tangerang, Banten, precisely at Terminals 2 and 3 which serve international flights. This system allows the process of checking identity and travel documents to be carried out automatically without the need for direct interaction with immigration officers, thus reducing human involvement, speeding up the inspection process, and increasing security at border and airport checkpoints. Autogate not only helps reduce queues and passenger waiting times, but also minimizes the potential for human error in the verification process.

However, although this technology offers many benefits, its adoption is often influenced by passengers' attitudes and perceptions of the system (Andhini et al., 2024). Trust in technology plays an important role in increasing user intentions to use new systems (Mortimer et al., 2021). In addition, the importance of positive user experiences in using technology can encourage technology adoption among passengers (Yang et al., 2020). Research by (Simarmata et al., 2025) found that the flow experience factor has a significant influence on technology evaluation and intention to continue using it in the context of self-service check-in at the airport.

Real problems that often arise in the implementation of digital technology or services include aspects of perceived ease of use which is an important issue because not all users feel

comfortable with complicated displays or features (Fauziah, 2024), then the problem of service compatibility is also often an obstacle, especially when the services offered do not match the needs, habits, or expectations of users (Hasni et al., 2022). Other problems also exist in the aspect of relative advantage which is an important factor that is often the starting point for users in deciding to use a service (Gumasing, 2025), then the need for social presence is also increasingly prominent in the digital era, especially in communication-based services or online interactions to assist in the process of implementing new technology (Wang, 2022). This can affect passengers' attitudes towards the intention to adopt the autogate system.

Although there have been many studies discussing the adoption of self-service technology in the air transportation sector, studies that discuss or explain the TAM and DOI frameworks in the context of Autogate at Indonesian airports are still limited in the literature (Mege & Oematan, 2021). A study from (Fanani et al., 2024) also explains the acceptance of self-check-in kiosk technology but uses UX TRAM as its analysis model. However, how the TAM and DOI frameworks can be integrated and extended to explain the acceptance of self-service technology in the air sector such as Autogate, as well as its implications for airport managers in Indonesia, is not explained. Therefore, by using the TAM and extended DOI frameworks, this study aims to investigate the factors that influence passenger attitudes towards the adoption of the autogate system at international airports. The contribution of the research in theory is the expansion of the TAM and DOI frameworks in the context of self-service technology in the aviation sector, especially in developing countries like Indonesia. Meanwhile, for airport managers, the results of this study can provide strategic insights in developing and implementing user-based digital technology, as well as assisting in designing services that are more in line with passenger expectations and behaviour.

2. LITERATURE REVIEW

2.1 TAM

The Technology Acceptance Model (TAM) was first developed by (Davis, 1989) to explain the factors influencing users' acceptance of information technology. This model focuses on two main constructs: Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). PU is defined as

the degree to which a person believes that using a system can enhance their performance or productivity. In other words, users believe that the system provides tangible benefits, such as greater efficiency or better work outcomes. PEOU refers to the extent to which a person believes that using the system requires minimal effort. If a system is perceived as easy to use, both cognitively and physically, the likelihood of it being accepted and used will be higher. In the context of this study, the variable Perceived Ease of Use was selected because it reflects users' belief in the ease and convenience of interacting with the autogate system. This can influence Attitude, which in TAM is a construct representing an overall evaluation of a technology. Such an attitude becomes an important predictor of the intention to adopt the technology.

1. Perceived Ease of Use

This concept focuses on how much users feel that using technology does not require significant effort. (P. S. H. Tan et al., 2023) emphasize that this perception of ease is an important element in determining attitudes towards new technologies. This ease includes several aspects, such as easy to learn, easy to control, clear and easy to understand, flexible, free from difficulty, and easy to use (Anastasiana, 2021). The higher the level of someone's belief that the system is easy to use, the more likely they are to accept and adopt the system (Febriyansah, 2022). When users feel that the system is free from complexity, flexible, and does not require hard work, this can strengthen the intention to use it (Napu, 2024). Perceived ease of use also explains the extent to which users feel confident that the technology system will not make things difficult for them, but can be used without much effort (Fibriani, 2020). Thus, the present study hypothesizes that:

H1: Perceived Ease of Use positively influences Attitude

2. Attitude

Attitude reflects the user's subjective evaluation of technology, which is influenced by perceptions of benefits, convenience, and potential risks. This attitude then becomes the main predictor in determining the user's intention to adopt a particular technology (Kliuchnikava, 2022). According to (Artha, 2021), Attitude is a psychological term related to perception and behaviour that includes affective, cognitive, and conative dimensions. The affective dimension

refers to emotional reactions to technology, cognitive reflects how individuals evaluate or assess usefulness and convenience, while conative relates to the intention or drive to act. The level of user attitudes also varies from receiving, responding, valuating, and responsible (Pramono, 2021). Thus, the present study hypothesizes that:

