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The Influence of Personnel Competence, Facility Reliability and Speed of Process on Customer Satisfaction through Service Performance at Terminal 3 of Soekarno-Hatta International Airport

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Abstract: This study examines the influence of personnel competence, facility reliability, and process speed on service performance and customer satisfaction, as well as examining the mediating role of service performance in the relationship between the independent variables and customer satisfaction at Terminal 3 of Soekarno-Hatta International Airport. A quantitative approach was employed using the SEM-PLS data analysis technique. Data were gathered through a survey involving 410 passengers at Terminal 3 of Soekarno-Hatta International Airport. The results of the study indicate that personnel competence, facility reliability, and process speed have a significant positive impact on both service performance and customer satisfaction. Furthermore, service performance is found to successfully mediate the relationship between the three independent variables and customer satisfaction. Based on these findings, it is recommended that the management of Terminal 3 at Soekarno-Hatta International Airport enhance personnel training, ensure optimal facility maintenance, and implement digitalization and automation technologies to expedite service delivery.

Keyword: Personnel Competence, Facility Reliability, Speed Process, Service Performance, Customer Satisfaction, SEM PLS, Soekarno-Hatta Airport

INTRODUCTION

Airports serve as the primary nodes for passenger embarkation and disembarkation, as well as cargo handling, with terminal buildings being central to time-sensitive operations aimed at meeting passenger expectations (Utama & Roellyanti, 2022). Soekarno-Hatta International Airport, managed by PT Angkasa Pura II, is the largest airport in Indonesia and was ranked the busiest in ASEAN and third in Asia-Pacific by the Airport Council International (ACI) in 2023.

As a service provider, the airport is subject to performance benchmarks, one of which is customer satisfaction. This requires compliance not only with regulatory standards but also with passengers' expectations. Several determinants contribute to satisfaction at airports,

notably service quality, which is shaped by operational processes, personnel competence, and infrastructure reliability.

Serving over 50 million passengers annually, Soekarno-Hatta International Airport encounters numerous operational challenges, particularly those associated with personnel competencies, the speed of service processes, and the reliability of airport infrastructure. These factors are interrelated and demand strategic attention from airport management to uphold customer satisfaction. Monitoring complaints and feedback through satisfaction metrics is essential to address passenger concerns.

To capture passenger feedback, the airport operates the Contact Center Airport 138. However, from 2021 to 2023, the percentage of customer complaints remained above 25%, with sentiment index scores ranging between 3.78 and 4.11—well below the target Voice of Customer sentiment index of ≥ 4.75 .

Table 1. Voice of Customer Sentiment Index – Soekarno-Hatta International Airport (2021–2023)

Year	Satisfaction	%	Dissatisfaction	%	Sentiment Index
2023	2.659	70%	1.140	30%	3,8
2022	3.295	78%	945	22%	4,11
2021	1.651	70%	721	30%	3,78

Note: 2023 data covers January 1 – October 31, 2023

Source: PT Angkasa Pura Indonesia (2024)

The top five service categories contributing to negative sentiment based on the Voice of Customer data are: 1) Airport Staff; 2) Indoor air conditioning; 3) Airline services; 4) Baggage handling; 5) Parking facilities.

An internal customer satisfaction survey and a mystery traveler audit conducted in 2023 by the holding company PT Aviassi Pariwisata Indonesia (InJourney Group) reported an overall satisfaction score of 3.3 (on a 5-point Likert scale) for Soekarno-Hatta International Airport, which falls below the average score of 3.47. Among 12 airports surveyed by the ASC Survey, Soekarno-Hatta ranked 8th.

These findings highlight ongoing challenges in achieving optimal customer satisfaction levels. The Voice of Customer sentiment index score of 3.92 falls short of the target of 4.75. Additionally, the ASC survey score of 3.3 is below both the target (4.65) and the average (3.47). Personnel (staff), service processes (e.g., baggage handling), and infrastructure (e.g., air conditioner and parking) are among the top sources of customer complaints.

