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65655 / hira dkk. / FAKTOR-FAKTOR YANG MEMBENTUK KEPUASAN DAN LOYALITAS PELANGGAN PADA PT PLN (PERSERO) ULP

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FACTORS SHAPING CUSTOMER SATISFACTION AND CUSTOMER LOYALTY AT PT PLN (PERSERO) ULP DEPOK KOTA

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ABSTRACT

This study aims to analyze the effect of product quality, promotion, and complaint handling on customer loyalty, with customer satisfaction serving as an intervening variable at PT PLN (Persero) ULP Depok Kota. The study employed a quantitative research method using a purposive sampling technique. The research sample consisted of 250 customers of PT PLN (Persero) ULP Depok Kota. Data were collected through questionnaires using a five-point Likert scale and analyzed using the Structural Equation Modeling–Partial Least Squares (SEM-PLS) approach with SmartPLS 4.1.1.8 software. The results indicate that product quality has a positive and significant effect on customer satisfaction and customer loyalty. Promotion has a positive and significant effect on customer satisfaction but does not have a direct significant effect on customer loyalty. Complaint handling has a positive and significant effect on both customer satisfaction and customer loyalty. Furthermore, customer satisfaction has a positive and significant effect on customer loyalty and mediates the relationships between product quality, promotion, and complaint handling with customer loyalty. Therefore, improving product quality, implementing effective promotional strategies, and providing effective complaint handling can enhance customer satisfaction and strengthen customer loyalty at PT PLN (Persero) ULP Depok Kota.

Keywords: product quality, promotion, complaint handling, customer satisfaction, customer loyalty.

1. INTRODUCTION

Amidst technological disruption and the energy transition, public demand for electricity continues to rise. This situation compels electricity providers to

enhance service quality to maintain customer satisfaction and loyalty. Meanwhile, the development of renewable energy specifically rooftop solar power systems is emerging as an alternative for the public.

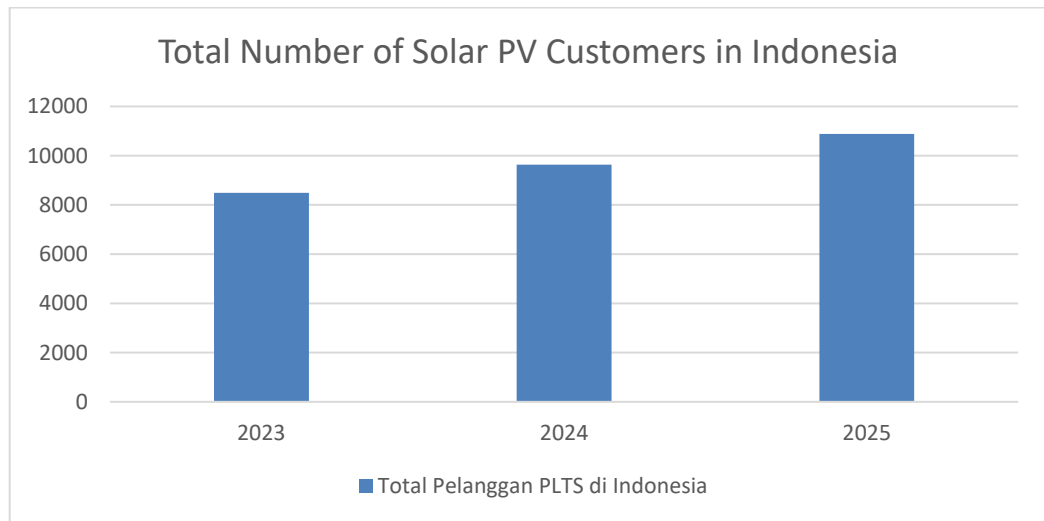


Figure 1 : Total Number of Solar PV Customers in Indonesia

Source : (Budiono, 2025; Darandono, 2024; Setiawan, 2025)

In Indonesia, the number of rooftop solar customers rose from 8,491 in 2023 to 9,632 in 2024, reaching 10,882 in 2025 (Budiono, 2025; Darandono, 2024). This growth reflects increasing public interest in clean energy and electricity cost efficiency (Setiawan, 2025).

The growth in rooftop solar adoption presents a challenge for PT PLN (Persero), as self-generated energy usage has the potential to reduce electricity consumption from the PLN grid and impact company revenue (Mellia, 2025). However, access to rooftop solar remains limited in Indonesia due to relatively high

installation costs and policies that do not yet fully support widespread adoption; consequently, usage is still dominated by the upper-middle class (Mellia, 2025). This situation offers PLN an opportunity to retain customers by improving service quality and strengthening customer relationships.

PT PLN (Persero) possesses a massive customer base. The total number of customers nationwide stands at 92,877,292, with 17,563,127 customers in the West Java Distribution Unit (UID) region (PT. PLN (Persero), 2024).