H5: Attitude positively influences Intention to Adopt Autogate

2.2 DOI Theory

The Diffusion of Innovation (DOI) theory proposed by (Rogers, 1983) explains how new ideas, products, or practices spread through communication channels over time among members of a social system. This diffusion process is influenced by factors such as the characteristics of the innovation itself, the means of communication, the time frame of adoption, and the nature of the social system involved. (Rogers, 1983) identifies five main attributes of innovations that affect their rate of adoption, namely relative advantage, compatibility, complexity, trialability, and observability. Innovations that provide clear benefits, fit user needs, are easy to understand and use, can be tried on a small scale, and have observable results tend to be adopted more quickly. DOI also emphasizes that adoption is a social process influenced by opinion leaders and homophily, which refers to the tendency of individuals to accept information from others they perceive as similar to themselves. In addition, innovations often undergo adjustments or reinvention to suit local contexts, which increases their relevance and acceptance.

In this study, three variables are used to examine the adoption of the autogate system: Service Compatibility, Relative Advantage, and Need for Social Presence. The first two variables are part of the main attributes described in DOI, while Need for Social Presence is included as an extension to capture the aspect of social interaction that may influence user attitudes.

1. Service Compatibility

According to (Buell et al., 2021), service compatibility plays an important role in the process of adopting service innovation. Service compatibility is a state in which two things, which can be anything that is at stake for consideration, can exist or occur together without problems or conflicts, such as service similarity, which can accelerate customer acceptance (C. C. Tan et al., 2024). Thus, the present study hypothesizes that:

H2: Service Compatibility positively influences Attitude

2. Relative Advantage

Relative advantage can influence the perception of value and user willingness to adopt a technology (Agyabeng-Mensah et al., 2020). Relative advantage also means the extent to which consumers view using a new product as better than using its substitute (Ezeh & Nkamnebe, 2022). Thus, the present study hypothesizes that:

H3: Relative Advantage positively influences Attitude

3. Need for Social Presence

Need for Social Presence can influence comfort and acceptance of automated technology related to the extent to which users need social interaction in using the technology. In a self-service context such as an autogate, some users may feel less comfortable without the presence of human staff (Weidlich et al., 2023). Thus, the present study hypothesizes that:

H4: Need for Social Presence positively influences Attitude

3. METHOD

This research method uses a quantitative approach with respondents who are passengers who have experience or knowledge regarding the use of autogate facilities at Soekarno-Hatta International Airport with 124 respondents. The sampling technique was carried out using purposive sampling, which specifically targets individuals who are relevant to the research objectives, namely those who have used or at least know the autogate feature at the airport. In this way, the data collected can better represent the real experience and actual perceptions of users of the technology.

Data collection was conducted entirely online, through the distribution of digital questionnaires using the Google Forms platform. The questionnaire link was shared through various social media channels such as WhatsApp and Instagram. This approach allowed for a wider reach to passengers with various demographic backgrounds and experiences, while also considering ease of access and respondent participation.

To ensure sample relevance, participants were screened using three specific questions: “When was the last time you travelled by plane?”, “Have you used the Autogate system at the airport?”, and “When was the last time you took an international trip?”. Only participants who met the criteria of having travelled by air in the past few months, used the Autogate system, and travelled internationally were included in the study. This approach ensured that the data collected truly reflected the experiences and perceptions of passengers familiar with international air travel procedures and the use of the Autogate system.

