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The Effect of Service Quality and Service Innovation on Customer Satisfaction at PT PLN (Persero) ULP Teluk Betung

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A B S T R A C T

This research uses quantitative methods, involving 100 respondents as samples. During this process, the instruments in the study were tested for validity and reliability. Followed by a classic assumption test consisting of normality test and multicollinearity test. Furthermore, hypothesis testing includes multiple linear regression analysis, coefficient of determination (R2), t test and f test. The purpose of this study was to determine whether service quality and service innovation affect customer satisfaction at PT PLN (Persero) ULP Teluk Betung. In this study, Service Quality affects Customer Satisfaction. This shows that the hypothesis is accepted. The value of Service Quality t count is 4.246> from t table 1.984. The results showed that Service Quality significantly affected Customer Satisfaction, Service Quality was rated positively in multiple regression analysis. The results of the study Service Innovation has a positive and significant effect on Customer Satisfaction, meaning that the hypothesis is accepted. The t test results show that the t value of Service Innovation is greater than the t table (7.256> 984). In multiple regression analysis, Service Innovation has a positive value on Customer Satisfaction. PLN is a state-claimed business that is delegated as a provider of electricity. Therefore, it needs a lot of innovation to attract new customers and service quality must be the main focus because it can create customer satisfaction and will affect customer loyalty.

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INTRODUCTION

Competition in the business world is getting tighter, requiring company management to be more careful in determining its competitive strategy, in order to win the competition it faces. Company management is required to be able to design and implement marketing strategies that are able to create, maintain and improve service quality to customer satisfaction, which in turn can create high customer loyalty to the products offered. The company's success in providing quality service can be determined by the service quality approach that has been developed by Parasuraman, et al in Lupiyoadi (2013: 181).

PLN is a state-claimed business that is delegated as a provider of electricity. Based on the results of observations and interviews, there are several complaints at PT PLN (Persero) ULP Teluk Betung, namely soaring electricity bills, differences in meter records, as well as electricity tokens that fail input and blocked kwh meters. So there needs to be an improvement in the quality of these services. Furthermore, the lack of socialization about Many customers do not know about PLN's service innovations, such as the PLN Mobile application and other programs. This leads to a low level of usage of PLN's innovative services. Therefore, more innovation is needed to attract new customers and develop ties with existing customers. The Company strives to develop the availability of electricity for power system units, improve the network and bring updates to products and facilities applied across all service units.

In January 2008, PLN developed a data update-based assistance called prepaid electricity. Prepaid electricity has become an individual's number one decision to oversee electricity usage. The utilization of prepaid electricity benefits customers because with the service customers can regulate electricity usage and can set a budget for monthly electricity costs. In addition, customers are free from late disconnection penalties and automatically overcome complaints about inaccurate meter readings by officers. With this prepaid system, things that are not desirable will not happen again, so that between customers and PLN have a good relationship. In addition, people who use prepaid electricity can save more on electricity usage every day, because the control of electricity usage is entirely in the hands of the customer.

One of the factors that can affect customer satisfaction is service quality. Therefore, service quality must be the main focus of attention for PT PLN (Persero) ULP Teluk Betung because it can create customer satisfaction and will affect customer loyalty. Good or bad service quality of goods or services depends on the company's ability to consistently meet customer expectations. Satisfied customers will indirectly create loyalty, and encourage word of mouth recommendations, and can even improve the company's image in the eyes of customers.

According to previous research Prasetya et al. (2022) found that service quality and service innovation simultaneously and partially affect customer satisfaction. Rahman, S. (2019). Service quality and innovation simultaneously affect customer satisfaction at PT PLN (Persero) Manado area. Effendi, R, et al. (2019). There is a significant relationship between innovation and customer satisfaction. Risdah (2023) found that service quality and service innovation simultaneously and partially affect customer satisfaction. Mulyani & Yulianti (2023) found that service innovation and service quality simultaneously and

partially affect customer satisfaction. This research is a hypothesis that states that the level of service quality of PT PLN (Persero) affects customer satisfaction in the Surabaya service area can be accepted. Saerang et al. (2018) From the research results obtained that service quality has a positive and significant effect on customer satisfaction.

