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THE INFLUENCE OF SERVICE QUALITY AND PRODUCT QUALITY ON CUSTOMER TRUST AND LOYALTY AT PERUMDA AIR MINUM JAYA (PAM JAYA)

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Abstract:
This research aims to determine the service quality and product quality of customer trust and loyalty of PERUMDA AIR MINUM JAYA (PAM JAYA), both directly and through intervening variables or indirect effects. This study uses a quantitative approach to explain the positions of the variables studied and the relationships between one variable and another. This research will demonstrate the causal relationships between variables through hypothesis testing. The data analysis technique is SEM-PLS with a total sample size. The study results show that all seven hypotheses proposed in the SEM-PLS model are accepted. This research implies that the management of PERUMDA AIR MINUM JAYA (PAM JAYA) is advised to conduct regular training for employees to improve their ability to provide responsive and professional services.

Keywords: Service Quality, Product Quality, Trust, Customer Loyalty

INTRODUCTION

PDAM is a government entity primarily providing clean water services to satisfy the public. PDAM (Perusahaan Daerah Air Minum) in Indonesia is actively engaging private sector participation, as PDAM is struggling to meet the increasing demand for clean water, according to data from the Directorate General of Human Settlements of the Public Works Department, which oversees clean water, 445 PDAMs across Indonesia as of December 1997, serving only 18% of the population, or 37.2 million people. However, PDAM's customers have increased by approximately 11.9% annually, reaching a peak in 2012 when national drinking water services could only cover 59.09% of the population. Despite this achievement, there remains a gap of 10.78%, equivalent to 33.5 million people, to meet the MDG target of 68.67% by the end of 2015. According to the 2010-2014 Development Plan, the government set a target of 70% for drinking water services (Maimuna et al., 2020).

PDAM in Indonesia faces many water-providing obstacles, leading to public dissatisfaction with the services rendered. Therefore, there is an opportunity for private companies, especially those in the clean water supply industry, to improve their services and assist public enterprises. One private company with a business segment similar to PDAM is PAM JAYA, which can provide services through its Regional Offices and Business Area Offices (AB) in various locations. The scope of service for PAM JAYA in providing clean water to the public is quite extensive, and the number of PAM JAYA customers continues to increase. However, the number of inactive connections at PAM JAYA has shown significant fluctuations, particularly between 2021 and 2022. Numerous complaints received through customer care and social media indicate that the quality of service could be more optimal. Complaints are one of the customer actions often referred to as consumer behavior. According to Kotler and Keller (2009), consumer behavior is the study of how individuals, groups, and organizations select, buy, use, and dispose of goods, services, ideas, or experiences to

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satisfy their wants and needs. Expectancy Confirmation Theory (ECT) explains the process of forming satisfaction or dissatisfaction of a consumer after using a particular service or product. It occurs due to the influence of the difference between reality and expectations (Laetitia et al., 2021).

According to Fandy Djiptono (2008), service is anything done by one party (individual or group) for another party (individual or group). There are five dimensions of the ServQual (Service Quality) model developed by Parasuraman, Zeithaml, and Berry, as cited by Zeithaml and Bitner (2000): tangible (physical evidence), reliability, responsiveness, assurance, and empathy. According to Davis and Yamit (2010), quality is a dynamic condition related to products, services, people, processes, and the environment that meets or exceeds expectations. According to Kotler and Keller (2009:143), quality is the totality of features and characteristics of a product or service that depends on its ability to satisfy stated or implied needs. Customer trust is the willingness of a person to rely on another party where we have confidence in them.

According to Tjiptono and Chandra (2011), loyalty is when consumers show a positive attitude toward a product or producer (service provider) accompanied by a consistent pattern of repeat purchases. According to Utami (2006), customer loyalty means the customer's commitment to shop at the company's location. According to Evan and Laskin in Ika Pratiwi and Sugiarto (2010), a loyal customer makes repeat purchases from the same company and informs potential consumers. Public complaints about PAM JAYA's services include leaking pipes, water outages, low pressure, cloudy water, and broken seals. Upon closer inspection, frequent technical disruptions or long recovery after problems can erode customer trust in PAM JAYA's reliability. These issues impact customers' decisions to unsubscribe from PAM JAYA.