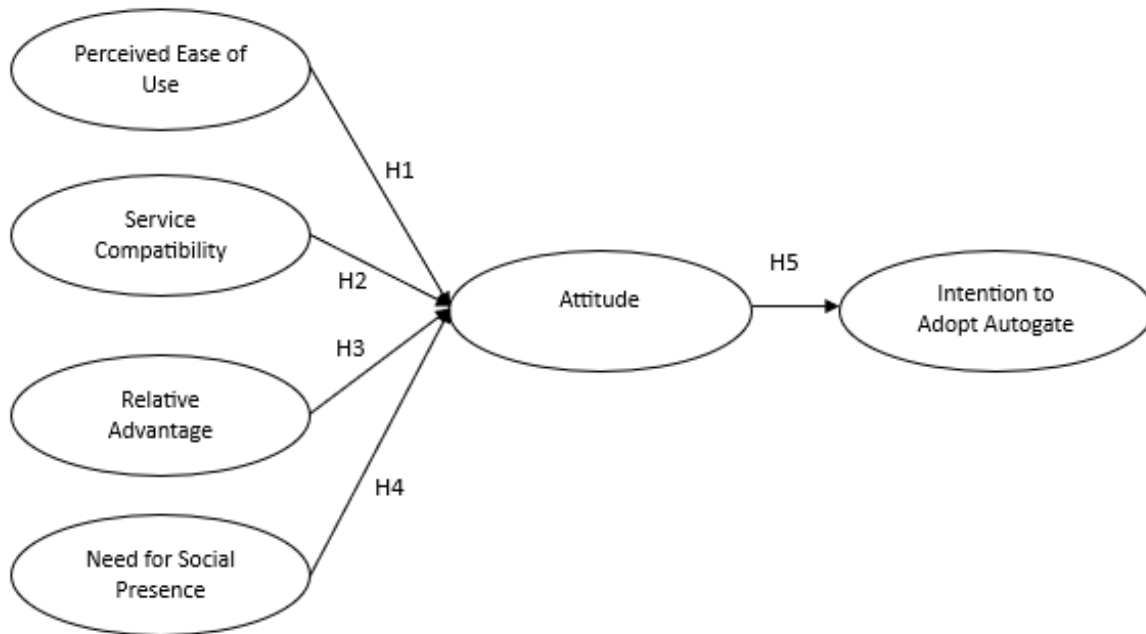


Figure 1. Proposed Research Model

The survey instrument, consisting of previously validated indicators to measure the variables of interest as shown in Table 1. The variables taken from the TAM and DOI frameworks were measured using items adapted from (Davis, 1989) and (Rogers, 1983). Specifically, perceived ease of use was measured with three indicators, Service compatibility with three indicators, relative advantage with three indicators, need for social presence with three indicators, attitude with three indicators and intention to adopt with 3 indicators measured with a 5-point Likert scale ranging from 1 (strongly disagree), 2 (disagree), 3 (quite agree), 4 (agree), and 5 (strongly agree), to

measure the level of respondent agreement quantitatively.

Data analysis was conducted using the Structural Equation Modeling (SEM) method with the Partial Least Squares (PLS) approach, through SmartPLS software. This method was chosen because of its ability to analyze complex relationships between latent constructs and its ability to handle data with non-normal distributions.

Table 1. Measurement of Variables

Variable	Indicator	Statement	Source
Perceived Ease of Use	Simplicity	Autogate is easy to use.	Davis (1989) and Caffaro et al. (2020)
	Learnability	Using Autogate is easy to learn.	
	Clarity of Interaction	Using Autogate is easy to understand.	
Service Compatibility	Value Fit	Using Autogate fits my habits regarding technology use during travel.	Rogers (1983) and Lee & Ohc (2025)
	Lifestyle Fit	The Autogate service fits my airport habits.	
	Experience Match	The Autogate system provides the convenience I expect from airport services.	
Relative Advantage	Efficiency	Autogate is more efficient than manual check-in.	Rogers (1983) and Nuseir & Aljumah (2020)
	Time Saving	Using Autogate saves me time at the airport.	
	Benefit Perception	Using Autogate has given me more advantages than disadvantages.	

Need for	Human	I prefer assistance from	Rogers (1983) and
Social	Contact	immigration officers rather than	Nuseir & Aljumah
Presence	Preference	just a machine/system.	(2020)
	Comfort with	I feel more comfortable when using	
	Interaction	Autogate accompanied by an	
		immigration officer.	
	Feeling of	The presence of immigration	
	Presence	officers when I used Autogate	
		made me feel like I was being	
		watched.	
Attitude	Evaluation	I found using Autogate to be a	Davis (1989) and
		positive experience.	Grassini (2023)
	Interest	When traveling I am more	
		interested in using Autogate.	
	Willingness	I would be willing to try/use	
		Autogate if it were available.	
Intention to	Future Usage	I will use the Autogate system for	Davis (1989) and
Adopt	Intention	my next trip.	Alshurafat et al. (2024)
	Usage	I would choose to use Autogate if I	
	Probability	had to choose between a manual	
		system or Autogate.	
	Continued	I will always use the Autogate	
	Use	system now and in the future.	

Note: Items adapted and modified from the cited sources to fit the study context.

