

Improving Customer Service Through the Electricity Loss Application

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Abstract

Digital transformation is a strategic key for companies in improving the quality of public services, including in the electricity sector. This study aims to analyze the effect of digital technology implementation and innovation management on customer service, with the innovation of the Electricity Loss Application as an intervening variable at PT PLN (Persero) ULP Bukittinggi. The research method used is a quantitative approach with an associative causal design, involving 100 respondents who are active customers using the Electricity Loss Application. Data analysis was carried out using Structural Equation Modeling (SEM) based on Partial Least Squares (SmartPLS 4.0). The results showed that the application of digital technology had no significant direct effect on customer service. However, digital technology has a positive and significant effect on application innovation. Innovation management is proven to have a direct and indirect effect on customer service, through the innovation of the Electricity Loss Application as a mediating variable. This application innovation is proven to significantly mediate the effect between technology implementation and innovation management on improving customer service. These findings confirm that the success of digital transformation in public services is highly dependent on the existence of digital innovations that meet user needs. Therefore, the Electricity Loss Application can be an effective digital technology-based service innovation model in improving the quality of services in the electricity sector.

Keywords: Digital Technology, Innovation Management, Electricity Loss Application, Customer Service, PLN.

INTRODUCTION

PT PLN (Persero), as the nation's primary electricity provider, is not only responsible for ensuring a continuous energy supply but also must be adaptive in responding to the dynamics of customer needs in the digital era. One of the main challenges faced by PLN is the increasing number of losses, which are the loss of electrical energy that should be distributed but is not utilized by customers because they switch to alternative sources such as generator sets. This condition results in potential lost revenue for the company and also reflects a lack of public trust in PLN's electricity services in certain situations, such as large-scale events (PLN, 2022).

This phenomenon is often encountered during weddings and other social events, where people prefer generators because they are considered more flexible, despite higher operational costs and a greater environmental impact. To address this issue, PLN developed the Electricity Loss Application as a digital-based service innovation that allows people to request multi-purpose electricity services more easily, quickly, and affordably, especially for temporary needs such as weddings. This digital innovation is very much in line with the research findings of Erwansyah (2023) which emphasizes the importance of digital-based consumer behavior. In the context of public services, a digital approach not only functions as an internal efficiency tool but also becomes a strategic tool in shaping user behavior that

is more environmentally conscious and oriented towards formal services that are safer, more reliable, and cleaner.

This application not only offers easy service access but also introduces competitive and environmentally friendly tariffs, considering that using the PLN electricity network is cleaner than using generators, which produce carbon emissions and noise (IEA, 2023). This innovation aligns with PLN's agenda to support sustainable development and its Green Energy Transition strategy. This transformation is expected to increase customer satisfaction, strengthen the company's image, and reach new markets in the informal sector that have previously been underserved. The Electricity Loss application reflects PLN's efforts to integrate digital technology, service innovation, and customer orientation into a single platform. This step aims not only to optimize revenue but also to strengthen PLN's position as a modern and adaptive energy company to changing times.

Formulation of the problem

1. Does the Implementation of Digital Technology have a positive and significant impact on Customer Service at PLN ULP Bukit Tinggi?
2. Does Innovation Management have a positive and significant impact on Customer Service at PLN ULP Bukit Tinggi?
3. Does the Implementation of Digital Technology have a positive and significant impact on the Innovation of Electricity Loss Applications at PLN ULP Bukit Tinggi?
4. Does Innovation Management have a positive and significant effect on the Innovation of Electricity Loss Applications at PLN ULP Bukit Tinggi?
5. Does the Electricity Loss Application Innovation have a positive and significant impact on Customer Service at PLN ULP Bukit Tinggi?
6. Does the Implementation of Digital Technology have a positive and significant impact on Customer Service at PLN ULP Bukit Tinggi through the Innovation of Electricity Loss Applications?
7. Does Innovation Management have a positive and significant impact on Customer Service at PLN ULP Bukit Tinggi through the Electricity Loss Application Innovation?