Based on this, researching the dimensions and attributes related to service quality is exciting and essential because this issue concerns both consumers and the company's partners, ensuring that consumers truly feel satisfied. Therefore, this study aims to identify and prove the influence of service quality on customer trust, the influence of product quality on customer trust, the influence of customer trust on customer loyalty, the influence of service quality on customer loyalty, the influence of product quality on customer loyalty, and the influence of service quality on loyalty through customer trust. This research is also expected to enhance the understanding of the importance of maintaining customer trust to improve service quality and support the increase of customer loyalty at PAM JAYA.

METHODS

This type of descriptive quantitative research aims to clarify the elements detailed from the outset (Prasetyadewi et al., 2024). It involves systematic research steps using a sample whose results are applied to the population, has hypotheses, has a straightforward design with research steps and expected results, requires representative data collection, and includes data analysis conducted after all data is collected.

Variables. This study involves two independent variables, service quality and product quality, one mediating variable, trust, and one dependent variable, loyalty.

Population. This study's population comprises PAM JAYA customers in the DKI Jakarta area. The minimum sample size is 135 respondents. The sampling method used is non-probability sampling, specifically purposive sampling, which involves distributing questionnaires to potential respondents, including the author's relatives, friends, and acquaintances. These potential respondents are indicated as customers/users of PAM JAYA's piped water.

RESULT AND DISCUSSION

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Descriptive Statistics of Variables.

Table 1. Description of the Service Quality Variable

Indicator	STS	TS	N	S	SS	Mean	Grand Mean
X1.1	0	16	39	96	54	3.92	4.09
X1.2	0	3	37	89	76	4.16	
X1.3	0	9	31	111	54	4.02	
X1.4	0	12	31	94	68	4.06	
X1.5	1	10	13	85	96	4.29	
X1.6	1	4	22	95	83	4.24	
X1.7	0	0	58	103	44	3.93	
X1.8	0	0	30	122	53	4.11	

Source: Data processed with MS Excel (2024)

Based on Table 1 above, the average responses from respondents for each indicator of the service quality variable (X1) are as follows: X1.1 is 3.92; X1.2 is 4.16; X1.3 is 4.02; X1.4 is 4.06; X1.5 is 4.29; X1.6 is 4.24; X1.7 is 3.93; and X1.8 is 4.11. The overall average value of all indicators is 4.09, indicating that, on average, respondents in this study expressed "Agree" towards the service quality variable.

Table 2. Description of the Product Quality Variable

Indicator	STS	TS	N	S	SS	Mean	Grand Mean
X2.1	0	0	49	100	56	4.03	3.97
X2.2	0	6	35	104	60	4.06	
X2.3	6	1	21	115	62	4.10	
X2.4	0	2	41	109	53	4.04	
X2.5	6	4	69	83	43	3.75	
X2.6	0	7	41	114	43	3.94	
X2.7	6	6	27	117	49	3.96	
X2.8	1	13	41	111	39	3.85	

Source: Data processed with MS Excel (2024)

Based on Table 2 above, the average responses from respondents for each indicator of the product quality variable (X2) are as follows: X2.1 is 4.03; X2.2 is 4.06; X2.3 is 4.10; X2.4 is 4.04; X2.5 is 3.75; X2.6 is 3.94; X2.7 is 3.96; and X2.8 is 3.85. The overall average value of all indicators is 3.97, indicating that, on average, respondents in this study expressed "Agree" towards the product quality variable.