As a result, customer satisfaction becomes a critical performance indicator for Soekarno-Hatta International Airport, especially since the holding company PT Aviassi Pariwisata Indonesia (Persero) mandates a Customer Satisfaction Index (CSI) target of 4.65. Improving passenger mood is also a business imperative, as it correlates with increased airport spending, ultimately enhancing airport revenue. Therefore, personnel competence, facility reliability, and process speed are essential variables that need strategic focus to improve customer experience.

This study is limited to: 1) Terminal 3 of Soekarno-Hatta International Airport, the largest terminal serving both domestic and international routes; 2) Passenger processing services only (check-in, boarding, baggage services, and document screening), excluding services provided by airlines, immigration, and customs; 3) Demographic and cultural factors are excluded due to the mixed passenger profile (business and economy).

Based on the above, the study formulates the following research questions: 1) To what extent do personnel competence, facility reliability, and process speed affect service performance at Terminal 3?; 2) To what extent do these three factors influence passenger satisfaction?; 3) Does service performance have a direct impact on passenger satisfaction?; 4)

Does service performance mediate the relationship between the three independent variables and passenger satisfaction?

METHOD

This study adopts a quantitative research design, employing data analysis techniques align with the research model and variables under investigation. Specifically, Structural Equation Modelling using Partial Least Squares (SEM-PLS) was utilized, operationalized through the SmartPLS software. SEM is a multivariate statistical technique which is a combination of factor analysis and regression analysis (correlation), which aims to test the relationship between variables in a model, both between indicators and their constructs, or the relationship between construct (Santoso, 2003).

According to Hair et al. (2021), the recommended sample size in SEM-PLS is based on a ratio of 5 to 10 respondents per indicator. This study involved 41 indicators, thereby necessitating a minimum of 410 respondents. The sample comprised passengers at Terminal 3 of Soekarno-Hatta International Airport, selected for its status as the airport's largest terminal serving both domestic and international flights.

The research focused on variables related to service personnel (competence and interaction), facility readiness and infrastructure quality, and service process efficiency. The survey was conducted over a five-month period, from September 2024 to January 2025, ensuring the representation of various operational conditions and avoiding seasonal anomalies that could distort the results. Data were collected using a structured questionnaire distributed to both domestic and international passengers—across economy and business travel segments—within the arrival areas of Terminal 3.

RESULT AND DISCUSSION

Result

Based on background and problem identification above, the result of the study are:

1. Convergent Validity Test

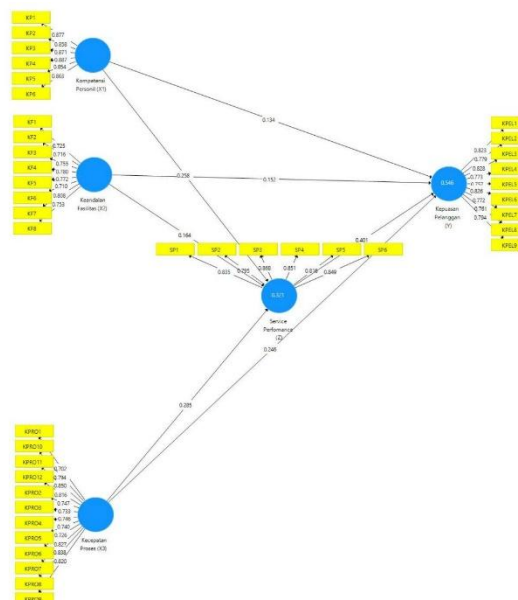


Figure 1. Research Paradigm

Source: SMART PLS 3, 2024

Convergent validity was assessed using outer loadings, with a threshold of ≥ 0.70 indicating acceptable validity. All measurement items in this study met this criterion, confirming that the indicators validly represent their respective constructs.