Research purposes

1. To study and analyze the influence of the implementation of digital technology on customer service at PLN ULP Bukit Tinggi
2. To study and analyze the influence of innovation management on customer service at PLN ULP Bukit Tinggi
3. To study and analyze the influence of the application of digital technology on innovation in electricity loss applications at PLN ULP Bukit Tinggi
4. To study and analyze the influence of innovation management on innovation in electricity loss applications at PLN ULP Bukit Tinggi.
5. To study and analyze the influence of electricity loss application innovation on customer service at PLN ULP Bukit Tinggi

6. To study and analyze the influence of the application of digital technology on customer service at PLN ULP Bukit Tinggi through the innovation of electricity loss applications.
7. To study and analyze the influence of innovation management on customer service at PLN ULP Bukit Tinggi through the innovation of electricity loss applications.

LITERATURE REVIEW

Customer service

According to Parasuraman, Zeithaml, and Berry (2018), the SERVQUAL model identifies five key dimensions of service: tangibles, reliability, responsiveness, assurance, and empathy. In the context of the Electricity Loss Application, these dimensions can be measured to assess customer satisfaction with the service provided. According to Mukarom & Laksana (2015), service quality is the result of the interaction of various aspects, such as service systems, human resources, and customer strategies. Quality service is measured by a good system, the ability to respond to customer needs, and providing effective control mechanisms to detect deviations. Good customer service directly contributes to customer satisfaction levels.

Indicator Customer Service

Customer Service and Customer Satisfaction Indicators Mukarom & Laksana (2015):

1. Ease of Service Access (Reliability)
The ability to provide the promised service consistently and accurately and easily.
2. Response Speed (Responsiveness)
Willingness and ability of service to provide prompt service.
3. Interaction Quality Assurance
The ability to instill trust and confidence in customers through competence, courtesy, and the ability to respond to questions or complaints.
4. Information Availability
Availability of complete information, equipment, staff and materials used in service delivery.
5. Customer Satisfaction
The level of customer satisfaction with the service received reflects the extent to which their expectations are met.
6. Customer Loyalty
Customers' willingness to continue using a company's services or products in the future, as well as their likelihood to recommend it to others.

Implementation of Digital Technology

The application of digital technology in public services refers to the use of technology-based information systems to improve service efficiency and effectiveness. According to Kotler and Keller (2016), digital technology enables companies to provide faster, more accurate, and more accessible services to customers. In the context of PT PLN (Persero),

applications such as PLN Mobile have been shown to increase customer satisfaction by providing various electricity services digitally.

Indicator Implementation of Digital Technology

Pedrosa et al. (2020) Digital Technology Implementation Indicators:

1. Ease of Use
The extent to which users find a digital system or service easy to use without requiring in-depth technical training.
2. User Data Security (Trustworthy)
User confidence that digital systems are secure, reliable, and provide services fairly and transparently.
3. Simplicity of Service (Simple)
The process of user interaction with digital services is uncomplicated, without excessive steps or confusing bureaucracy.
4. 24/7 Service Availability (Available)
The ability of the system to continue functioning without interruption, and to be accessible anytime and anywhere by users.
5. Customer Support Availability (Understandable)
The extent to which the information presented in digital services is easy for users to understand, with a clear and informative design.
6. Application Performance Consistency (Consistent)
Regularity and uniformity in the appearance and function of the system, so that users can easily adapt and use it.
7. Application Processing Speed (Fast)
Fast response and processing times in digital services, providing an efficient and satisfying user experience.

Innovation Management

Innovation management in public services encompasses the process of developing and implementing new ideas to improve the quality and efficiency of public services. Tidd and Bessant (2015) state that effective innovation management can result in services that are more responsive and adaptive to customer needs. PT PLN (Persero) has demonstrated its commitment to innovation management through the development of the Electricity Loss Application, which is part of the company's digital transformation.