Table 3. Description of the Trust Variable

Indicator	STS	TS	N	S	SS	Mean	Grand Mean
Z.1	0	5	20	83	97	4.33	4.28
Z.2	0	0	28	83	94	4.32	
Z.3	0	0	36	77	92	4.27	
Z.4	0	3	27	76	99	4.32	
Z.5	0	0	33	95	77	4.21	
Z.6	0	9	17	100	79	4.21	

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Source: Data processed with MS Excel (2024)

Based on Table 3 above, the average responses from respondents for each indicator of the trust variable (Z) are as follows: Z.1 is 4.33; Z.2 is 4.32; Z.3 is 4.27; Z.4 is 4.32; Z.5 is 4.21; and Z.6 is 4.21. The overall average value of all indicators is 4.28, indicating that, on average, respondents in this study expressed "Agree" towards the trust variable.

Table 4. Description of the Loyalty Variable

Indicator	STS	TS	N	S	SS	Mean	Grand Mean
Y.1	0	1	24	105	75	4.24	
Y.2	0	2	39	104	60	4.08	
Y.3	0	5	60	82	58	3.94	4.12
Y.4	0	1	30	118	56	4.12	
Y.5	0	8	14	111	72	4.20	

Source: Data processed with MS Excel (2024)

Based on Table 4 above, the average responses from respondents for each indicator of the loyalty variable (Y) are as follows: Y.1 is 4.24; Y.2 is 4.08; Y.3 is 3.94; Y.4 is 4.12; and Y.5 is 4.20. The overall average value of all indicators is 4.12, indicating that, on average, respondents in this study expressed "Agree" towards the loyalty variable.

Structural Equation Modelling Analysis (SEM-PLS). The data analysis used in this study is Structural Equation Modeling (SEM) with the help of SmartPLS 3.0, aimed at proving the presence or absence of correlations between the independent and dependent variables. The results of the SEM-PLS analysis are as follows:

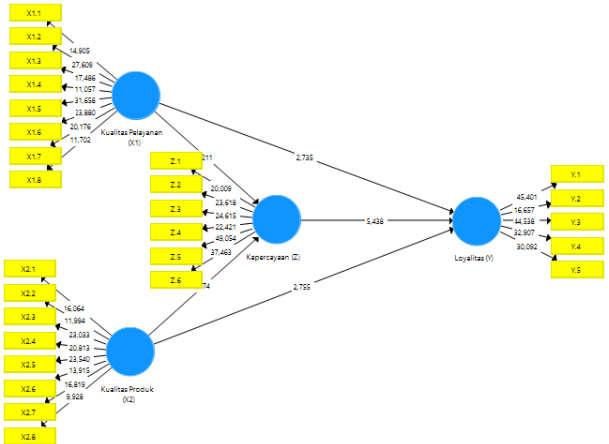

Figure 1. SEM-PLS Model

Outer Model Test (Measurement Model). The tests conducted on the outer model include validity testing and reliability testing.

Table 5. Loading Factors Results

Construct	Indicator	Outer Loading Value	Description
Service Quality (X_1)	X1.1	0,708	Valid
	X1.2	0,748	Valid

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Product Quality (X_2)	X1.3	0,725	Valid
	X1.4	0,708	Valid
	X1.5	0,832	Valid
	X1.6	0,774	Valid
	X1.7	0,710	Valid
	X1.8	0,634	Valid
	X2.1	0,640	Valid
	X2.2	0,699	Valid
	X2.3	0,790	Valid
	X2.4	0,708	Valid
	X2.5	0,821	Valid
	X2.6	0,663	Valid
	X2.7	0,781	Valid
	X2.8	0,677	Valid
Trust (Z)	Z.1	0,831	Valid
	Z.2	0,688	Valid
	Z.3	0,813	Valid
	Z.4	0,817	Valid
	Z.5	0,840	Valid
	Z.6	0,783	Valid
Loyalty (Y)	Y.1	0,829	Valid
	Y.2	0,852	Valid
	Y.3	0,795	Valid
	Y.4	0,855	Valid
	Y.5	0,776	Valid

Based on Table 5 above, each indicator used in this research model is valid because the loading factor values are > 0.60. Each indicator can be measured and correlated with its latent variable. Thus, this study has 27 indicators.