Based on the description above, the authors draw conclusions with the formulation of the problem:

1. Can service quality affect customer satisfaction at PT PLN (Persero) ULP Teluk Betung?
2. Can customer satisfaction at PT PLN (Persero) ULP Teluk Betung be influenced by service quality?
3. Is customer satisfaction at PT PLN (Persero) ULP Teluk Betung influenced by service quality and service innovation?

Research Objectives

1. Knowing the effect of service quality on customer satisfaction at PT PLN (Persero) ULP Teluk Betung.
2. Knowing the effect of service innovation on customer satisfaction at PT PLN (Persero) ULP Teluk Betung.
3. Knowing the effect of service quality and service innovation on customer satisfaction at PT PLN (Persero) ULP Teluk Betung.

LITERATURE REVIEW

Service Quality

According to Tjiptono (2015: 121) Service quality is a measure of how good the level of service provided is able to match customer expectations. Based on this definition, service quality can be realized through fulfilling customer needs and desires and the accuracy of their delivery to balance customer expectations. Parasuraman, et al. (in Kotler, 2016) states that there are five dimensions of service quality that affect customer satisfaction, namely tangibles (physical evidence), reliability, responsiveness, assurance, empathy.

Service Innovation

Owano et al., (2014) explain that service innovation is in the form of service products or service processes in the application of several technologies and systematic methods. Chen et al. (2016) suggest that service innovation has become an increasingly important consideration for companies, emphasizing innovative service initiatives, adoption and implementation of market concepts and value-added chains, with sustainable goals. Forms of service innovation can be in the form of mobile application development, online service development, new product and service development.

Customer Satisfaction

Customer satisfaction is the level of feeling happy or disappointed with the customer for the service received. Kotler in Cashmere (2017: 236) argues that customer decisions are an assessment of the customer's use of goods or services compared to expectations before their use. (Tjiptono 2014: 101) Customer

satisfaction can be measured through several indicators, such as the level of customer perception of service quality, the level of customer loyalty, the level of willingness to recommend.

Framework of Thinking

The purpose of this study is to determine whether or not there is a relationship between the independent variables, namely service quality (x1) and service innovation (x2), and the dependent variable, namely customer satisfaction (y). The following is the framework used to formulate the hypothesis of this study:

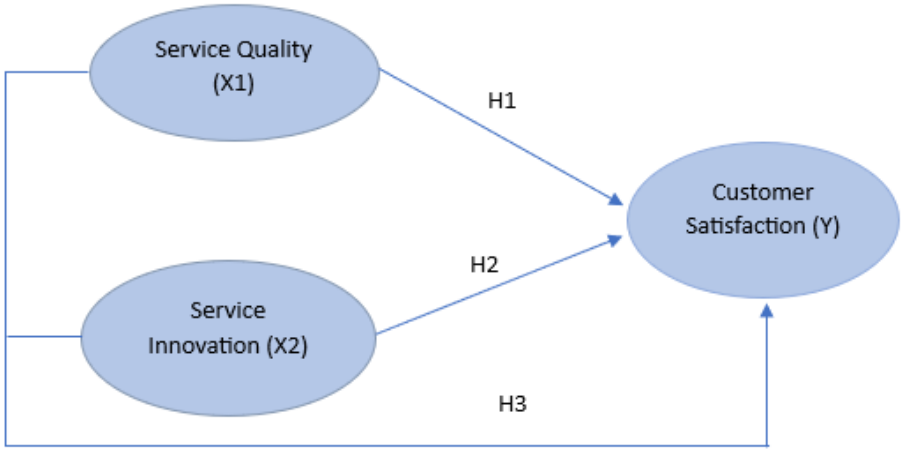

Figure 1. Framework of Thinking
Source: Rahman, S. (2019)

Based on the theoretical review of the literature described above, the research hypotheses proposed are:

1. H1 : Service quality has a significant positive effect on customer satisfaction of PT PLN (Persero) ULP Teluk Betung.
2. H2 : Service innovation has a significant positive effect on customer satisfaction of PT PLN (Persero) ULP Teluk Betung.
3. H3 : Service quality and service innovation have a significant positive effect on customer satisfaction of PT PLN (Persero) ULP Teluk Betung.

METHODOLOGY

This type of research is quantitative research with the scope of discussing "The Effect of Service Quality and Service Innovation on Customer Satisfaction at PT PLN (Persero) ULP Teluk Betung".