Indicator Innovation Management

Innovation Management Indicators according to Silitonga, et al. (2020):

1. Identify innovation opportunities
Measuring how many new ideas are generated and how relevant they are to emerging market needs and technologies.
2. Strategic Planning

Measuring efficiency in terms of the time and cost required to develop and launch new innovations.

3. Innovation Implementation

Assess the extent to which innovative ideas are successfully implemented into new products or processes that can be applied in the company.

4. Evaluation of Innovation Results

Assess the extent to which the resulting innovation has a positive impact on company performance, such as increased revenue, operational efficiency, or customer satisfaction.

5. Ability to Adapt to Technological Changes

Measuring the extent to which a company is able to adapt and adopt new technologies to support the innovation process.

Customer service

According to Mukarom & Laksana (2015), service quality is the result of the interaction of various aspects such as service systems, human resources, and customer strategies. Quality service is assessed from a good system, able to respond to customer needs, and provide effective control mechanisms to detect deviations. Good customer service contributes directly to the level of customer satisfaction. Parasuraman, Zeithaml, and Berry (2018) developed the SERVQUAL model that identifies five main dimensions of service: tangible, reliability, responsiveness, assurance, and empathy. In the context of the Electricity Loss Application, these dimensions can be measured to assess customer satisfaction with the services provided.

Indicator Customer Service

Customer Service and Customer Satisfaction Indicators Mukarom & Laksana (2015):

1. Ease of Service Access (Reliability)
2. Response Speed (Responsiveness)
3. Interaction Quality Assurance
4. Information Availability
5. Customer Satisfaction
6. Customer Loyalty

Electrical Loss Application Innovation

According to Adams R et al. (2006) The innovation of the Electricity Loss application functions as an intervening variable that mediates the relationship between the application of digital technology and innovation management with customer service. The Electricity Loss application can explain how digital technology and innovation management contribute to improving customer service.

Indicator Innovation

Seven indicators of innovation according to Adams, R et al. (2006):

1. Creativity in Idea Development

2. Implementation of New Solutions
3. Service Quality Improvement
4. Operational Efficiency
5. Impact on Community Satisfaction
6. Collaboration with Stakeholders
7. Sustainability of Innovation

Conceptual framework

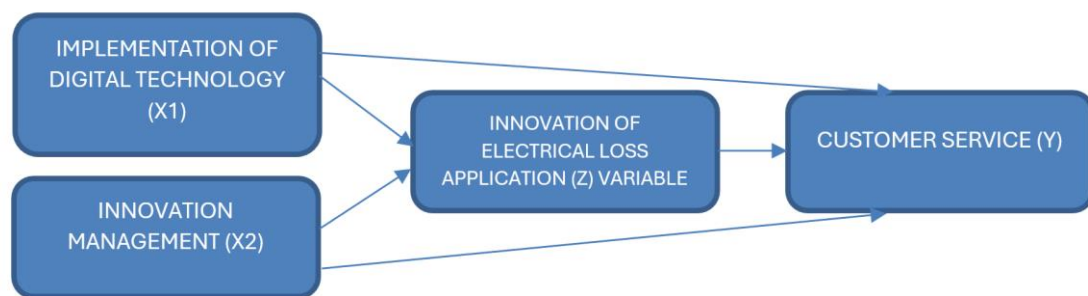


Figure 1. Conceptual Framework

Hypothesis

1. H1: The application of digital technology has a positive impact on the innovation of the Electricity Loss Application.
2. H2: Innovation management has a positive influence on the innovation of the Electricity Loss Application.
3. H3: The Electricity Loss Application Innovation has a positive impact on customer service.
4. H4: The implementation of digital technology has a direct positive impact on customer service.
5. H5: Innovation management has a direct positive impact on customer service.
6. H6: The Electricity Loss Application Innovation mediates the relationship between the application of digital technology and customer service.
7. H7: The Electrical Loss Application Innovation mediates the relationship between innovation management and customer service.

