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Analysis of the Influence of Service Quality and Supporting Airport Facilities on Customer Satisfaction at Halim Perdanakusuma Airport

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Abstract: Halim Perdanakusuma Airport has seen a significant rise in passenger traffic in the post-COVID-19 period, creating an urgent need to improve terminal facilities and service quality. Despite these developments, users continue to report dissatisfaction with various aspects of airport services and infrastructure. This study aims to examine the effect of terminal facilities and service quality on passenger satisfaction. Using a quantitative approach, data were collected through surveys and analyzed with multiple linear regression via SPSS. The independent variables include electronic facilities (X1), IT facilities (X2), infrastructure facilities (X3), electrical facilities (X4), and service quality (X5), while passenger satisfaction serves as the dependent variable (Y). The results show that all independent variables have a positive and significant influence on passenger satisfaction, both individually and simultaneously. Among these, electronic facilities and service quality have the most dominant impact. The F-test supports the model's validity, confirming that the combination of variables significantly influences satisfaction levels. These findings highlight the importance of a comprehensive service strategy that integrates technology, infrastructure, and human interaction to enhance overall service quality in the aviation sector.

Keyword: Terminal Facilities, Customer Satisfaction, Service Quality

INTRODUCTION

The service industry is undergoing rapid changes in line with advancements and developments in technology, both in terms of the types of services offered and the institutions involved in the industry. One such service-based product is transportation and logistics.

Halim Perdanakusuma International Airport has seen a significant increase in passenger numbers following the COVID-19 pandemic, which has also led to a rise in the frequency of flights at the airport. The growth in the number of users at Halim Perdanakusuma International Airport can be observed in the following table:

Table 1. Passenger Statistics Data for 2017-2023 at Halim Perdanakusuma International Airport

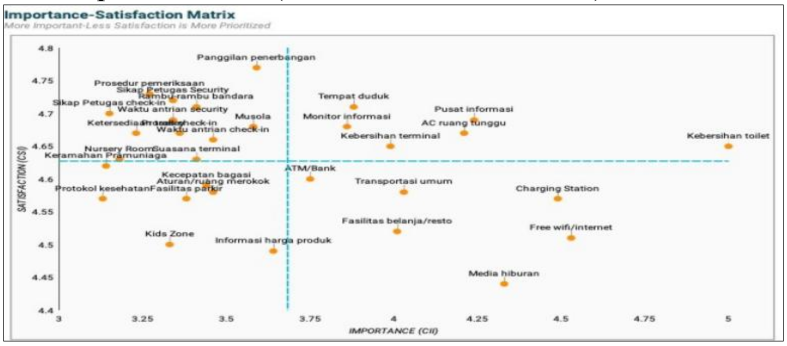
Year	Total Passangers HLP	Growth	Total Pasanggers Indonesia	National Contribution	Description
2023	3.797.868	288.26 %	65.950.181	5.75%	Normal
2022	978.163	-29.80%	56.416.234	1.73%	Revit
2021	1.394.724	-28.10%	33.364.983	4.18%	Normal
2020	1.940.093	-67.90%	35.393.966	5.48%	Normal
2019	6.044.359	-17.08%	79.466.559	7.6%	Normal
2018	7.289.885	93.25%	101.260.614	7.19%	Normal
2017	3.770.586	-	95.401.545	3.95%	Normal

Source : PT Angkasapura Indonesia Branch Bandara Halim Perdanakusuma

Based on the table above, the total number of passengers at Halim Perdanakusuma International Airport over a span of seven years can be observed. The highest number was recorded in 2018, with a total of 7,289,885 passengers an increase of 93.25% compared to the previous year.

In 2023, the airport experienced its highest growth in aircraft movements, rising by 172.27% from 16,211 to 44,138 movements, contributing 8.51% to Indonesia's overall aviation activity. This surge has been accompanied by rising public expectations for improved service quality and airport facilities in the post-pandemic period.

However, this growth has not been fully matched by improvements in service quality and infrastructure, resulting in lower passenger satisfaction in several key areas (Yunanto 2019). One of the main issues affecting passenger satisfaction at Halim Perdanakusuma Airport is the suboptimal performance of basic services and infrastructure, as highlighted in a report by the Indonesian House of Representatives (Komisi V DPR-RI 2022).