2. Cross Loading Test

Table 2. Cross Loading Test Result

	Keandalan Fasilitas (X2)	Kecepatan Proses (X3)	Kepuasan Pelanggan (Y)	Kompetensi Personil (X1)	Service Performance (Z)
KF1	0.725	0.422	0.378	0.238	0.282
KF2	0.716	0.502	0.321	0.280	0.247
KF3	0.755	0.493	0.394	0.292	0.260
KF4	0.780	0.554	0.473	0.428	0.381
KF5	0.772	0.506	0.395	0.355	0.361
KF6	0.710	0.434	0.489	0.319	0.484
KF7	0.808	0.517	0.481	0.319	0.378
KF8	0.753	0.564	0.365	0.354	0.312
KP1	0.386	0.289	0.415	0.877	0.381
KP2	0.334	0.278	0.388	0.858	0.351
KP3	0.429	0.313	0.370	0.871	0.381
KP4	0.343	0.239	0.403	0.887	0.388
KP5	0.347	0.275	0.400	0.854	0.338
KP6	0.427	0.306	0.359	0.863	0.354
KPEL1	0.505	0.525	0.823	0.438	0.587
KPEL2	0.500	0.497	0.779	0.430	0.538
KPEL3	0.580	0.592	0.828	0.381	0.550
KPEL4	0.377	0.374	0.773	0.319	0.473
KPEL5	0.369	0.368	0.757	0.325	0.497
KPEL6	0.468	0.496	0.826	0.379	0.514
KPEL7	0.375	0.390	0.772	0.247	0.452
KPEL8	0.315	0.373	0.761	0.250	0.480
KPEL9	0.415	0.452	0.794	0.372	0.470
KPRO1	0.685	0.702	0.447	0.210	0.377
KPRO10	0.442	0.794	0.387	0.171	0.303
KPRO11	0.473	0.850	0.488	0.227	0.371
KPRO12	0.446	0.816	0.449	0.250	0.316
KPRO2	0.646	0.747	0.347	0.261	0.306
KPRO3	0.667	0.733	0.402	0.253	0.371
KPRO4	0.400	0.746	0.488	0.309	0.425
KPRO5	0.486	0.740	0.478	0.310	0.446
KPRO6	0.495	0.726	0.478	0.330	0.418
KPRO7	0.538	0.827	0.476	0.252	0.400
KPRO8	0.493	0.838	0.499	0.200	0.353
KPRO9	0.437	0.820	0.436	0.241	0.317
SP1	0.356	0.382	0.575	0.274	0.835
SP2	0.292	0.306	0.548	0.293	0.795
SP3	0.433	0.457	0.587	0.349	0.868
SP4	0.405	0.423	0.531	0.402	0.851
SP5	0.371	0.370	0.501	0.433	0.816
SP6	0.460	0.444	0.494	0.361	0.849

Source: Output SMART PLS 3, 2024

Cross-loading analysis demonstrated that each indicator's loading on its respective latent construct was higher than its correlation with other constructs. This confirms discriminant validity and affirms that the constructs are distinct from one another.

3. Reliability Test

Table 3. Reliability Test Result

Construct Reliability and Validity

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Keandalan Fasilitas (X2)	0.892	0.899	0.913	0.567
Kecepatan Proses (X3)	0.941	0.942	0.949	0.608
Kepuasan Pelanggan (Y)	0.925	0.930	0.938	0.625
Kompetensi Personil (X1)	0.935	0.936	0.948	0.754
Service Performance (Z)	0.914	0.916	0.933	0.699

Source: SMART PLS 3 (2024)

The reliability analysis, using Cronbach's Alpha and Composite Reliability, yielded values exceeding the 0.70 threshold for all constructs. This indicates that the instrument is internally consistent and reliable.

4. Variance Inflation Factor (VIF) Test

Table 4. VIF Test Result

Inner VIF Values

	Keandalan Fasilitas (X2)	Kecepatan Proses (X3)	Kepuasan Pelanggan (Y)	Kompetensi Personil (X1)	Service Performance (Z)
Keandalan Fasilitas (X2)			2.004		1.964
Kecepatan Proses (X3)			1.902		1.783
Kepuasan Pelanggan (Y)					
Kompetensi Personil (X1)			1.334		1.237
Service Performance (Z)			1.472		

Source: SMART PLS 3 (2024)

All VIF values were below 5, suggesting the absence of multicollinearity among the predictor variables. This supports the statistical independence of each construct in the model.

5. Goodness of Fit Test

Table 5. Goodness of Fit Test Result

Model_Fit

Fit Summary

	Saturated Model	Estimated Model
SRMR	0.094	0.094

Source: SMART PLS 3 (2024)

The model's Standardized Root Mean Square Residual (SRMR) was 0.094, which is below the accepted threshold of 0.10, indicating good model fit. The minimal SRMR difference between the saturated and estimated models further supports the model's compatibility with the data.