METHOD

This study employed a quantitative approach with a causal-associative design, aiming to examine the influence between two or more variables. A quantitative method was chosen because it enables objective measurement of relationships between variables using numerical data and statistical analysis (Sugiyono, 2018).

The research was conducted from May to July 2025. The population consisted of customers of PT PLN (Persero) who had used the Electricity Loss Application for wedding events. The sample size was determined based on Hair et al. (2017), which suggests that in

SEM or linear regression studies, the minimum sample should be 5–10 times the number of indicators, with an ideal minimum of 100 respondents.

The feasibility of the measurement model was assessed using the outer model test, which evaluates outer loading values to ensure validity and reliability. The structural model test (inner model) included the coefficient of determination (R^2) test to assess how well the model explains the variation in the dependent variable. The R^2 value ranges from 0 to 1, with higher values indicating stronger explanatory power.

The goodness-of-fit test was applied to assess how well the observed data matched the theoretical distribution assumed by the model. Hypothesis testing was performed using the T-statistic test, which included path coefficient analysis to evaluate the direct effect of each independent variable on the dependent variable, as well as the indirect effect through intervening variables.

The direction of the relationship between variables is interpreted as positive if the coefficient value ranges from 0 to 1, and negative if it ranges from 0 to -1. A hypothesis is accepted if the T-statistic value exceeds the T-table value. According to Ghazali & Latan (2015), the T-table criterion at a 5% significance level is 1.9

RESULTS AND DISCUSSION

Outer Model Analysis

The outer model testing in this study uses algorithm analysis on *SmartPLS software version 4.0*, in order to obtain outer loading values that meet validity and reliability requirements.

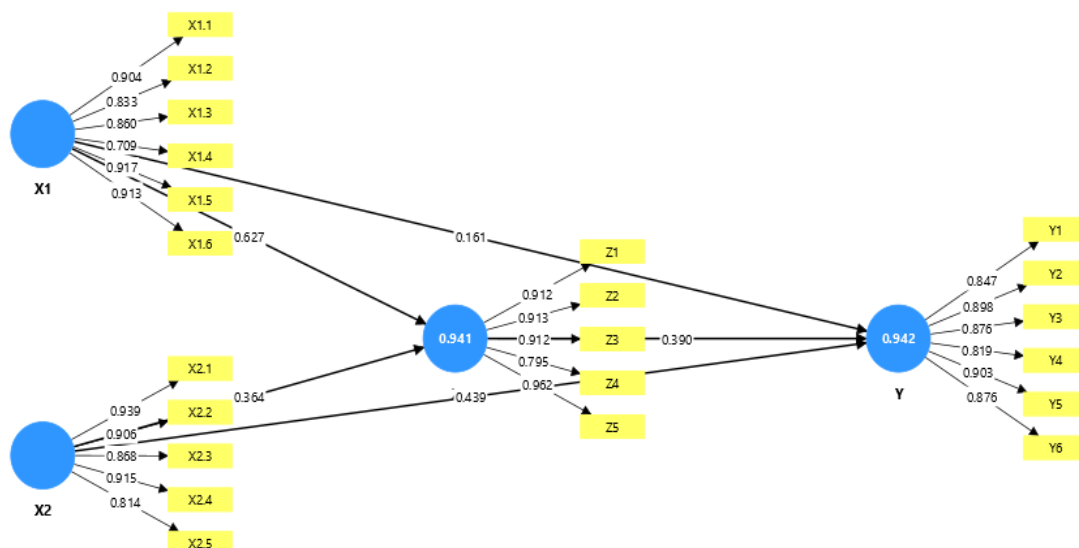


Figure 2. Outer Model Test Results

Convergent Validity Test Results

Convergent validity is demonstrated by the outer loading and AVE values. Indicators are considered valid if they have an outer loading > 0.7 and an AVE > 0.5 . The processing results show that all indicators meet these requirements.