Source: Indonesia National Air Carriers Association (INACA)

Figure 1. CSI Matrix Facilities and Services at Halim Perdanakusuma Airport

The INACA survey showed that passenger satisfaction at Halim Perdanakusuma Airport ranged from 4.4 to 4.8, while the importance of the facilities ranged from 3 to 5. Some facilities were seen as very important but had low satisfaction scores. These included: weak Wi-Fi, limited entertainment, dirty dining and shopping areas, poor air conditioning, expensive and unreliable public transport, few charging stations, frequent FIDS errors, not enough seating, crowded parking, unfriendly staff, small toilet capacity, overall cleanliness, and no ATMs or bank services. These problems are commonly experienced by passengers. Therefore, improving key facilities that directly affect passenger comfort is essential. Once basic needs are met, satisfaction is more likely to improve.

METHOD

This study adopts a quantitative approach, which refers to a research method that systematically collects and analyzes numerical data using a scientific framework (Sugiyono, 2021). Quantitative analysis in this research is used to examine the influence between variables, employing a multiple linear regression analysis processed through the Statistical Package for the Social Sciences (SPSS) version 16 for Windows.

The population in this study consists of passengers during the research period who used services at Halim Perdanakusuma Airport. Since the exact number of passengers per day, week, or month is uncertain, the population is considered unknown or infinite. The sampling technique used is accidental sampling, also known as convenience sampling, where respondents are selected based on their availability and willingness to participate. Because the population size is undefined, the sample size was calculated using Cochran's formula (Sugiyono, 2022:142). Based on this calculation, a total of 385 respondents were selected as the sample for this research.

The data used in this study consist of two types: primary data and secondary data. Primary data were collected through questionnaires distributed to respondents, while secondary data were obtained through literature studies such as books, related journals, and previous research relevant to the topic, serving as references to support this study.

RESULTS AND DISCUSSION

Instrument Testing

1. Validity Test

The validity test is conducted by comparing the calculated *r* value (r-count) with the critical value from the *r* table. In this case, the degrees of freedom (df) are calculated as 385 – 2, resulting in df = 383. At a significance level of 0.05, the corresponding *r* table value is 0.1008. If the *r-count* is greater than the *r-table* value and the correlation is positive, the questionnaire item is considered valid.

Table 2. Validity Testing

Variable	Statement Items	r-count	r-table	Description
Electronic Facilities (X1)	X2.1	0.728	0,1008	VALID
	X2.2	0.719	0,1008	VALID
	X2.3	0.714	0,1008	VALID
	X2.4	0.749	0,1008	VALID
	X2.5	0.761	0,1008	VALID
	X2.6	0.689	0,1008	VALID
	X2.7	0.739	0,1008	VALID
	X2.8	0.734	0,1008	VALID
	X2.9	0.769	0,1008	VALID
	X2.10	0.776	0,1008	VALID
IT Facilities (X2)	X3.1	0.779	0,1008	VALID
	X3.2	0.767	0,1008	VALID
	X3.3	0.742	0,1008	VALID
	X3.4	0.770	0,1008	VALID
	X3.5	0.740	0,1008	VALID
	X3.6	0.762	0,1008	VALID
	X3.7	0.729	0,1008	VALID
	X3.8	0.786	0,1008	VALID
	X3.9	0.737	0,1008	VALID
	X3.10	0.703	0,1008	VALID
Infrastructure Facilities (X3)	X4.1	0.726	0,1008	VALID
	X4.2	0.741	0,1008	VALID
	X4.3	0.697	0,1008	VALID
	X4.4	0.743	0,1008	VALID
	X4.5	0.694	0,1008	VALID
	X4.6	0.742	0,1008	VALID
	X4.7	0.759	0,1008	VALID
	X4.8	0.769	0,1008	VALID
	X4.9	0.749	0,1008	VALID
	X4.10	0.696	0,1008	VALID

