

The Effect of Information Availability and Facility Accessibility on The Use of The Arrival Umrah Holding Area at Juanda International Airport.

Muhammad Girald Aulalgafari¹, Zamratul Aswad², Hanaa Ali Aldahawi³, Dimas Arya Soeadyfa Fridyatama⁴

¹ Aviation Polytechnic of Surabaya, Surabaya, Indonesia; giraldgafari6@gmail.com

² Muhammadiyah University of Mataram, Mataram, Indonesia; zamroaswad20@gmail.com

³ King Abdulaziz University, Jeddah, Saudi Arabia; haldahawi@kau.edu.sa

⁴ Aviation Polytechnic of Surabaya, Surabaya, Indonesia; dimasaryasf@poltekbangsby.ac.id

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ABSTRACT

This study was conducted in response to congestion involving Umrah pilgrims and pick-up parties in the arrival area of Terminal 2 at Juanda International Airport despite the availability of an Umrah arrival holding area. Previous studies have primarily focused on airport service quality, crowd management, and Hajj operations, while limited attention has been given to the utilization of Umrah arrival holding areas from the perspectives of information availability and facility accessibility, particularly within Indonesian airport operations. Therefore, this study aims to address this gap by examining the combined effects of these two factors and providing practical recommendations for airport passenger flow management. A quantitative path analysis approach using Partial Least Squares–Structural Equation Modeling (PLS-SEM) was employed. Data were collected through questionnaires distributed to Umrah pilgrims and pick-up parties at the international arrival terminal. Information availability and facility accessibility were examined as independent variables, while holding area utilization served as the dependent variable. The data were analyzed using SmartPLS to evaluate validity, reliability, and structural relationships among variables. The findings showed that all indicators met the validity and reliability requirements, with outer loading values above 0.70 and AVE values above 0.50. The structural model produced an R-square value of 0.660, indicating that the independent variables explained 66% of the variation in holding area utilization. Hypothesis testing revealed that both variables had positive and significant effects ($p < 0.05$), with facility accessibility exerting the stronger influence. These findings demonstrate that improving accessibility and passenger information can substantially enhance holding area utilization, providing practical evidence to support more effective passenger flow management and congestion mitigation at airport terminals.

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Corresponding Author:

Muhammad Giraldd Aulalgafari

Aviation Polytechnic of Surabaya, Surabaya, Indonesia; giraldgafari6@gmail.com

1. INTRODUCTION

The Air transportation plays a vital role in supporting community mobility and regional economic development, particularly in countries with high travel demand and extensive geographical coverage such as Indonesia (Ahyudanari, 2021). Airports function not only as locations for aircraft operations but also as service centers that must manage passenger movement effectively and efficiently (AlMataani & Ayadi, 2025). As passenger traffic continues to increase, airport operators are required to provide facilities and operational systems that ensure comfort, safety, and smooth passenger circulation within terminal areas (Borille et al, 2022). Ineffective passenger flow management may lead to congestion, operational disruption, and reduced service quality, especially in high-density areas such as arrival terminals (Otieno, 2025; Palaşcă et al, 2025).

One of the airports with a strategic role in eastern Indonesia is Juanda International Airport, which serves both domestic and international flights, including Umrah pilgrimage services to Saudi Arabia. The number of Umrah passengers using the airport has increased significantly in recent years, resulting in higher activity levels within the international arrival terminal (Zahra et al., 2025). Unlike regular international passengers, Umrah pilgrims generally travel in groups through travel agencies and are commonly welcomed by large numbers of family members or pick-up parties upon (Md Tarmudi et al., 2022; Saad et al., 2024). This condition often creates crowd accumulation in terminal arrival areas, particularly around exits, terminal corridors, and curbside pick-up zones.

Based on preliminary observations conducted at Terminal 2 of Juanda International Airport in February 2026, congestion was frequently found during peak arrival periods of Umrah flights. The crowd density extended beyond the terminal exit area to pedestrian corridors and vehicle lanes, potentially disrupting passenger circulation and airport ground transportation flow. To reduce congestion, the airport operator has provided a designated Umrah arrival holding area intended as a temporary gathering point for pilgrims and pick-up parties. However, the utilization of this facility remains relatively low, as many users still prefer waiting around terminal exits or other informal gathering spots.