Table 2. Outer Loading

Indicator	<i>Outer Loading</i>	Information
IMPLEMENTATION OF DIGITAL TECHNOLOGY(X1)		
X1.1	0.904	Valid
X1.2	0.833	Valid
X1.3	0.86	Valid
X1.4	0.709	Valid
X1.5	0.917	Valid
X1.6	0.913	Valid
INNOVATION MANAGEMENT (X2)		
X2.1	0.939	Valid
X2.2	0.906	Valid
X2.3	0.868	Valid
X2.4	0.915	Valid
X2.5	0.814	Valid
ELECTRICAL LOSS APPLICATION INNOVATION (Z)		
Z1	0.912	Valid
Z2	0.913	Valid
Z3	0.912	Valid
Z4	0.795	Valid
Z5	0.962	Valid
CUSTOMER SERVICE (Y)		
Y1	0.847	Valid
Y2	0.898	Valid
Y3	0.876	Valid
Y4	0.819	Valid
Y5	0.903	Valid
Y6	0.876	Valid

Source: Smart PLS Output, 2025

Based on Table 2, all indicators have loading factor values > 0.60 . According to Ghozali, Imam & Latan (2014), an indicator is considered valid if its loading factor value is > 0.60 . Therefore, all indicators in this study are valid and can be further researched. The following is displayed in the form of a structural model, as shown in the following figure:

Discriminant Validity Test Results

The next test is discriminant validity. This test aims to determine whether a reflective indicator is a good measurement of its construction based on the principle that the indicator is highly correlated with the construct. The following table shows the cross-loading results from the discriminant validity test:

Table 3. Discriminant Validity

Indicator	X1	X2	Y	Z
X1.1	0.904	0.846	0.853	0.891
X1.2	0.833	0.739	0.78	0.804
X1.3	0.86	0.816	0.829	0.824
X1.4	0.709	0.602	0.627	0.631
X1.5	0.917	0.828	0.842	0.878
X1.6	0.913	0.854	0.873	0.885
X2.1	0.839	0.939	0.881	0.864
X2.2	0.773	0.906	0.83	0.81
X2.3	0.84	0.868	0.847	0.855
X2.4	0.896	0.915	0.91	0.911
X2.5	0.703	0.814	0.754	0.707
Y1	0.779	0.789	0.847	0.802
Y2	0.845	0.827	0.898	0.867
Y3	0.829	0.87	0.876	0.845
Y4	0.767	0.786	0.819	0.78
Y5	0.875	0.853	0.903	0.893
Y6	0.793	0.845	0.876	0.8
Z1	0.921	0.823	0.839	0.912
Z2	0.842	0.869	0.889	0.913
Z3	0.831	0.853	0.872	0.912
Z4	0.801	0.712	0.743	0.795
Z5	0.918	0.944	0.947	0.962

Source: Smart PLS Output, 2025

Composite reliability test results

The next test determines the reliable value with the composite reliability of the indicator block that measures the construct. A construct value is said to be reliable if the composite reliability value is above 0.60. In addition to looking at the composite reliability value, the reliable value can be seen from the variable construct value with the Cronbach's alpha of the indicator block that measures the construct. A construct is declared reliable if the Cronbach's alpha value is above 0.7. The following table shows the loading values for the research variable constructs generated from running the Smart PLS program in the following table.

Table 4. Construct Reliability and Validity

Construct	Cronbach's Alpha	Composite Reliability	AVE
X1	0.927	0.936	0.944
X2	0.933	0.938	0.95
Z	0.936	0.937	0.949

Construct	Cronbach's Alpha	Composite Reliability	AVE
Y	0.94	0.946	0.955

Source: Output Smart PLS, 2025

Based on Table 4 above, it can be explained that the AVE value for each tested variable has a value > 0.5 , indicating that all variables in this study meet the criteria for discriminant validity. To determine reliability in this study, the composite reliability value was used. The accepted value for the reliability level is > 0.7 . Based on these criteria, it can be seen that all variables in this study have a value > 0.70 , so it can be stated that all variables tested meet construct reliability.