	X4.11	0.712	0,1008	VALID
	X4.12	0.743	0,1008	VALID
Electrical Facilities (X4)	X5.1	0.727	0,1008	VALID
	X5.2	0.749	0,1008	VALID
	X5.3	0.706	0,1008	VALID
	X5.4	0.685	0,1008	VALID
	X5.5	0.742	0,1008	VALID
	X5.6	0.765	0,1008	VALID
	X5.7	0.678	0,1008	VALID
	X5.8	0.690	0,1008	VALID
	X5.9	0.687	0,1008	VALID
	X5.10	0.763	0,1008	VALID
Service Quality (X5)	X1.1	0.732	0,1008	VALID
	X1.2	0.730	0,1008	VALID
	X1.3	0.769	0,100	VALID
	X1.4	0.744	0,1008	VALID
	X1.5	0.750	0,1008	VALID
	X1.6	0.747	0,1008	VALID
	X1.7	0.753	0,1008	VALID
	X1.8	0.792	0,1008	VALID
	X1.9	0.762	0,1008	VALID
Customer Satisfaction (Y)	Y.1	0.803	0,1008	VALID
	Y.2	0.823	0,1008	VALID
	Y.3	0.815	0,1008	VALID
	Y.4	0.809	0,1008	VALID
	Y.5	0.750	0,1008	VALID
	Y.6	0.779	0,1008	VALID
	Y.7	0.805	0,1008	VALID
	Y.8	0.775	0,1008	VALID
	Y.9	0.807	0,1008	VALID
	Y.10	0.783	0,1008	VALID
	Y.11	0.806	0,1008	VALID
	Y.12	0.792	0,1008	VALID

Source: Research data

From the tables presented, it can be seen that each questionnaire item has a calculated *r* value (*r-count*) greater than the *r-table* value (0.1008) and is positive. Therefore, all items are considered valid.

2. Realibility Test

Table 3. Realibility Test

Variable	Coefficient Realibility	Cronbach Alpha	Description
Electronic Facilities (X1)	10 Item	0.907	Reliable
IT Facilities (X2)	10 Item	0.914	Reliable
Infrastructure Facilities (X3)	12 Item	0.920	Reliable
Electrical Facilities (X4)	10 Item	0.895	Reliable
Service Quality (X5)	9 Item	0.904	Reliable
Customer Satisfaction (Y)	12 Item	0.947	Reliable

Source : Research data

Based on the information in the table above, it is shown that each variable has a Cronbach's Alpha value greater than 0.60. As a result, these variables can be considered reliable.

Classical Assumption Test

1. Normality Test

One-Sample Kolmogorov-Smirnov Test

			Unstandardized Residual
N			385
Normal Parameters[a,b]	Mean		.0000000
	Std. Deviation		2.39154257
Most Extreme Differences	Absolute		.170
	Positive		.141
	Negative		-.170
Test Statistic			.170
Asymp. Sig. (2-tailed)[c]			.200
Monte Carlo Sig. (2-tailed)[d]	Sig.		.105
	99% Confidence Interval	Lower Bound	.098
		Upper Bound	.138

a. Test distribution is Normal.
b. Calculated from data.
c. Lilliefors Significance Correction.
d. Lilliefors' method based on 10000 Monte Carlo samples with starting seed 2000000.

Source: Research data

Figure 2. Normality Test

Based on Table 4.67, the results of the normality test using the Kolmogorov-Smirnov method show a significance value of 0.098, which is greater than 0.05. Therefore, it can be concluded that the regression model in this study meets the normality assumption.

2. Heteroscedasticity Test

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	15.013	1.504		9.985	<.001
	X1	-.106	.058	-.160	-1.832	.068
	X2	-.118	.047	-.194	-2.513	.012
	X3	.060	.033	.105	1.807	.072
	X4	-.019	.045	-.037	-.418	.676
	X5	-.103	.049	-.171	-2.104	.036

a. Dependent Variable: ABS_RES

Source: Research data

Figure 3. Heteroscedasticity Test

Based on Table 4.68, the results of the Glejser test show that the significance values for all independent variables are greater than 0.05. This indicates that there is no heteroscedasticity problem in the data. Therefore, the data meet the requirements to be used in this study.