6. *f*-Square Test

Table 6. *f*-square Test Result

f Square

	Keandalan Fasilitas (X2)	Kecepatan Proses (X3)	Kepuasan Pelanggan (Y)	Kompetensi Personil (X1)	Service Performance (Z)
Keandalan Fasilitas (X2)			0.025		0.020
Kecepatan Proses (X3)			0.070		0.067
Kepuasan Pelanggan (Y)					
Kompetensi Personil (X1)			0.030		0.079
Service Performance (Z)			0.240		

Source: SMART PLS 3, 2024

Most of the *f*-Square values indicated small to moderate effect sized, ranging from 0.02 to 0.24. The most notable was the effect of service performance on customer satisfaction, with an *f*-Square of 0,240, indicating a moderate impact.

7. R-Square Test

Tabel 7. R-square Test Result

R Square

	R Square	R Square Adjusted
Kepuasan Pelanggan (Y)	0.546	0.542
Service Performance (Z)	0.321	0.316

Source: SMART PLS 3, 2024

The results of the R-Square test show that the influence of personnel competence, facility reliability, process speed, and service performance on customer satisfaction has an R-Square value of 0.546, which indicates a model with moderate strength (54.60% influence). While the influence of personnel competence, facility reliability, and process speed on service performance has an R-Square value of 0.321, which indicates a weak model (32.10% influence). The rest is influenced by other factors outside the model.

8. Q-Square Test

Table 8. Q-square Test Result

Construct Crossvalidated Redundancy

Total

	SSO	SSE	Q ² (=1-SSE/SSO)
Keandalan Fasilitas (X2)	3304.000	3304.000	
Kecepatan Proses (X3)	4956.000	4956.000	
Kepuasan Pelanggan (Y)	3717.000	2488.536	0.330
Kompetensi Personil (X1)	2478.000	2478.000	
Service Performance (Z)	2478.000	1929.957	0.221

Source: SMART PLS 3 (2024)

The Q-Square shows that the predictive relevance for the influence model of personnel competence, facility reliability, process speed, and service performance on customer satisfaction is 0.330, which is classified as moderate. Likewise, the influence of personnel competence, facility reliability, and process speed on service performance, which has a Q-Square value of 0.221, is also classified as moderate predictive relevance.

9. Path Coefficients Test

Table 9. Path Coefficients Test Result

Path Coefficients

Mean, STDEV, T-Values, P-Values

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
Keandalan Fasilitas (X2) -> Kepuasan Pelanggan (Y)	0.152	0.149	0.073	2.078	0.019
Keandalan Fasilitas (X2) -> Service Performance (Z)	0.164	0.175	0.069	2.370	0.009
Kecepatan Proses (X3) -> Kepuasan Pelanggan (Y)	0.246	0.249	0.074	3.310	0.000
Kecepatan Proses (X3) -> Service Performance (Z)	0.285	0.280	0.073	3.915	0.000
Kompetensi Personil (X1) -> Kepuasan Pelanggan (Y)	0.134	0.130	0.063	2.122	0.017
Kompetensi Personil (X1) -> Service Performance (Z)	0.258	0.257	0.049	5.308	0.000
Service Performance (Z) -> Kepuasan Pelanggan (Y)	0.401	0.407	0.070	5.716	0.000

Source: SMART PLS 3 (2024)

Path coefficient results showed that all hypothesized relationships were statistically significant, with p-values < 0.05. This confirms positive direct effects of personnel competence, facility reliability, and process speed on both service performance and customer satisfaction.