Several factors are believed to influence the underutilization of the holding area. One important factor is the availability of information regarding the location and function of the facility (Park & Kim, 2023; Srikhwan, 2025). Directional signs, visual guidance, and operational information are considered insufficiently visible or difficult to understand for some airport users (Rossolov et al, 2021; Wang & Wang, 2025). In addition, the separation between regular international arrival routes and special Umrah arrival routes may create confusion among pick-up parties regarding the correct waiting location (Nordin et al, 2025). Another influential factor is facility accessibility, which refers to the ease with which passengers and visitors can physically reach the holding area (Jamei et al, 2022). Accessibility issues become more significant considering that many Umrah pilgrims are elderly passengers who require convenient and barrier-free movement within the terminal environment (Alhuzali et al, 2024; Nour, 2021).

Previous studies have highlighted the importance of accessibility, information systems, and passenger facility management in improving airport service quality and passenger experience (Hakim

et al., 2025). Putra & Yudartha (2024) emphasized that accessible airport facilities are essential for supporting efficient passenger movement and minimizing operational disruptions within airport terminals. Similarly, Sheromova & Komleva (2025) reported that accessibility and information services significantly influence passenger satisfaction and overall operational effectiveness. These findings consistently demonstrate that physical accessibility and effective information provision are fundamental elements in enhancing airport service performance. In the context of Hajj and Umrah operations, Ayyad (2022) identified information management as a key factor in controlling passenger crowds, a conclusion that is supported by Abdoh (2025) and Aldahawi (2021), who highlighted the role of digital information systems in improving crowd management efficiency during pilgrimage activities. Although these studies consistently acknowledge the importance of accessibility and information management, they primarily focus on airport service quality, passenger satisfaction, or crowd management in general, with limited attention given to the utilization of Umrah arrival holding facilities. Moreover, most previous studies were conducted in the context of Saudi Arabian pilgrimage operations rather than Indonesian airports, indicating a gap in the existing literature.

Therefore, this study aims to analyze the influence of information availability and facility accessibility on the utilization of the Umrah arrival holding area at Terminal 2 of Juanda International Airport using the Partial Least Squares–Structural Equation Modeling (PLS-SEM) approach. Unlike previous studies that examined accessibility and information management separately or focused primarily on crowd management and service quality, this study investigates the combined effects of these two variables on the utilization of a dedicated Umrah arrival holding facility within the operational context of an Indonesian international airport. This study contributes to the existing literature by providing empirical evidence on factors influencing holding area utilization and offers practical recommendations for airport operators to optimize passenger flow, improve facility utilization, and reduce congestion during Umrah arrival operations.

2. METHODS

This study employed a quantitative path analysis approach using Partial Least Squares–Structural Equation Modeling (PLS-SEM) to examine the influence of information availability and facility accessibility on the utilization of the Umrah arrival holding area at Terminal 2 of Juanda International Airport. The research subjects consisted of Umrah pilgrims and pick-up parties located in the international arrival area. Respondents were selected using an accidental sampling technique, involving approximately 100 participants who had direct experience with the operational conditions of the arrival terminal and the holding facility. This sampling technique was considered appropriate because the target population was dynamic and continuously changing according to Umrah flight arrival schedules, making it difficult to establish a complete sampling frame. Therefore, respondents who were available and met the research criteria during the data collection period were selected to obtain representative information regarding the utilization of the Umrah arrival holding area.

Prior to data collection, the questionnaire instrument was validated by three experts in airport operations and aviation management to ensure the relevance, clarity, and suitability of the research indicators. Data collection was conducted through direct field observation and questionnaires distributed digitally using Google Forms accessed through QR codes at the research location. The questionnaire employed a four-point Likert scale ranging from strongly disagree to strongly agree.