Multicollinearity Test

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Statistics Tolerance	VIF
1	(Constant)	-24.529	2.202		-11.138	<.001		
	X1	.494	.084	.269	5.851	<.001	.273	3.669
	X2	.485	.068	.288	7.087	<.001	.350	2.859
	X3	.162	.049	.102	3.320	<.001	.613	1.631
	X4	.341	.066	.241	5.182	<.001	.267	3.746
	X5	.170	.072	.101	2.358	.019	.318	3.149

a. Dependent Variable: Y

Source: Research data

Figure 4. Multicollinearity Test

The results of the multicollinearity test are shown in Table 4.69. Based on the analysis, each independent variable has a VIF value less than 10 and a tolerance value greater than 0.10. Therefore, it can be concluded that the regression model does not exhibit multicollinearity.

Multiple Linear Regression Analysis

This analysis is used to determine whether the independent variables have a positive or negative effect on the dependent variable. The statistical calculations for the multiple linear regression analysis in this study were performed using the SPSS software, version 26.

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Statistics Tolerance	Collinearity Statistics VIF
1	(Constant)	-24.529	2.202		-11.138	<.001		
	X1	.494	.084	.269	5.851	<.001	.273	3.669
	X2	.485	.068	.288	7.087	<.001	.350	2.859
	X3	.162	.049	.102	3.320	<.001	.613	1.631
	X4	.341	.066	.241	5.182	<.001	.267	3.746
	X5	.170	.072	.101	2.358	.019	.318	3.149

a. Dependent Variable: Y

Source: Research data

Figure 5. Multiple Linear Regression Analysis

This regression equation illustrates the contribution of each independent variable to passenger satisfaction, with a constant value of -24.529. Overall, all independent variables in the model show a positive relationship with the dependent variable passenger satisfaction indicating that improvements in each independent variable have the potential to increase passenger satisfaction.

Hypothesis Testing

1. T-Test

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Statistics Tolerance	Collinearity Statistics VIF
1	(Constant)	-24.529	2.202		-11.138	<.001		
	X1	.494	.084	.269	5.851	<.001	.273	3.669
	X2	.485	.068	.288	7.087	<.001	.350	2.859
	X3	.162	.049	.102	3.320	<.001	.613	1.631
	X4	.341	.066	.241	5.182	<.001	.267	3.746
	X5	.170	.072	.101	2.358	.019	.318	3.149

a. Dependent Variable: Y

Source: Research data

Figure 6. T Test

The T-test was conducted using a t-table value of 1.966 at a 5% significance level. The results indicate that all independent variables have a positive and significant influence on passenger satisfaction. Electronic Facilities (X1) recorded a t-count of 7.087 with a significance value of 0.001; IT Facilities (X2) had a t-count of 3.320 and a significance of 0.001; Infrastructure Facilities (X3) showed a t-count of 5.182 with a significance of 0.001; Electrical Facilities (X4) had a t-count of 2.358 and a significance of 0.019; and Service Quality (X5) demonstrated a t-count of 5.851 with a significance of 0.001. Since all t-count values are greater than the t-table value and the significance levels are below 0.05, it can be concluded that each of these variables has a direct and statistically significant effect on increasing passenger satisfaction.

2. F-Test

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12813.574	5	2562.715	270.509	<.001[b]
	Residual	3590.530	379	9.474		
	Total	16404.104	384			

a. Dependent Variable: Y

b. Predictors: (Constant), X5, X3, X2, X1, X4

Source: Research data

Figure 7. F Test

Based on the calculation results, the F-count value obtained is 270.509. To determine its significance, a 5% significance level was used with degrees of freedom (df) of 380 for the numerator (385 – 5) and 4 for the denominator (5 – 1). The corresponding F-table value for these degrees of freedom is 2.21. Since the F-count (270.509) is greater than the F-table value (2.21) and the significance value (0.001) is less than 0.05, it can be concluded that, simultaneously, the independent variables have a significant effect on passenger satisfaction.

Coefficient of Determination (R^2)

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.884[a]	.781	.778	3.078

a. Predictors: (Constant), X5, X3, X2, X1, X4

b. Dependent Variable: Y

Source: Research data

Figure 8. Coefficient of Determination (R^2) Test

Based on Table 4.73, the Adjusted R Square (R^2) value obtained is 0.781. This indicates that 78.1% of the variation in customer satisfaction can be explained by the independent variables: Electronic Facilities (X1), IT Facilities (X2), Infrastructure Facilities (X3), Electrical Facilities (X4), and Service Quality (X5). The remaining 21.9% is influenced by other factors not included in this research model.