Research Variables

This study uses three variables, namely:

1. Independent variables are some factors or signs that determine or influence whether other symptoms or factors exist or appear, such as service quality (x1) and innovation (x2).

2. The dependent variable is a group of signs or factors that exist or appear to be influenced or determined by the presence of certain independent variables, namely customer satisfaction (y).

Type and Source of Data

The data used in this study are as follows:

1. Primary data, which comes from data collected directly by researchers; this can also be referred to as "field research", because researchers will get information from the subjects to be studied directly in the field, namely customers of PT PLN (Persero) ULP Teluk Betung.
2. Secondary data, which comes from data obtained from pre-existing sources. Such as journals, articles, websites, and books.
3.

Population and Sample

According to Sugiyono (2014), population is a generalization area consisting of subjects or objects that have certain quantities and characteristics that have been determined by researchers to study and then draw conclusions. In this study, the population is all prepaid electricity customers of PT PLN (Persero) ULP Teluk Betung. Sample The author determines the sample members used in this research method are 100 respondents. In this study, the sampling method used was the "Simple Random Sampling" method, because all assumptions of the population were made randomly in other words the population was considered equal.

Data Collection Methods

A questionnaire, also called a poll, is a research tool consisting of a series of questions intended to collect data from the person being surveyed. This can be done personally via the internet, telephone, computer, or post (Mcleod, 2023). Next, a questionnaire is created and its validity and credibility are tested. Validity testing is done to ensure the research instrument is valid or not. Valid indicates that the tool can be used to measure what should be measured. Based on the data above, the items of each variable given to respondents are declared valid if Rcount is greater than Rtabel. Reliability testing is carried out to turn on the ability of measuring instruments to produce reliable or trusted data. Cronbach Alpha was used to spread the reliability of this study. The criteria for answering the questionnaire based on the assessment are as follows:

Table 1. Statement and Rating Weight

STATEMENT	SYMBOL	WEIGHT
Strongly Agree	SS	5
Agree	S	4
Neutral	N	3
Disagree	TS	2
Strongly Disagree	STS	1

Source: Anisa, M. (2020)

Classical Assumption Test

Normality Test

According to Ghozali in Alharits & Wahyono, (2022) the purpose of this normality test is to test whether the confounding or residual variables in a regression model have a normal distribution.

Multicolonierity Test

According to Ghozali in Putri & Susanti, (2022) Multicollinearity testing is the process of analyzing how existing regression equations relate to each other as independent variables. To see the presence of multicollinearity in the regression equation, it can be determined by using the tolerance value and the variational inflation factor (VIF). If the VIF value is below or < 10 and the Tolerance value is above > 0.1, it can be concluded that multicolonierity does not occur.

Heteroscedasticity Test

A condition where there is an inequality of variance from the residuals for all observations in the regression model. How to test with the Glejser Test. The test is done by regressing the independent variables on the absolute residual value. Residual is the difference between the value of variable Y and the predicted value of variable Y, and absolute is the absolute value (all positive values). If the significance value between the independent variable and the absolute residual> 0.05 then there is no heteroscedasticity.

Hypothesis Test

Partial Test (t Test)

To determine whether the independent variable (X) and the dependent variable (Y) have a partial influence on each other, the t test is performed. The probability value of the independent variable is used to determine its significance to the dependent variable.

Concurrent Significance Test (F Statistical Test). The purpose of the F test is to initiate a regression model relating to the influence of all independent variables and the dependent variable simultaneously. The results are measured with a significance level of 5% or 0.05. The F test is conducted as follows:

1. Determine the formulation of the null hypothesis and alternative hypothesis: Ho: b = b = 0, meaning there is no effect of X1.
2. Make a decision based on the F-count test. If the probability of the F-count error rate is less than 5%, Ho is rejected and Ha is accepted; otherwise, if the probability of the F-count error rate is more than 5%, Ho is accepted and Ha is rejected, which indicates that the independent variables do not affect the dependent variable simultaneously.