The independent variables in this study were information availability and facility accessibility, while the dependent variable was the utilization of the Umrah arrival holding area. Information availability was measured through indicators such as signage visibility, information accuracy, staff assistance, and readability of operational guidance. Facility accessibility included walking distance,

physical accessibility, visibility of the holding area location, and pedestrian connectivity. Meanwhile, holding area utilization was evaluated through occupancy level, passenger compliance, crowd distribution, passenger flow orderliness, and waiting comfort.

The collected data were analyzed using SmartPLS software to evaluate the measurement model and structural model relationships among variables. The analysis included convergent validity testing, composite reliability, Cronbach's alpha, model fit evaluation using SRMR and NFI, coefficient of determination (R-square).

3. FINDINGS AND DISCUSSION

3.1. Respondent Characteristics

This study involved respondents consisting of Umrah pilgrims and pick-up parties located in the international arrival area of Terminal 2 at Juanda International Airport. The respondents were selected using an accidental sampling technique during Umrah arrival operations to ensure that participants had direct experience related to the utilization of the Umrah arrival holding area. Data collection was carried out during peak arrival periods in order to capture actual operational conditions within the terminal environment.

A total of 100 respondents participated in this study. The respondents consisted of both male and female participants with different age categories and travel purposes. Most respondents were pick-up parties accompanying arriving pilgrims, while the remaining respondents were Umrah passengers. The diversity of respondents allowed the research to represent the actual conditions experienced by users of the arrival terminal facilities.

Table 1. Respondent Characteristics

No	Respondent Characteristics	Category	Frequency	Percentage
1.	Gender	Men	68	68%
		Women	32	32%
2.	Respondent Category	Pick-up Person	44	44%
		Umrah Pilgrim	56	56%

Based on Table 1, the respondents represented users directly involved in Umrah arrival activities. The dominance of pick-up parties and adult respondents reflects the actual operational conditions at the international arrival terminal, where crowd accumulation frequently occurs during Umrah arrival schedules.

3.2. Instrument Validation

Before the questionnaire was distributed to respondents, the research instrument was evaluated by three experts with knowledge and experience in aviation operations and airport service management. The expert validation process aimed to assess the clarity, relevance, and suitability of the questionnaire indicators with the research variables.

The experts reviewed the questionnaire items related to information availability, facility accessibility, and utilization of the Umrah arrival holding area. Based on the evaluation results,

several improvements were made to the wording and structure of the questionnaire to ensure better understanding and consistency among respondents.

Table 2. Expert Validation Results

Expert	Field of Expertise	Validation Result
Expert 1	Aviation Language	Valid
Expert 2	Aviation Management	Valid
Expert 3	Airport Services	Valid

The expert assessment confirmed that the questionnaire indicators were appropriate for measuring the research variables and could be used for further data collection and statistical analysis.

3.3. Measurement Model Evaluation

The measurement model evaluation was conducted to determine the validity and reliability of all research indicators. The analysis included outer loading, Average Variance Extracted (AVE), composite reliability, and Cronbach's alpha values using SmartPLS software. This evaluation aimed to ensure that each indicator was capable of accurately measuring the constructs of information availability, facility accessibility, and the utilization of the Umrah arrival holding area. The assessment of convergent validity was performed by examining the outer loading and AVE values, while reliability testing was conducted through composite reliability and Cronbach's alpha measurements. These procedures were important to confirm that the research instrument had adequate consistency and accuracy before proceeding to the structural model analysis and hypothesis testing stages. In addition, the measurement model evaluation was carried out to minimize measurement errors and to ensure that the collected data appropriately represented the actual operational conditions within the international arrival area of Juanda International Airport.