Table 6. AVE Results

Construct	AVE
Service quality (X_1)	0,665
Product quality (X_2)	0,535
Trust (Z)	0,526
Loyalty (Y)	0,639

Based on Table 6 above, the AVE (Average Variance Extracted) values are as follows: service quality is 0.665, product quality is 0.535, trust is 0.526, and loyalty is 0.639. Therefore, it can be stated that all AVE values are > 0.50, indicating that each construct has sufficient variance to explain the construct.

Table 7. Cross Loadings Results

Indicator	Trust (Z)	Service Quality (X1)	Product Quality (X2)	Loyalty (Y)
X1.1	0,381	**0,708**	0,357	0,366
X1.2	0,578	**0,748**	0,446	0,490
X1.3	0,407	**0,725**	0,422	0,419

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X1.4	0,391	**0,708**	0,452	0,468
X1.5	0,507	**0,832**	0,433	0,536
X1.6	0,467	**0,774**	0,479	0,540
X1.7	0,393	**0,710**	0,515	0,443
X1.8	0,323	**0,634**	0,449	0,366
X2.1	0,403	0,559	**0,640**	0,487
X2.2	0,246	0,470	**0,699**	0,335
X2.3	0,515	0,559	**0,790**	0,557
X2.4	0,333	0,346	**0,708**	0,337
X2.5	0,315	0,366	**0,821**	0,399
X2.6	0,353	0,354	**0,663**	0,337
X2.7	0,446	0,448	**0,781**	0,407
X2.8	0,386	0,313	**0,677**	0,283
Y.1	0,730	0,578	0,472	**0,831**
Y.2	0,433	0,447	0,358	**0,688**
Y.3	0,492	0,415	0,414	**0,813**
Y.4	0,461	0,433	0,484	**0,817**
Y.5	0,501	0,597	0,504	**0,840**
Z.1	**0,783**	0,311	0,359	0,338
Z.2	**0,829**	0,444	0,442	0,388
Z.3	**0,852**	0,419	0,396	0,388
Z.4	**0,795**	0,357	0,313	0,353
Z.5	**0,855**	0,607	0,459	0,698
Z.6	**0,776**	0,602	0,533	0,799

Based on Table 7 above, the outer loading values for each indicator concerning its construct are higher than the outer loading values concerning other constructs. It indicates that each indicator used to measure a construct has explanatory solid power or correlation with its construct.

Table 8. Fornell-Larcker Results

Construct	Trust (Z)	Service Quality (X1)	Product Quality (X2)	Loyalty (Y)
Trust (Z)	**0,815**			
Service Quality (X1)	0,599	**0,732**		
Product Quality (X2)	0,534	0,605	**0,725**	
Loyalty (Y)	0,671	0,627	0,562	**0,800**

Based on Table 8 above, the Average Variance Extracted (√AVE) square root for each construct is greater than the correlations between the construct and other constructs. The model has good discriminant validity, as √the AVE for each construct is larger than the correlations between the construct and other constructs.

Table 9. HTMT Results

Construct	Trust (Z)	Service Quality (X1)	Product Quality (X2)	Loyalty (Y)
Trust (Z)	-	-	-	-
Service Quality (X1)	0,613	-	-	-

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Product Quality (X2)	0,554	0,679	-	-
Loyalty (Y)	0,665	0,706	0,624	-

Based on Table 9 above, it can be seen that the HTMT (Heterotrait-Monotrait Ratio) values for each variable are < 0.90, indicating that each indicator within a construct has different discriminant validity compared to indicators in other constructs.