Coefficient of determination

This study uses the coefficient of determination (R2) to measure how well the independent variables (Service Quality and Service Innovation) can explain the dependent variable (customer satisfaction). The coefficient of determination ranges from zero to one. A lower R2 value (close to zero) indicates that the ability of the independent variable to explain the dependent

variable is very limited or the effect is very small. Conversely, a larger R2 value (close to one) indicates that the independent variables provide almost all the information needed to predict the dependent variation or have a significant influence. To see how much the contribution of variables X1 (service quality) and X2 (service innovation) to Y (customer satisfaction).

RESEARCH RESULT

Respondents' Responses

Table 2. Frequency Distribution of Service Quality (X1)

Interval	Category	F	%
36-41	Very good	48	48
30-35	Good	32	32
23-29	Fair	14	14
16-22	Not Good	5	5
9-15	Very unfavorable	1	1
Total		100	100

Source: Data processed 2024

From the table presented above, out of 100 respondents, it can be concluded that 48 respondents or 48% stated that the Service Quality was in a very good category, 32% categorized it as good, then 14% categorized it as sufficient, then only 5% categorized it as not good and 1% categorized it as very bad. So it can be concluded that the Quality of Service is in the very good category.

Table 3. Frequency Distribution of Service Innovation (X2)

Interval	Category	F	%
42-49	Very good	25	25
34-41	Good	62	62
26-33	Fair	7	7
18-25	Not Good	5	5
10-17	Very unfavorable	1	1
Total		100	100

Source: Data processed 2024

From the table presented above, out of 100 respondents, it can be concluded that 25 respondents or 25% stated that Service Innovation was in a very good category, 62% categorized it as good, then 7% categorized it as sufficient, then only 5% categorized it as not good and 1% categorized it as very bad. So it can be concluded that the Service Innovation is in the good category.

Table 4. Frequency Distribution of Customer Satisfaction (Y)

Interval	Category	F	%
42-49	Very good	31	31
34-41	Good	56	56
26-33	Fair	8	8
18-25	Not Good	4	4
10-17	Very unfavorable	1	1
Total		100	100

Source: Data processed 2024

From the table presented above, out of 100 respondents, it can be concluded that 31 respondents or 31% stated Customer Satisfaction (Y) in the very good category, 56% categorized it as good, then 8% categorized it as sufficient, then only 4% categorized it as not good and 1% categorized it as very bad. So it can be concluded that Customer Satisfaction is in the good category.

Validity Test

The following are the results of testing the validity of the research variables:

Table 5. Validity Test

Variable	Indicator	R.Count	R.Table	Description
Service Quality	X1.1	0,625	0,1966	Valid
	X1.2	0,487	0,1966	Valid
	X1.3	0,711	0,1966	Valid
	X1.4	0,748	0,1966	Valid
	X1.5	0,768	0,1966	Valid
	X1.6	0,763	0,1966	Valid
	X1.7	0,784	0,1966	Valid
	X1.8	0,664	0,1966	Valid
	X1.9	0,593	0,1966	Valid
Service Innovation	X2.1	0,708	0,1966	Valid
	X2.2	0,598	0,1966	Valid
	X2.3	0,800	0,1966	Valid
	X2.4	0,776	0,1966	Valid
	X2.5	0,743	0,1966	Valid
	X2.6	0,833	0,1966	Valid
	X2.7	0,729	0,1966	Valid
	X2.8	0,740	0,1966	Valid
	X2.9	0,780	0,1966	Valid
	X2.10	0,780	0,1966	Valid
Customer Satisfaction	Y1	0,730	0,1966	Valid
	Y2	0,622	0,1966	Valid
	Y3	0,725	0,1966	Valid
	Y4	0,758	0,1966	Valid
	Y5	0,672	0,1966	Valid

	Y6	0,776	0,1966	Valid
	Y7	0,775	0,1966	Valid
	Y8	0,787	0,1966	Valid
	Y9	0,746	0,1966	Valid
	Y10	0,750	0,1966	Valid

Source: Data processed 2024

The validity test is carried out with a significance level of r table 5% (0.05). The value is calculated based on the correlation between respondents' answers. With degrees of freedom (df) = N - 2 = 98, the two-sided r table value is obtained at 0.1966, and the r product moment table has an alpha significance of 5% (0.05). The instrument is declared valid if r count is greater than r table and invalid if r count is lower than r table. Based on the table above, all statements for the Service Quality, Service Innovation, and Customer Satisfaction variables are declared valid because r count is greater than r table 0.1966.