4. RESULTS AND DISCUSSION

4.1. Respondent Profile

As shown in Table 2, the gender distribution was relatively balanced, with 71 females (57%) and 53 males (43%). The age distribution reveals that a majority of respondents were between 18

and 30 years old (78%), followed by those aged 31–40 years (16%) and 41–50 years. In terms of occupation, respondents were predominantly students (41%), followed by private employees (30%), entrepreneurs (14%), civil servants (10%), and professionals (5%).

Table 2. Respondent Profile

Category	Subcategory	Number	Percentage
Gender	Male	53	43%
	Female	71	57%
	Total	124	100%
Age	<18	0	0%
	18 – 30	96	78%
	31 – 40	19	16%
	41 – 50	7	6%
	>60	0	0%
	Total	124	100%
Occupation	Students	51	41%
	Civil Servants	12	10%
	Private Employees	37	30%
	Entrepreneurs	18	14%
	Professionals	6	5%
	Total	124	100%
Last Travel Purpose	Business	35	28%
	Holidays	70	56%
	Visiting friends and relatives	18	15%
	Other	1	1%
	Total	124	100%
Last International Trip	In the last 3 months	59	48%

In the last 6 months	37	30%
In the last year	28	22%
Total	124	100%

Regarding travel purpose, most respondents traveled for holidays (56%), followed by business (28%), and visiting friends or relatives (15%), with only a small fraction (1%) traveling for other reasons. In addition, 48% of respondents had taken an international trip in the past three months.

4.2. Measurement Model Analysis

This assessment aims to verify that each indicator accurately represents the construct it is intended to measure. According to Hair et al. (2019), an indicator demonstrates convergent validity when its outer loading value is ≥ 0.70 . As shown in Table 3, all indicators for the variables Perceived Ease of Use, Service Compatibility, Relative Advantage, Need for Social Presence, Attitude, and Intention to Adopt Autogate have outer loadings between 0.792 and 0.934, exceeding the recommended threshold. This confirms that all indicators contribute significantly to their respective constructs. The reliability and validity of the constructs were further assessed using Cronbach's Alpha, Composite Reliability (CR), and Average Variance Extracted (AVE). Based on Table 10, all constructs have Cronbach's Alpha values ranging from 0.798 to 0.911, Composite Reliability above 0.88, and AVE values exceeding 0.71. These results surpass the minimum acceptable criteria (≥ 0.70 for reliability and ≥ 0.50 for AVE), indicating excellent internal consistency and strong convergent validity for all constructs.

Table 3. Outer Model Analysis

Variable	Item	SLF	Cr. α	Rho_A	AVE	t-values
Perceived Ease of Use			0.798	0.813	0.711	
	PEOU1	0.875				21.45
	PEOU2	0.861				20.78
	PEOU3	0.792				17.62

Service Compatibility		0.888	0.909	0.815
	SC1	0.901		24.15
	SC2	0.919		25.02
	SC3	0.896		23.44
Relative Advantage		0.874	0.909	0.795
	RA1	0.923		25.85
	RA2	0.932		26.43
	RA3	0.907		24.92
Need for Social Presence		0.911	0.943	0.847
	NFSP2	0.934		26.81
	NFSP3	0.883		23.09
	NFSP3	0.934		26.87
Attitude		0.798	0.813	0.711
	A1	0.900		23.97
	A2	0.882		22.73
	A3	0.893		23.14
Intention to Adopt	ITAA1	0.905		23.88
Autogate	ITAA2	0.883		23.03
	ITAA3	0.921		25.61

Source: (SmartPLS 4 Output)

To test discriminant validity, the Heterotrait-Monotrait Ratio (HTMT) criterion was applied. Following Hair et al. (2019), HTMT values ≤ 0.85 suggest adequate discriminant validity. Table 4 shows that all HTMT values fall below this threshold, confirming that each construct is distinct and free from multicollinearity issues with other constructs.

Table 4. Discriminant Validity – Heterotrait-Monotrait Ratio of Correlations (HTMT)

	AT	ITA	NFSP	PEO	RA	S
	T			U		C
Attitude						
Intention to Adopt	0.68					
Autogate	1					
Need for Social	0.35	0.25				
Presence	3	0				
Perceived Ease of Use	0.36	0.25	0.232			
	3	0				
Relative Advantage	0.53	0.42	0.422	0.231		
	5	3				
Service Compatibility	0.29	0.24	0.262	0.300	0.38	
	1	5			1	

Source: (SmartPLS 4 Output)

Discriminant validity evaluates if the constructs being measured are separate entities. A technique suggested by (Hair et al., 2019) is the Heterotrait-Monotrait Ratio (HTMT), with values are $\leq 0,85$ indicate good validity. In Table 4, all HTMT values are $\leq 0,85$, confirming no overlap and clear distinction between constructs.