Structural Model Evaluation (Inner Model)

Inner model evaluation is carried out to measure the relationship between latent constructs and determine the significance of the influence between variables.

Results of the Determination Coefficient Test (R^2 and Adjusted R^2)

The coefficient of determination (R^2) test is used to determine whether a particular independent latent variable has a substantive influence on the dependent latent variable. Based on data processing using the SmartPLS 4.0 program, the R Square value is obtained as shown in the following table.

Table 5. R Square Results

Endogenous Variables	R^2	Adjusted R^2	Interpretation
Z (Application Innovation)	0.942	0.94	Very strong
Y (Service)	0.941	0.94	Very strong

Source: Smart PLS Output, 2025

Based on the results of data processing using SmartPLS 4, it is known that the endogenous variables in the research model, namely Electricity Loss Application Innovation (Z) and Customer Service (Y) have very high coefficient of determination (R^2) values, namely 0.948 for Z and 0.944 for Y. The Adjusted R^2 value also shows very good model consistency, namely 0.946 for Z and 0.943 for Y.

The interpretation of these values is as follows:

1. Electrical Loss Application Innovation (Z)

The R^2 value of 0.948 means that 94.8% of the variation in application innovation can be explained by two exogenous variables, namely the Application of Digital Technology (X1) and Innovation Management (X2). In other words, these two variables have a very strong contribution in influencing the formation of Electrical Loss application innovation at PLN ULP Bukittinggi.

2. Customer Service (Y)

The R^2 value of 0.944 indicates that 94.4% of changes or variations in customer service can be explained by the combination of Digital Technology Implementation (X1),

Innovation Management (X2), and Application Innovation (Z). This means that the quality of customer service provided by PLN ULP Bukittinggi is greatly influenced by how technology and innovation are managed and implemented effectively.

Goodness of Fit Test Results

A goodness of fit test is a statistical method used to evaluate how well a model or statistical distribution being tested fits the observed data. The goodness of fit test aims to determine the extent to which the observed data conforms to the theoretical distribution assumed by the model or hypothesis. The goodness of fit of a model can be determined by looking at the NFI value in the program. If the NFI value is greater than SRMR and closer to 1, the better the model fit. Based on data processing performed using SmartPLS 3.0, the Model Fit values are as follows.

Table 6. Fit Model

	Saturated Model	Estimated Model
SRMR	0.054	0.054
d_ ULS	0.739	0.739
d_ G	1,862	1,862
Chi-Square	753,177	753,177
NFI	0.769	0.769

Source: Smart PLS Output, 2025

Based on the table above, it can be seen that the NFI value is $0.769 > 0.054$, so it can be stated that the model in this study has sufficient goodness of fit and is suitable for use in testing the research hypothesis.

Hypothesis Testing Results

After conducting the inner model analysis, the next step is to evaluate the relationships between latent constructs to answer the research hypothesis. Hypothesis testing in this study was conducted using T-statistics and P-values. The hypothesis is accepted if the T-statistic is >1.96 and P-values are <0.05 . The following table shows the path coefficients for the direct influence between variables.

Table 7. Path Coefficients (Direct Effect)

VARIABLE	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
IMPLEMENTATION OF DIGITAL TECHNOLOGY -> CUSTOMER SERVICE	0.161	0.166	0.109	1,476	0.135

VARIABLE	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
IMPLEMENTATION OF DIGITAL TECHNOLOGY -> INNOVATION OF ELECTRICAL LOSS APPLICATIONS	0.627	0.628	0.108	5.81	0.000
INNOVATION MANAGEMENT -> CUSTOMER SERVICE	0.439	0.439	0.097	4.53	0.000
INNOVATION MANAGEMENT -> ELECTRICITY LOSS	0.364	0.363	0.111	3,279	0.001
APPLICATION INNOVATION POWER LOSS APPLICATION INNOVATION -> CUSTOMER SERVICE	0.39	0.385	0.126	3.103	0.002