Discussions

1. **Electronic Facilities (X1):**

Electronic facilities have a positive and significant impact on passenger satisfaction (t = 7.087; *sig.* = 0.001), covering systems such as FIDS, selfcheck-in kiosks, automated announcements, and charging stations. The presence of this technology enhances both comfort and efficiency. This is supported by (Kuo & Jou, 2014), who found that the digitalization of airport facilities strengthens passenger experience and operational efficiency.

2. **IT Facilities (X2):**

IT facilities, including mobile applications, QR code boarding passes, and Wi-Fi, also show a significant effect (t = 3.320; *sig.* = 0.001). Information technology simplifies service access and accelerates the travel process. (Waruwu & Sari, 2024) concluded that the optimal implementation of IT positively influences perceived quality and user satisfaction.

3. **Infrastructure Facilities (X3):**

Infrastructure elements such as waiting areas, departure zones, and parking spaces significantly influence comfort and satisfaction (t = 5.182; *sig.* = 0.001). Clean, ergonomic infrastructure creates a more pleasant travel experience. Prentice & Kadan (2019) observed that well-designed infrastructure enhances users' emotional satisfaction.

4. **Electrical Facilities (X4):**

Electrical facilities, including lighting, air conditioning, and charging points, also contribute significantly to comfort and satisfaction (t = 2.358; *sig.* = 0.019). A comfortable environment in terms of temperature and lighting strengthens passengers' positive perception. (Jazilatur & Laksono, 2024) emphasized that electrical facilities support overall comfort and satisfaction in public spaces.

5. **Service Quality (X5):**

Service quality reflected in friendliness, responsiveness, and clarity of information has a significant influence on passenger satisfaction (t = 5.851; *sig.* = 0.001). Positive, direct interactions greatly enhance the overall perception of service. (Siringoringo et al., 2023), using the SERVQUAL model, demonstrated that human-centered aspects play a key role in determining customer satisfaction levels.

6. **The Simultaneous Influence of All Independent Variables on the Dependent Variable:**

The F-test results show that all five independent variables collectively have a significant influence on passenger satisfaction, with an F-value of 270.509 and a significance level of 0.001. This indicates the strength of the regression model in explaining the overall variability in satisfaction. These findings are consistent with the SERVQUAL model (Parasuraman et al., 1988) and the study by (Ostrowski et al.,1993), which suggest that customer satisfaction in the air transportation sector is shaped by a combination of service elements such as reliability, accessibility, facilities, information, and customer service. From a managerial perspective, this highlights the importance of a holistic approach to airport management, where all dimensions of service must be improved in a synergistic manner to create a consistent, comprehensive, and satisfying customer experience.

CONCLUSION

The findings of this study conclude that all independent variables electronic facilities, IT facilities, infrastructure facilities, electrical facilities, and service quality have a positive and significant impact on customer satisfaction at Halim Perdanakusuma Airport. Electronic facilities such as FIDS and selfcheck-in kiosks contribute to greater efficiency; IT facilities like Wi-Fi and mobile applications improve access to information; infrastructure elements such as comfortable waiting areas and clear signage enhance passenger mobility; and electrical facilities, including proper lighting and temperature control, add to overall comfort. On the other hand, fast, friendly, and professional service quality remains a dominant factor in strengthening the user experience. The simultaneous test (ANOVA) produced an F-value of 270.509 with a significance level below 0.001, confirming that the combination of these five variables collectively and significantly explains customer satisfaction. These results underscore the importance of integrated service management in delivering a holistic and satisfying airport experience.

It is recommended that Injourney Airports place greater focus on enhancing services and optimizing the use of existing facilities at Halim Perdanakusuma Airport. Regular evaluations of facility usage are necessary to ensure their effectiveness. Moreover, this study can serve as a reference for future research, particularly in the Airside area, providing valuable insights for both government and the public in efforts to improve airport services toward a higher standard.

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