4.3. Structural Model Analysis

Before testing the hypothesis, the Variance Inflation Factor (VIF) was examined to ensure there were no multicollinearity issues among the predictors. All VIF values range from 1.000 to 1.276, well below the recommended threshold of 5.0, indicating that the model is free from multicollinearity and that the estimated path coefficients are reliable.

The structural model was evaluated through hypothesis testing, R^2 , f^2 , and VIF analyses following the PLS-SEM guidelines of Hair et al. (2019). Hypothesis testing was conducted using

the bootstrapping method at a 5% significance level, where a path is considered significant when the t-value ≥ 1.64 and p-value ≤ 0.05 .

Table 5. Structural Model Analysis Results

Path / Variable	R ²	f ²	VIF	β	t-value	p-value
Attitude	0.285					
Intention to Adopt Autogate	0.338					
Need for Social Presence -> Attitude		0.019	1.209	0.127	1.527	0.127
Perceived Ease of Use -> Attitude		0.053	1.114	0.206	2.590	0.001
Relative Advantage -> Attitude		0.139	1.276	0.356	4.653	0.000
Service Compatibility -> Attitude		0.003	1.195	0.049	0.617	0.537
Attitude -> Intention to Adopt Autogate		0.512	1.000	0.582	9.502	0.000

The results show that Attitude has a strong and significant positive effect on Intention to Adopt Autogate ($\beta = 0.582$; $t = 9.502$; $p < 0.001$). Among the predictors of Attitude, Relative Advantage ($\beta = 0.356$; $t = 4.653$; $p < 0.001$) and Perceived Ease of Use ($\beta = 0.206$; $t = 2.590$; $p = 0.001$) exhibit significant positive effects, while Need for Social Presence ($\beta = 0.127$; $t = 1.527$; $p = 0.127$) and Service Compatibility ($\beta = 0.049$; $t = 0.617$; $p = 0.537$) show no significant influence. These results indicate that travelers' attitudes toward using Autogate are primarily shaped by its perceived usefulness and ease of use rather than social or habitual factors.

The R² values indicate the model's explanatory power. The R² for Attitude is 0.285, meaning that 28.5% of its variance is explained by Perceived Ease of Use, Service Compatibility, Relative Advantage, and Need for Social Presence. Meanwhile, the R² for Intention to Adopt Autogate is 0.338, indicating that 33.8% of its variance is explained by Attitude. According to Hair et al. (2019), R² values of 0.25, 0.50, and 0.75 represent weak, moderate, and substantial explanatory power, respectively. Therefore, the model demonstrates weak explanatory power for Attitude and moderate explanatory power for Intention to Adopt Autogate.

The effect size (f^2) values provide insight into each exogenous construct's contribution to the endogenous constructs. Following Hair et al. (2019), f^2 values of 0.02, 0.15, and 0.35 are considered small, medium, and large, respectively. The results indicate that Attitude has a large effect (0.512) on Intention to Adopt Autogate. Relative Advantage has a moderate effect (0.139) on Attitude, while Perceived Ease of Use (0.053) exhibits a small-to-moderate effect. Conversely, Need for Social Presence (0.019) and Service Compatibility (0.003) show small or negligible effects, confirming that their impact on attitude formation is minimal.

4.4. Discussion

The results indicate that Perceived Ease of Use has a significant positive effect on Attitude ($t = 2.590$; $p = 0.001$). This finding suggests that when travelers perceive the Autogate system as simple, intuitive, and easy to operate, they tend to form more favorable attitudes toward its use. This aligns with the Technology Acceptance Model (TAM) proposed by Davis (1989), which emphasizes perceived ease of use as a central determinant of attitude toward technology adoption. The result is consistent with prior studies such as Caffaro et al. (2020) and Alshurafat et al. (2024), which also found that user-friendly system design enhances user satisfaction and positive perception. In the context of airport automation, this reinforces the idea that clear system interfaces and smooth operational procedures are essential for shaping user acceptance.