Table 10. Reliability Test Results

Construct	Cronbach's Alpha	Composite Reliability
Trust (Z)	0,905	0,922
Service Quality (X1)	0,875	0,902
Product Quality (X2)	0,870	0,898
Loyalty (Y)	0,858	0,898

Table 10 above shows that the Cronbach's Alpha and Composite Reliability values for each construct are > 0.70, indicating that all constructs have good reliability. Thus, the outer model meets the criteria for good measurement results.

Inner Model Test (Structural Model).

Table 11. R-Square Results

Variable	R Square	R Square Adjusted
Trust (Z)	0,406	0,400
Loyalty (Y)	0,547	0,540

Based on Table 11 above, the R-Square values are as follows: the R-Square for the trust variable is 0.406, which falls into the weak category, and the R-Square for the loyalty variable is 0.547, which falls into the moderate category.

Table 12. F-Square (Effect Size) Results

Construct	Trust (Z)	Loyalty (Y)
Service Quality (X1)	0,202	0,087
Product Quality (X2)	0,078	0,040
Trust (Z)	-	0,224

Based on Table 12 above, the F-Square values are as follows: the F-Square for service quality on trust is 0.202, and on loyalty, it is 0.087. The F-Square for product quality on trust is 0.078, and on loyalty, it is 0.040. The F-Square for trust on loyalty is 0.224. Thus, all F-Square values fall into the moderate category.

Table 13. Q-Square Results

Variable	Q^2
Trust (Z)	0,238
Loyalty (Y)	0,330

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Based on Table 13 above, the Q2 value for the trust variable (Z) is 0.238, and the Q2 value for the loyalty variable (Y) is 0.330. Thus, since all Q2 values are more significant than zero, the structural model in this study exhibits Predictive Relevance.

Model Fit Test.

Table 14. Model Fit Test Results

Model Fit Measure	Saturated Model	Estimated Model
SRMR	0,102	0,102
d ULS	3,939	3,939
d_G	1,452	1,452
Chi-Square	1,443,250	1,443,250
NFI	0,644	0,644

Based on Table 14 above, the SRMR (Standardized Root Mean Square Residual) value is < 0.120, indicating that the model fits well and meets the goodness of fit criteria.

Hypothesis Testing.

Table 15. Hypothesis Testing Results

Relationship Between Construct	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	*P values*	Description
			Direct Effect			
X1 -> Y	0,274	0,273	0,103	2,664	0,008	**Accepted**
X2 -> Y	0,176	0,184	0,059	2,958	0,003	**Accepted**
Z -> Y	0,413	0,404	0,079	5,220	0,000	**Accepted**
X1 -> Z	0,435	0,434	0,084	5,185	0,000	**Accepted**
X2 -> Z	0,271	0,276	0,071	3,842	0,000	**Accepted**
			Indirect Effect			
X1 -> Z -> Y	0,180	0,172	0,035	5,063	0,000	**Accepted**
X2 -> Z -> Y	0,112	0,113	0,039	2,892	0,004	**Accepted**

Based on the results of all hypothesis tests above, it was found that out of the seven hypotheses, one hypothesis was rejected, while six hypotheses were accepted. The service quality variable significantly affects loyalty at PAM JAYA in the Jakarta region. Two statistical test criteria indicate it: a t-statistic value of 2.664 > 1.96 and a p-value of 0.008 < 0.05. Therefore, the first hypothesis is accepted. Customers who perceive high-quality service tend to feel satisfied and loyal to the company (Oktaviari et al., 2023). The product quality variable significantly affects loyalty at PAM JAYA in the Jakarta region. Two statistical test criteria indicate it: a t-statistic value of 2.958 > 1.96 and a p-value of 0.003 < 0.05. Therefore, the second hypothesis is accepted. Consumers who are satisfied with product quality are often more likely to recommend the service to others. The trust variable significantly affects loyalty at PAM JAYA in the Jakarta region. Two statistical test criteria indicate a t-statistic value of 5.220 > 1.96 and a p-value of 0.000 < 0.05. Therefore, the third hypothesis is accepted. Customers who believe PAM JAYA will meet their needs without issues are likelier to remain loyal.