Source: Smart PLS Output, 2025

Based on the results of the path coefficient analysis using SmartPLS, it is known that the effect of implementation of digital technology on customer service is not statistically significant, with a coefficient value of 0.161 and a p-value of 0.14 (> 0.05). This indicates that the implementation of digital technology has not been able to provide a strong direct impact on improving customer service. However, the implementation of digital technology has a positive and significant influence on innovation in electricity loss control applications, with a coefficient value of 0.627 and a p-value of 0.000. This means that the higher the level of digital technology implementation, the more it will encourage increased innovation in electricity loss control applications.

Furthermore, innovation management is proven to have a positive and significant effect on customer service, with a coefficient value of 0.439 and a p-value of 0.000. In addition, innovation management also has a significant effect on innovation in electricity loss applications, with a coefficient of 0.364 and a p-value of 0.001. This shows that good innovation management not only contributes to service improvement but also encourages the development of innovation in technical management such as electricity loss control.

Finally, the innovation of electricity loss applications has a significant influence on customer service, with a coefficient of 0.390 and a p-value of 0.002. This finding indicates that success in developing technical innovations in energy management contributes to providing better service to customers. Based on these overall results, it can be concluded that although the implementation of digital technology does not directly affect customer service, the indirect influence through innovation of electricity loss applications appears significant, thus opening up the possibility of a mediation effect that can be further explored in the indirect influence between variables as shown in the following table.

Table 8. Indirect Effect

VARIABLE	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
IMPLEMENTATION OF DIGITAL TECHNOLOGY -> ELECTRICITY LOSS APPLICATION INNOVATION -> CUSTOMER SERVICE INNOVATION MANAGEMENT -> ELECTRICITY LOSS APPLICATION INNOVATION -> CUSTOMER SERVICE	0.245	0.243	0.093	2,628	0.009
IMPLEMENTATION OF DIGITAL TECHNOLOGY -> ELECTRICITY LOSS APPLICATION INNOVATION -> CUSTOMER SERVICE INNOVATION MANAGEMENT -> ELECTRICITY LOSS APPLICATION INNOVATION -> CUSTOMER SERVICE	0.142	0.138	0.057	2,491	0.013

Source: Smart PLS Output, 2025

The results of the indirect effect analysis indicate that the application of digital technology has a positive and significant indirect effect on customer service through innovation in electricity loss control applications. This is indicated by a coefficient value of 0.245 with a t-statistic value of 2.628 and a p-value of 0.009 (<0.05). This means that although the direct effect of the application of digital technology on customer service is not significant, through the mediation channel of innovation in electricity loss applications, the effect becomes significant. This finding confirms that application innovation in electricity loss management plays an important role in bridging the influence of digital technology on improving the quality of customer service.

In addition, innovation management also has a significant indirect effect on customer service through innovation in electricity loss control applications, with a coefficient value of 0.142, a t-statistic of 2.491, and a p-value of 0.013. This indicates that the better the innovation management, the higher the level of technical innovation in electricity loss applications, which ultimately has a positive impact on customer service. Thus, innovation in electricity loss applications acts as an effective mediator in strengthening the relationship between innovation management and customer service quality.

The results of the study indicate that the implementation of digital technology does not have a significant direct impact on customer service, with a coefficient value of 0.161 and a p-value of 0.135. This indicates that although digitalization has been implemented in the form of service applications such as the Electricity Loss Application, its existence has not been fully able to provide a direct impact on improving the quality of service perceived by customers. This finding reinforces the view of Kotler and Keller (2016) that the implementation of digital technology must be accompanied by a deep understanding of user needs so that the results have a real impact on customer experience.

Conversely, the application of digital technology has a very significant influence on innovation in electricity loss applications (coefficient = 0.627; p-value = 0.000). This indicates that the digital technology used by PLN supports the creation of innovative solutions in the form of multi-purpose digital electricity service applications. According to Laudon and Laudon (2020), a good information system can increase organizational effectiveness in providing innovative, efficient, and customer-oriented services. Therefore, although it has not had a direct impact, the application of digital technology has an influence through the development of innovative products and platforms.