10. Specific Indirect Test

Table 10. Hasil Pengujian Specific Indirect

Specific Indirect Effects

Mean, STDEV, T-Values, P-Values

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
Keandalan Fasilitas (X2) -> Service Performance (Z) -> Kepuasan Pelanggan (Y)	0.066	0.073	0.035	1.895	0.029
Kecepatan Proses (X3) -> Service Performance (Z) -> Kepuasan Pelanggan (Y)	0.114	0.114	0.035	3.307	0.001
Kompetensi Personil (X1) -> Service Performance (Z) -> Kepuasan Pelanggan (Y)	0.103	0.104	0.023	4.527	0.000

Source: SMART PLS 3 (2024)

The mediating role of service performance was confirmed in all three indirect paths, as indicated by significant p-values (< 0.05). Thus, service performance effectively mediates the impact of the three independent variables on customer satisfaction.

Discussion

1. The Influence of Personnel Competence on Service Performance at Terminal 3 of Soekarno-Hatta International Airport

The analysis reveals a positive and significant influence of personnel competence on service performance, with a path coefficient of 0.258. This suggests that enhanced staff capabilities—such as knowledge, communication, and interpersonal skills substantially improve the quality of service delivery. Skilled and competent staff are better equipped to address passenger needs effectively, thus strengthening overall service performance.

These findings are consistent with Hendra & Alfari (2019), who emphasized personnel competence as a key determinant of service quality in the public sector. In the context of airport operations, such competence directly contributes to smoother passenger flow and improved airport service standards.

2. The Influence of Facility Reliability on Service Performance at Terminal 3 of Soekarno-Hatta International Airport

Facility reliability also exhibits a positive impact on service performance, with a coefficient of 0.164. Well-maintained infrastructure such as clean restrooms, comfortable waiting areas, reliable baggage systems, and clear signage enhances the passenger experience and supports operational efficiency.

This aligns with Srijani & Hidayat (2017), who found that reliable facilities have a significant impact on the quality of services delivered. Well-functioning infrastructure enhances operational efficiency and contributes to a more pleasant passenger experience. Accordingly, continuous maintenance and improvement of facilities are essential to sustaining high service quality at Terminal 3 and ensuring greater passenger satisfaction.

3. The Influence of Process Speed on Service Performance di Terminal 3 of Soekarno-Hatta International Airport

Service process speed has a significant positive effect on service performance at Terminal 3, as indicated by a path coefficient of 0.285. This implies that any improvement in process speed leads to a proportional increase in perceived service performance. In this context, process speed refers to the efficiency of check-in procedures, security screening, and baggage retrieval. Faster processing reduces passenger wait times and fosters a more streamlined experience, thereby enhancing the overall perception of service quality.

These results reinforce Putra et al. (2020), who demonstrated that implementing self-service technologies (e.g., kiosks, mobile check-in) can significantly reduce queues and improve service punctuality, thus enhancing service performance. Speed in the service process is a very important factor in increasing operational efficiency and improving the passenger

experience at the airport. By speeding up this process, the overall quality of service can be improved.

4. The Influence of Personnel Competence on Customer Satisfaction at Terminal 3 of Soekarno-Hatta International Airport

Personnel competence at Terminal 3 has a significant effect on customer satisfaction, with a path coefficient of 0.134. Increasing personnel competence will lead to an increase in customer satisfaction of 0.134. This indicates that the more competent the personnel at the airport, the higher the satisfaction felt by passengers. Passengers who are served by personnel who have the right skills, knowledge, and attitudes will feel more appreciated and satisfied with the service they receive.

This outcome supports Yuliana (2020), who concluded that both competence and service innovation are pivotal in shaping customer satisfaction in health and service sectors. In the airport setting, such competence builds trust and promotes positive emotional responses. Therefore, training and competency development of personnel at Terminal 3 is an important factor in increasing passenger satisfaction.

5. The Influence of Facility Reliability on Customer Satisfaction at Terminal 3 of Soekarno-Hatta International Airport

The reliability of facilities has been proven to have a positive effect on customer satisfaction, with a path coefficient value of 0.152. This means that every increase in the quality of facilities will increase the customer satisfaction score by 0.152. Comfortable, clean, and easily accessible facilities play a major role in creating a positive experience for passengers. Passengers who feel comfortable with the facilities available at the airport will be more satisfied with the services they receive.

These findings are corroborated by prior studies indicating that the quality of airport facilities such as well-maintained waiting areas and overall cleanliness plays a critical role in shaping passenger satisfaction. Reliable and functional facilities enhance user comfort and contribute significantly to a more positive passenger experience, thereby elevating overall satisfaction levels.