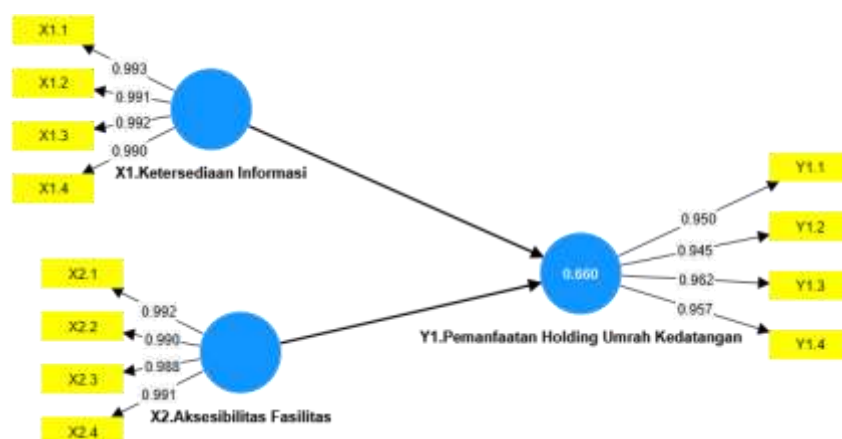


Figure 1. Outer Model Evaluation Results

The research findings indicate that all indicators achieved an eigenloadings value above 0.70, signifying that each indicator is capable of accurately measuring its respective construct.

Furthermore, all AVE values exceeded 0.50, indicating satisfactory convergent validity. Table 3 shows that the composite reliability and Cronbach's alpha values also demonstrate strong internal consistency amongst these indicators. These findings confirm that the indicators used to measure the availability of information, accessibility of facilities, and utilisation of the Umrah arrival waiting area are statistically reliable and capable of consistently representing each construct. The strong validity and reliability results indicate that the questionnaire instrument is suitable for evaluating passengers' perceptions regarding the utilisation of the Umrah arrival waiting area at Juanda International Airport. Furthermore, these results indicate that the measurement model meets the requirements for further structural equation modelling analysis and hypothesis testing using the PLS-SEM approach.

Table 3. Validity and Reliability Results

Variable	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
X1. Information Availability	0.994	0.995	0.996	0.983
X2. Facility Accessibility	0.993	0.995	0.995	0.981
Y1. Utilisation of the Umrah Arrival Holding	0.967	0.968	0.976	0.909

These findings confirm that all constructs fulfilled the required validity and reliability standards, meaning the research instrument was suitable for further structural analysis. The results indicate that all indicators consistently represented their respective variables and were capable of measuring the concepts of information availability, facility accessibility, and holding area utilization accurately. Therefore, the measurement model was considered sufficiently robust for hypothesis testing and structural model evaluation using the PLS-SEM approach. In addition, the satisfactory validity and reliability results demonstrate that the collected data were reliable in reflecting the actual conditions experienced by Umrah pilgrims and pick-up parties within the international arrival area of Juanda International Airport.

3.4. Model Fit Evaluation

The model fit evaluation was conducted to determine whether the proposed structural model adequately represented the relationship among variables. The assessment used the Standardized Root Mean Square Residual (SRMR) and Normed Fit Index (NFI).

Table 4. Model Fit Result

Model Fit Indicator	Value	Recommended Value	Result
SRMR	0.035	< 0.08	Good Fit

	0.842	> 0.80	Acceptable
NFI			

The SRMR value below 0.08 indicates that the model had a good level of accuracy, while the NFI value demonstrated that the structural model was acceptable for hypothesis testing and further analysis.

3.5. Structural Model Analysis

The structural model analysis was performed to examine the relationship between information availability, facility accessibility, and the utilization of the Umrah arrival holding area. The analysis focused on the coefficient of determination (R-square), path coefficient values, and hypothesis testing.