Reliability Test

The reliability test is carried out to determine how consistent the measurement results are if the measurement is carried out twice or more with the same symptoms with the same measuring instrument (Siregar, 2015). The reliability of the research instrument will be tested with Cronbach's Alpha. The criterion for the reliability of the research instrument is if the reliability coefficient (r11) is greater than 0.70. The following table shows the test results:

Table 6. Reliability Test

Variable	Cronbach's Alpha	Criteria	Description
Service quality (X1)	0,905	0,70	Reliable
service innovation (X2)	0,937	0,70	Reliable
customer satisfaction (Y)	0.933	0,70	Reliable

Source: SPSS output, 2024

A variable can be considered reliable if it has a Cronbach Alpha value of more than 0.70 (Ghozali, 2016). Based on the reliability table, the Cronbach's alpha values for the Service Quality (X1), Service Innovation (X2) and Customer Satisfaction (Y) variables are 0.905, 0.937, and 0.933 respectively. Therefore, it can be concluded that all item statements are reliable because the Cronbach's alpha value of all variables is more than 0.70.

Classical Assumption Test
Heteroscedasticity Test

Based on the output below, it shows that the Glejser test value can be seen that the sig> 0.05. For the Service Quality sig value of 0.687, and the sig

value on the Service Innovation variable is 0.885. So it can be concluded that there are no symptoms of heteroscedasticity.

Table 7. Heteroscedasticity Test Results
Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	2.615	1.054		2.480	.015
	Service quality	-.021	.052	-.074	-.404	.687
	service innovation	.007	.048	.027	.145	.885

a. Dependent Variable: abs_res
Source: SPSS output, 2024

Multicollinearity Test

From the results of data processing below, it is obtained that the tolerance value is greater than 0.10 or the same as the VIF value is smaller than 10, so it can be concluded that the regression model shows no multicollinearity.

Table 8. Multicollinearity Test Results

Collinearity Statistics	
Tolerance	VIF
0,306	3,273
0,306	3,273

a. Dependent Variable: customer satisfaction
Source: SPSS output, 2024

Normality Test

Based on the output results below, it can be seen that the significance value is 0.200> 0.05 so it can be concluded that the data tested is normally distributed.

Table 9. Normality Test
One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		100
Normal Parameters[a,b]	Mean	.0000000
	Std. Deviation	2.77919367
Most Extreme Differences	Absolute	.064
	Positive	.034
	Negative	-.064
Test Statistic		.064
Asymp. Sig. (2-tailed)		.200[c,d]

a. Test distribution is Normal.
b. Calculated from data.
Source: SPSS output, 2024

Multiple Linear Regression Analysis

Multiple linear regression analysis is a statistical method used to see the relationship between the dependent variable and the independent variable (predictor). The purpose of this analysis is to determine how significant the effect of the predictor (independent) variable is on the dependent variable so that it can make accurate predictions (Pramesti, 2015). The following table shows the analysis of multiple linear regression results:

Table 10. Multiple Linear Regression Test Results

Coefficients[a]				
Model		Unstandardized Coefficients		Standardized Coefficients
		B	Std. Error	Beta
1	(Constant)	4.917	1.720	
	Service quality	.358	.084	.345
	service innovation	.568	.078	.589
a. Dependent Variable: customer satisfaction				

Source: SPSS output, 2024

Based on table 10, after testing, the regression equation is obtained as follows: Y=4.917+0.358 X1+0.568 X2 + e
Based on the multiple linear regression equation above, the following results are obtained

1. The constant value obtained is 4,917, meaning that if the value of service quality (X1) and service innovation (X2) is 0, customer satisfaction is 4,917.
2. Because the regression coefficient of the service quality variable (X1) is 0.358, customer satisfaction (Y) will increase by 0.358, or 35.8%, if the other independent variables are constant and service quality (X1) increases by 1 unit.
3. With a regression coefficient of the service innovation variable (X2) of 0.568, customer satisfaction (Y) will increase by 0.568 or 56.8%, if the other independent variables remain constant and the service innovation variable (X2) increases by 1 unit.