6. The Influence of Speed of Process on Customer Satisfaction at Terminal 3 of Soekarno-Hatta International Airport

Speed of process demonstrates a strong positive influence on customer satisfaction, with a coefficient of 0.246. Passengers value fast and seamless services from check-in to baggage claim because these reduce travel-related stress and enhance the airport experience.

These findings echo those of Zuripal & Bachri (2023), who identified service speed as a key determinant of satisfaction in public service environment. Increasing the speed of the process will increase efficiency and provide a more enjoyable experience for passengers, which in turn will increase their satisfaction with services at the airport.

7. The Influence of Service Performance on Customer Satisfaction at Terminal 3 of Soekarno-Hatta International Airport

Service performance is the most influential predictor of customer satisfaction in this study, with a coefficient of 0.401. When service delivery aligns with passenger expectations in terms of responsiveness, reliability, and professionalism, satisfaction levels rise significantly.

This study supports the findings that suggest that fast, expected, and customer-friendly service performance will have a positive effect on customer satisfaction. Passengers who feel well served and meet their expectations tend to be more satisfied with their airport experience.

8. Mediating Effect of Service Performance on the Relationship Between Personnel Competence and Customer Satisfaction at Terminal 3 of Soekarno-Hatta International Airport

The test results show that personnel competence affects customer satisfaction through service performance, with a direct path coefficient of 0.134 and an indirect path coefficient of

0.103. This means that personnel competence has a more direct effect on customer satisfaction, although it also has an indirect effect through service performance. Passengers who interact with competent personnel feel more appreciated, which increases their satisfaction.

This study is consistent with the findings that show that reliable and professional employees in their fields have a major impact on customer satisfaction. Competent personnel will improve service quality and performance, which ultimately increases customer satisfaction.

9. Mediating Effect of Service Performance on the Relationship Between Facility Reliability and Customer Satisfaction di Terminal 3 of Soekarno-Hatta International Airport

Facility reliability affects customer satisfaction through service performance with a direct path coefficient of 0.152 and an indirect path coefficient of 0.066. Although facility reliability has a direct effect on customer satisfaction, the indirect effect through service performance is smaller. Passengers highly value the facilities in Terminal 3, such as the cleanliness of the toilets and the comfort of the waiting room, which can improve their experience.

This finding supports the explanation that the indirect relationship between the independent and dependent variables through service performance has a positive and significant effect. Reliable facilities provide additional comfort that increases passenger satisfaction.

10. Mediating Effect of Service Performance on the Relationship Between Speed of Process and Customer Satisfaction at Terminal 3 of Soekarno-Hatta International Airport

Speed of process influences customer satisfaction through service performance, with a direct path coefficient of 0.246 and an indirect path coefficient of 0.114. Enhanced process speed improves both service quality and passenger satisfaction. Passengers who experience fast and efficient services are more likely to feel satisfied, as shorter wait times contribute to a smoother and more pleasant travel experience.

These findings are consistent with previous studies demonstrating that service process speed significantly affects customer satisfaction. Improvements in service delivery speed enhance operational efficiency and create a more enjoyable airport experience, ultimately leading to higher levels of passenger satisfaction.

CONCLUSION

Based on the findings of this study, it can be concluded that personnel competence, facility reliability, and speed of process each have a positive and statistically significant impact on both service performance and passenger satisfaction at Terminal 3 of Soekarno-Hatta International Airport. Improvements in staff capabilities, infrastructure reliability, and operational efficiency contribute directly to enhancing the perceived quality of service, which in turn significantly boosts customer satisfaction. Furthermore, service performance functions as an effective mediating variable, strengthening the influence of the three independent variables on customer satisfaction.

All proposed hypotheses in this study are empirically supported, indicating that strategic efforts aimed at improving staff training, maintaining high standards for airport facilities, and accelerating service processes are essential for advancing both service quality and customer satisfaction in airport terminals. These findings have important managerial implications for airport operators and policymakers. Enhancing the customer experience in key operational areas can increase overall satisfaction levels and ultimately improve the airport's competitive position in the regional aviation market.

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