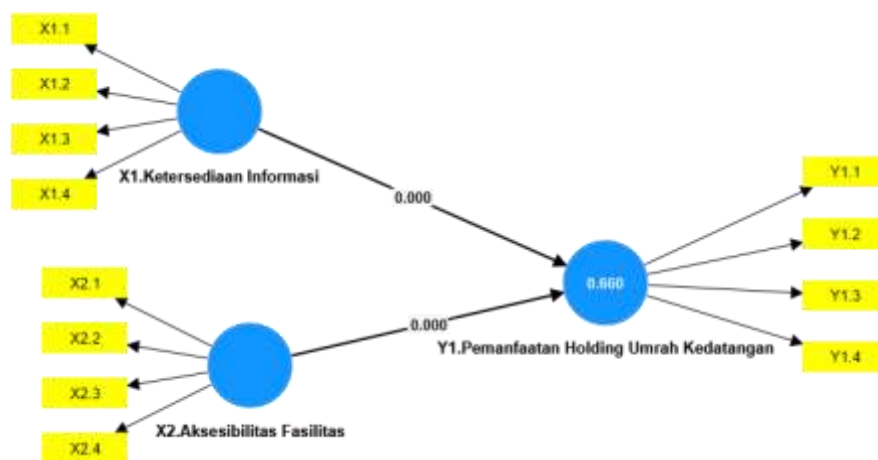


Figure 2. Structural Model Results

The results revealed an R-square value of 0.660, meaning that information availability and facility accessibility explained 66% of the variation in holding area utilization. This result indicates that both independent variables had a substantial contribution to improving the use of the holding facility. The remaining 34% of the variation was influenced by other factors outside the scope of this study, such as passenger behavior, operational conditions, terminal crowd density, and airport service management. The findings demonstrate that the proposed structural model possessed moderate to strong explanatory power in describing passenger and pick-up party behavior related to the utilization of the Umrah arrival holding area at Juanda International Airport. Furthermore, the result suggests that improvements in accessibility and information systems could significantly support more effective passenger flow management and reduce congestion within the airport arrival terminal.

Table 5. R-square Result

Variable	R-square	R-square adjusted
Y1. Utilisation of the Umrah Arrival Holding	0.660	0.653

The structural model produced an R-square value of 0.660, indicating that information availability and facility accessibility jointly explained 66.0% of the variance in the utilization of the Umrah arrival holding area. The adjusted R-square value was 0.653, suggesting that the model maintained a stable explanatory capability after adjustment for the number of predictors

Table 6. Path Coefficient and Hypothesis Testing Result

Variable Relationship	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
X1. Information Availability -> Y1. Utilisation of the Umrah Arrival Holding	0.546	0.547	0.055	9.956	0.000
X2. Facility Accessibility -> Y1. Utilisation of the Umrah Arrival Holding	0.659	0.661	0.046	14.447	0.000

The hypothesis testing results are presented in Table 6. Information availability showed a positive path coefficient of 0.546, with a t-statistic of 9.956 and a p-value of 0.000, indicating a statistically significant relationship with the utilization of the Umrah arrival holding area. Likewise, facility accessibility produced a positive path coefficient of 0.659, with a t-statistic of 14.447 and a p-value of 0.000, indicating a statistically significant relationship with holding area utilization. Since both p-values were below the significance level of 0.05, both research hypotheses were accepted. Furthermore, the standardized path coefficient of facility accessibility ($\beta = 0.659$) was higher than that of information availability ($\beta = 0.546$), indicating a stronger statistical effect within the structural model.

3.6. Discussion

3.6.1. The Effect of Information Availability on Holding Area Utilization.

The findings indicate that information availability had a positive and significant effect on the utilization of the Umrah arrival holding area. This result suggests that passengers and pick-up parties were more likely to use the designated holding area when clear directional signage, accurate operational information, and staff assistance were available. The influence of information availability can be explained by the characteristics of airport terminals, where passengers—particularly first-time Umrah pilgrims and accompanying family members—often experience difficulty locating designated waiting areas without adequate guidance. Under these conditions, visual information and operational assistance help reduce uncertainty and encourage users to follow the intended passenger flow.

This finding is consistent with Hakim et al. (2025), who reported that effective airport information systems improve passenger movement and operational efficiency by reducing confusion within terminal facilities. Likewise, Ayyad (2022) emphasized that information management is a key element in controlling passenger movements during Hajj and Umrah operations, while Abdoh (2025) and Aldahawi (2021) highlighted the importance of integrated information systems in supporting crowd management. Although previous studies mainly focused on crowd management and airport service quality, the present study extends these findings by demonstrating that information availability also plays a significant

role in encouraging the utilization of dedicated Umrah arrival holding facilities within the operational context of an Indonesian international airport.