Innovation management was also shown to have a positive and significant impact on customer service (coefficient = 0.439; p-value = 0.000), as well as on innovation in electricity loss applications (coefficient = 0.364; p-value = 0.001). These findings align with Tidd and Bessant (2018), who stated that effective innovation management can improve public service performance through more adaptive and relevant solutions. Well-managed innovation will create systems and applications that can address community challenges and needs quickly and accurately.

Furthermore, the innovation in electricity loss applications significantly impacted customer service (coefficient = 0.390; p-value = 0.002). This innovation represents a concrete demonstration of successful digital transformation and directly impacts accessibility, service speed, and customer satisfaction. According to Adams et al. (2006), the success of innovation in the public sector is determined by an organization's ability to develop user-focused solutions that directly add value.

In the indirect effect, the results show that the implementation of digital technology has a significant influence on customer service through innovation in electricity loss applications as a mediating variable (coefficient = 0.245; p-value = 0.009). Similarly, innovation management also has an indirect influence on customer service through innovation in electricity loss applications (coefficient = 0.142; p-value = 0.013). This finding refers to the mediation theory proposed by Baron and Kenny (1986), which states that

intervening variables can explain how and why an influence occurs. In this context, innovation in electricity loss applications significantly mediates the relationship between digital strategy and internal innovation on customer satisfaction.

CLOSING

Conclusion

1. The application of digital technology does not have a significant direct impact on customer service, so the effectiveness of technology in this context has not been optimally felt by customers directly (Kotler & Keller, 2016).
2. The application of digital technology has a positive and significant impact on innovation in electricity loss applications, which proves that technology is an important driver in the creation of customer-based digital service solutions (Laudon & Laudon, 2020).
3. Innovation management has a significant impact on customer service, proving that a good innovation strategy can produce higher quality and adaptive services (Tidd & Bessant, 2018).
4. Innovation management also has a significant influence on innovation in electricity loss applications, so that a systematic managerial approach to innovation supports the birth of impactful technological solutions (Silitonga & Sitepu, 2021).
5. The innovation of electricity loss applications has a positive and significant impact on customer service, because this digital service provides faster, more efficient and more satisfying access for customers (Adams et al., 2016).
6. The application of digital technology has an indirect influence on customer service through innovation in electricity loss applications, which means that the effects of digital transformation will be felt if it is packaged in the form of application innovations that suit customer needs (Baron & Kenny, 2016).
7. Innovation management also has an indirect effect on customer service through innovation in electricity loss applications, showing that the results of innovation that are managed properly will have an impact on better service quality (Tidd & Bessant, 2018).

Suggestion

1. Strengthening the Implementation of Digital Technology

ULP Bukittinggi is advised to continue improving the quality of its digital infrastructure, including the integration of internal and external systems that support the operation of the Electricity Loss application. The use of technologies such as the Internet of Things (IoT), big data, and real-time monitoring dashboards needs to be developed.

2. Improving Innovation Management Strategy

Innovation management needs to be improved through a cross-unit collaboration-based approach, ongoing employee training, and strengthening a culture of innovation within the workplace. PLN ULP Bukittinggi can establish a dedicated digital innovation management team tasked with conducting routine evaluations and developing application features according to customer needs.

3. Increased Customer Engagement

PLN ULP Bukittinggi is advised to open an active feedback channel integrated with the application. Regular customer satisfaction surveys and online discussion forums can be effective tools for capturing user feedback and identifying areas for improvement.

4. Data-Based Monitoring and Evaluation

Every report, response, and resolution of a service request or disruption report submitted through the app must be recorded and processed as an evaluative database. PLN needs to utilize this data to compile periodic reports, assess service unit performance, and set data-driven service targets.

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