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The service quality variable significantly affects trust at PAM JAYA in the Jakarta region. Two statistical test criteria indicate it: a t-statistic value of 5.185 > 1.96 and a p-value of 0.000 < 0.05. Therefore, the fourth hypothesis is accepted. Customers who feel that their complaints and inquiries are handled promptly and professionally will be more likely to trust the company. The product quality variable significantly affects trust at PAM JAYA in the Jakarta region. Two statistical test criteria indicate a t-statistic value of 3.842 > 1.96 and a p-value of 0.000 < 0.05. Therefore, the fifth hypothesis is accepted. If customers feel that the product they receive (in this case, clean water) is always high-quality and consistent, they are more likely to trust PAM JAYA as a reliable provider.

The service quality variable significantly affects loyalty through trust at PAM JAYA in Jakarta (Dharma et al., 2023). Two statistical test criteria indicate it: a t-statistic value of 5.063 > 1.96 and a p-value of 0.000 < 0.05. Therefore, the sixth hypothesis is accepted. Customers who receive high-quality service are more likely to trust the company. This trust then strengthens their loyalty to the company. The service quality variable significantly affects loyalty through trust at PAM JAYA in Jakarta. Two statistical test criteria indicate it: a t-statistic value of 2.892 > 1.96 and a p-value of 0.004 < 0.05. Therefore, the seventh hypothesis is accepted. When customers believe that the product they receive (in this case, clean water) is always high-quality and consistent, they are more likely to trust PAM JAYA.

Mediation Effect Test.

Table 16. Mediation Effect Test Results

Mediation Pathways	P_1	P2	P3
Service Quality (X1) -> Trust (Z) -> Loyalty (Y)	Significant (+)	Significant (+)	Significant (+)
Product Quality (X2) -> Trust (Z) -> Loyalty (Y)	Significant (+)	Significant (+)	Significant (+)

Based on the table above, it is found that the effects of mediation on service quality (H6) and product quality (H7) fall into the complementary category (partial mediation). Upsilon (v) will measure the mediation effects, which will be calculated by squaring each path. The following are the results of the mediation effect size test using upsilon statistics:

Table 17. Mediation Effect Test Results

Path of Influence	Upsilon Statistics (v)	Description
Service Quality (X1) -> Trust (Z) -> Loyalty (Y)	$(0,435)^2 \times (0,413)^2 = 0,032$	Low Mediation Effect
Product Quality (X2) -> Trust (Z) -> Loyalty (Y)	$(0,271)^2 \times (0,413)^2 = 0,012$	Low Mediation Effect

According to the table above, the upsilon (v) mediation effect statistics refer to Cohen's recommendations in Ogbeibu et al. (2020): 0.175 (high mediation effect), 0.075 (medium mediation effect), and 0.01 (low mediation effect). Based on the calculations, trust has a low mediation effect on service quality and a high mediation effect on product quality.

CONCLUSION

Based on the analysis results, it can be concluded that the research titled "The Influence of Service Quality and Product Quality on Customer Trust and Loyalty at Perumda Air Minum Jaya

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(PAM JAYA)" finds that service quality, product quality, and trust have a significant impact on customer loyalty at PAM JAYA. Additionally, service and product quality significantly impact customer trust at PAM JAYA. Likewise, service quality significantly affects loyalty through customer trust at PAM JAYA, and product quality significantly affects loyalty through customer trust at PAM JAYA.

In line with the conclusions above, the researcher suggests that PAM JAYA management should improve service quality, enhance product quality, build customer trust, and increase customer loyalty. Future research could explore different research subjects with similar models to confirm the theory further. Additionally, researchers are encouraged to include moderating variables such as age, income level, and education level to assess whether customers have different perceptions across customer profiles.

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