3.6.2. The Effect of Facility Accessibility on Holding Area Utilization

The results showed that facility accessibility exerted a stronger influence on holding area utilization than information availability. This finding indicates that the physical characteristics of the holding area, including walking distance, visibility, pedestrian connectivity, and ease of access, were the primary considerations influencing passenger decisions to use the facility. This result is understandable because many Umrah pilgrims are elderly and frequently travel with family members or luggage, making convenience and physical accessibility more important than simply receiving information about the facility.

This finding supports the study conducted by Putra & Yudartha (2024), which concluded that accessible airport facilities facilitate passenger movement and improve operational effectiveness. Similarly, Sheromova & Komleva (2025) found that accessibility is closely associated with passenger satisfaction and efficient airport operations. While previous studies primarily examined accessibility in relation to airport service quality, the present study provides additional evidence that accessibility is also a determining factor in the utilization of airport holding facilities. The stronger effect observed in this study suggests that even when passengers receive adequate information, they may still choose not to use the holding area if it is perceived as difficult to reach or visually disconnected from the main passenger circulation route.

3.6.3. Implications of the Findings

The findings of this study have several practical implications for airport management, particularly in optimizing passenger flow during Umrah arrival operations. Since facility accessibility showed a stronger influence than information availability, airport operators should prioritize improvements to pedestrian connectivity, holding area visibility, and walking convenience while simultaneously strengthening passenger information systems through clearer directional signage, digital information displays, and staff assistance. These measures are expected to encourage greater utilization of the holding area and reduce passenger accumulation around terminal exits.

Compared with previous studies that mainly focused on airport service quality, passenger satisfaction, or crowd management during Hajj and Umrah, this study specifically examines the utilization of the Umrah arrival holding area by integrating information availability and facility accessibility within a single PLS-SEM model. Consequently, this research contributes new empirical evidence regarding passenger behavior in using holding facilities and provides practical recommendations for improving airport operational management, particularly for international airports handling high volumes of Umrah passengers such as Juanda International Airport.

4. CONCLUSION

This study was conducted to analyze the influence of information availability and facility accessibility on the utilization of the Umrah arrival holding area at Terminal 2 of Juanda International Airport. Based on the results of the PLS-SEM analysis, both independent variables were found to have positive and significant effects on the utilization of the holding area. The findings indicate that clearer operational information, effective directional signage, and adequate staff guidance can improve

passenger understanding regarding the location and function of the holding facility. In addition, facility accessibility was identified as the most influential factor affecting holding area utilization, particularly in terms of walking distance, visibility of the facility, pedestrian connectivity, and ease of movement within the terminal area.

The results also demonstrate that information availability and facility accessibility explained 66% of the variation in holding area utilization, indicating that both variables made substantial contributions to passenger behavior and crowd distribution within the arrival terminal. These findings suggest that improving accessibility and strengthening passenger information systems can support more effective passenger flow management and reduce congestion during Umrah arrival operations.

This study contributes to the development of airport passenger service management, particularly in optimizing holding facility utilization within high-density arrival terminals. From a practical perspective, the findings provide empirical evidence for airport operators to prioritize improvements in directional signage, pedestrian accessibility, and operational guidance. These measures can enhance the utilization of holding facilities, improve terminal circulation, minimize passenger congestion at arrival exits, and support more efficient passenger flow management during peak Umrah operations. The results may also serve as a reference for airport management in planning facility improvements and operational policies related to Umrah passenger services.

However, this study was limited to two independent variables and focused only on the operational conditions of the Umrah arrival area at Juanda International Airport. In addition, the use of an accidental sampling technique and data collection from approximately 100 respondents may limit the generalizability of the findings to other airport environments with different operational characteristics. Future studies are therefore encouraged to investigate additional factors, such as passenger behavior, service quality, terminal layout effectiveness, crowd management systems, operational staff performance, and the integration of digital information technologies. Comparative studies involving multiple international airports and larger sample sizes are also recommended to provide broader evidence and strengthen the generalizability of findings related to airport passenger flow management and holding facility utilization.

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