Hypothesis Test

T Test / Partial Test

The effect of the independent variable partially on the dependent variable is the purpose of the t test. The t test is done by comparing t count with t table or by looking at the significance column for each t count. The test results are shown in the following table:

Table 11. Partial T / Test Results

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	4.917	1.720		2.860	.005
	Service quality	.358	.084	.345	4.246	.000
	service innovation	.568	.078	.589	7.256	.000

a. Dependent Variable: customer satisfaction

Source: SPSS output, 2024

Based on Table 11, it is known that the Sig value of the effect of Service Quality (X1) on Customer Satisfaction (Y) is 0.00 <0.05 and the t value is 4.246> from the t table 1.984 so it can be concluded that H1 is accepted, which means that there is an influence between Service Quality (X1) on Customer Satisfaction (Y). Second Hypothesis Testing (H2) It is known that the Sig value of the effect of Service Innovation (X2) on Customer Satisfaction (Y) is 0.00 <0.05 and the t value is 7,256> t table of 1.984 so it can be concluded that H2 is accepted, which means there is an influence on variable Y.

F Test / Simultaneous Test

Table 12. Results of the F Test / Simultaneous Test

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3148.722	2	1574.361	199.712	.000[b]
	Residual	764.668	97	7.883		
	Total	3913.390	99			

a. Dependent Variable: customer satisfaction

b. Predictors: (Constant), Service quality, service innovation

Source: SPSS output, 2024

From table 12, the calculated F value of 199.712 is greater than the F table, namely 3.94 and a significance value of 0.000 <0.05. So it can be concluded that H3 is accepted, which means that there is an influence between service quality (X1) and service innovation (X2) simultaneously on customer satisfaction (Y).

Coefficient of determination (R2)

By using the coefficient of determination test, we can determine the extent to which the independent variable explains the attachment variable. The coefficient of determination for two independent variables is determined by the value:

Table 13. Results of the Coefficient of Determination (R^2) Results

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.897[a]	.805	.801	2.808

a. Predictors: (Constant), service innovation, service quality,

Source: SPSS output, 2024

The effect of the independent variable (X) on the dependent variable (Y) is 80.1 percent, as shown by the results of the table above. The table also shows how the Service Quality and Service Innovation variables affect Customer Satisfaction. The calculation results show the value of R = 0.890, and the coefficient of determination R Square is 0.805, or 80.5%. The magnitude of the coefficient of determination means that the magnitude of change in the 80.5% Customer Satisfaction variable is influenced by Service Quality and Service Innovation, the remaining 19.5% is influenced by other variables not examined in this study.

DISCUSSION

The Effect of Service Quality on Customer Satisfaction

In this study, Service Quality affects Customer Satisfaction. This shows that the hypothesis is accepted. The value of Service Quality t count is 4.246> from t table 1.984. The results show that Service Quality significantly affects Customer Satisfaction, more specifically, Service Quality is rated positively in multiple regression analysis.

The Effect of Service Innovation on Customer Satisfaction

The results of the study Service Innovation has a positive and significant effect on Customer Satisfaction of PT PLN (Persero) ULP Teluk Betung, meaning that the hypothesis is accepted. The t test results show that the t value of Service Innovation is greater than the t table (7,256> 984). In multiple regression analysis, Service Innovation has a positive value on Customer Satisfaction.

CONCLUSIONS AND RECOMMENDATIONS

The results showed that the service quality variable had a positive and significant effect on customer satisfaction of PT PLN (Persero) ULP Teluk Betung. This shows that service quality is one of the most important indicators of customer satisfaction, because good service creates customer satisfaction. The higher the quality of service provided, the higher the customer satisfaction.

The results showed that the service innovation variable had a positive and significant effect on customer satisfaction of PT PLN (Persero) ULP Teluk Betung. This shows that service innovation is an indicator of customer satisfaction. Because new innovations that can make service easier and more convenient create customer satisfaction. The better the service innovation offered, the higher the customer satisfaction.

ADVANCED RESEARCH

The suggestions submitted by the author are as follows:

1. PT PLN needs to strive to improve its services, by providing services to customers and thoroughly solving all problems faced by customers, so that customers feel satisfied with the services provided.
2. There needs to be a good socialization or promotion strategy to the public regarding the advantages of every innovation made by PT PLN, one of which is prepaid electricity, both people who have used this innovation and those who have not so that education can be an option for the community in electricity users.

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