Contrary to expectations, Service Compatibility does not have a significant effect on Attitude ($t = 0.617$; $p = 0.537$). This suggests that users' attitudes toward Autogate are not strongly influenced by how well the service aligns with their existing travel habits or preferences. A plausible explanation is that Autogate usage at airports is often situational and mandatory rather than discretionary, meaning that users adapt regardless of its compatibility with prior habits. This result differs from Rogers' (1983) Diffusion of Innovation Theory, which posits compatibility as an important predictor of innovation adoption. However, similar findings were reported by Nutsier and Aljumah (2020), who observed that perceived compatibility may be less influential in contexts where technology adoption is facilitated or required by institutions rather than by personal choice.

The analysis shows a strong and significant relationship between Relative Advantage and Attitude ($t = 4.653$; $p = 0.000$). This indicates that travelers who perceive the Autogate as offering

greater efficiency, convenience, and time-saving benefits compared to manual immigration processing are more likely to develop positive attitudes toward it. This finding supports Rogers' (1983) assertion that perceived relative advantage is a critical driver of innovation acceptance. It is also consistent with studies by Nuseir and Aljumah (2020) and Lee & Ohc (2025), which found that the perceived superiority of automated systems particularly in speed and reliability strongly influences user attitudes in technology-mediated environments such as airports.

The Need for Social Presence shows a positive but insignificant relationship with Attitude ($t = 1.527$; $p = 0.127$). This implies that users' desire for human interaction does not substantially affect their attitude toward using Autogate, a system designed for minimal human contact. This finding suggests that travelers may prioritize convenience and autonomy over interpersonal engagement during airport processes. The result aligns with Grassini (2023), who argued that in high-efficiency contexts such as self-service technologies, the social dimension is often secondary. It also resonates with Davis (1989), who emphasized that perceived usefulness and ease of use tend to outweigh emotional (Werdani et al., 2024) or social needs in shaping user attitudes toward technology.

The results reveal that Attitude has a strong and significant positive influence on Intention to Adopt Autogate ($t = 9.502$; $p = 0.000$). This finding confirms that individuals with favorable attitudes toward the Autogate system are more likely to continue using it in the future. This aligns with TAM and the Theory of Planned Behavior (Ajzen, 1991), both of which posit that a positive attitude is a key determinant of behavioral intention. Similar evidence was reported by Alshurafat et al. (2024) and Caffaro et al. (2020), who found that a positive user experience and trust in automated systems directly enhance intention to reuse. Therefore, fostering a positive user attitude through reliable system performance and user-centered design is crucial for encouraging long-term adoption of airport automation technologies.

5. CONCLUSION

This study aimed to investigate the factors influencing passenger attitudes towards the adoption of the autogate system at international airports, utilizing the Technology Acceptance Model (TAM) and the Diffusion of Innovation (DOI) frameworks. The analysis results indicate

that relative advantage and perceived ease of use have a significant positive effect on attitude, while service compatibility and need for social presence do not show a significant influence. Furthermore, attitude was found to have a strong positive effect on intention to adopt autogate. These findings highlight that the perceived benefits and simplicity of use are key determinants in driving positive attitudes, which in turn increase the willingness to adopt self-service technology in the air travel context.

6. IMPLICATIONS, LIMITATIONS, AND FUTURE RESEARCH

The results of this study provide several practical implications for airport authorities, policymakers, and technology developers (Windriya, 2019). First, to enhance adoption rates, stakeholders should focus on increasing the perceived advantages of autogate, such as efficiency, time savings, and improved user experience. Second, system interfaces and operational processes should be designed to be intuitive and user-friendly, minimizing the learning curve for first-time users. Third, as service compatibility and the need for social presence were found to have no significant effect, resources can be directed towards features that improve functionality and convenience rather than customizing services for individual preferences (Kurniawati, 2022) or increasing human interaction (Mashudi & Mashudi, 2025). Theoretically, this study contributes to the expansion of TAM and DOI in explaining self-service technology adoption in developing countries, offering a model that can be adapted for similar contexts.

This study has several limitations. First, the sample size was limited to 124 respondents using purposive sampling, which may not represent the broader population of international passengers. Second, the data were collected entirely through an online survey, potentially introducing bias toward respondents more familiar with technology. Third, the study focused solely on a single type of self-service technology autogate without comparing it to other automated services, which may limit the generalizability of the findings. Fourth, the variables examined were restricted to perceived ease of use, service compatibility, relative advantage, and need for social presence, excluding other potentially relevant factors such as trust in technology, perceived risk, or prior usage experience. Future research could address these limitations by employing larger and more diverse samples, using mixed data collection methods, exploring multiple airport locations,

and integrating additional variables to develop a more comprehensive understanding of technology adoption in the air travel industry.

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