Table 1: Number of PLN Customers

Year	Number of Customers
2023	331.353
2024	341.246
2025	350.648

Source : Data Internal PT. PLN (Persero ULP Depok Kota

At the PLN Depok City Customer Service Unit (ULP), the customer count rose from 331,353 in December 2023 to 341,246 in December 2024 and 350,648 in December 2025 (PT. PLN PERSERO,

2025). Yet, this growth in the customer base has been accompanied by an average of 593 customer complaints per month during the 2025-2026 period. This situation indicates that customer growth

must be balanced with improvements in service quality to maintain customer satisfaction and loyalty.

A large customer base does not automatically guarantee loyalty, as customers continue to evaluate the company based on their experiences and the quality of service received. Therefore, amidst rising customer expectations and the growth of alternative energy sources, PT PLN (Persero) ULP Depok City needs to maintain the quality of its customer relationships to ensure sustained satisfaction and loyalty. This context serves as a crucial basis for research into the factors influencing customer satisfaction and loyalty at PT PLN (Persero) ULP Depok City.

The rising demand for electricity has made it an essential part of daily life, compelling PT PLN (Persero) to provide high-quality products and services while maintaining customer satisfaction and loyalty. This challenge is particularly relevant given the growing adoption of alternative energy sources such as rooftop solar power systems which could potentially impact the loyalty of conventional electricity customers. In this context, product quality, promotion, and complaint handling are critical factors, as they directly influence customer satisfaction and loyalty.

There is still significant scope for further research regarding customer loyalty at PT PLN (Persero) ULP Depok Kota. Previous studies have yielded

inconsistent findings concerning the impact of product quality, promotion, and complaint handling on customer satisfaction and loyalty. Furthermore, existing research on this specific unit has largely focused on technical electrical aspects and corporate communications, while studies integrating these three variables into a single model with customer satisfaction acting as an intervening variable remain limited.

The novelty of this study lies in its integration of product quality, promotion, and complaint handling to analyze customer loyalty, using customer satisfaction as an intervening variable within the context of PT PLN (Persero) ULP Depok Kota. The study employs the Structural Equation Modeling–Partial Least Squares (SEM-PLS) approach to examine both direct and indirect effects among the variables.

This research aims to analyze the impact of product quality, promotion, and complaint handling on customer satisfaction and loyalty. It also seeks to examine the influence of customer satisfaction on loyalty and its role as an intervening variable in the relationship between the three aforementioned factors and customer loyalty. The findings are expected to provide an empirical contribution to the field of marketing management and offer valuable insights for PT PLN (Persero) ULP Depok Kota in its efforts to enhance customer satisfaction and loyalty.

2. LITERATURE REVIEW

Customer loyalty can be established when the benefits offered by a company meet customer expectations, thereby creating a perception of high value and a positive experience that exceeds expectations often referred to as "customer joy" (Adha et al., 2025). One

factor influencing customer loyalty is product quality. High-quality products satisfy customer needs and expectations, thereby fostering loyalty (Nopitasari & Sentosa, 2023). Customers who perceive product quality positively are also likely to share their positive experiences with others (Daniswara & Rahardjo, 2023b). Conversely, product quality that fails to

meet expectations may drive customers to switch to other products (Nopitasari & Sentosa, 2023).

In addition to product quality, promotion plays a role in shaping customer loyalty. Promotions serve as a communication tool between companies and consumers, enhancing appeal and encouraging repeat purchases (Ni Putu Mahyoni & Hery Margono, 2023). Strategically designed promotions can shape positive perceptions and foster loyal customer behavior (Putri et al., 2026). The more attractive the promotion, the higher the level of consumer loyalty that can be cultivated (Manihuruk et al., 2023).

Complaint handling is also a crucial factor in maintaining customer loyalty. The quality of complaint handling is an integral part of strategies to enhance customer loyalty (Adha et al., 2025). Ease of lodging complaints and obtaining resolutions can increase the likelihood of customers remaining loyal to the company (Indrawati & Syafrida, 2024).

The influence of product quality, promotion, and complaint handling on customer loyalty can be mediated by customer satisfaction. Satisfaction stemming from positive experiences and the fulfillment of expectations can strengthen customer trust, commitment, and loyalty (Soetiyono & Alexander, 2025). Satisfied customers are also inclined to reuse the products or services provided by the company (Ester et al., 2025). Thus, customer satisfaction can serve as a foundation for the development of loyal behavior (Indrawati & Syafrida, 2024).

Product quality plays a role in enhancing customer satisfaction, as quality that meets customer needs and expectations creates a positive experience (Herlina & Silitonga, 2024). High product quality can also provide a competitive advantage for the company

in meeting or even exceeding customer expectations (Mutazam et al., 2025). Such positive experiences can subsequently strengthen the customer's bond with the company (Soetiyono & Alexander, 2025).

Promotion can also influence customer satisfaction based on the alignment between formed expectations and actual experiences. Engaging promotions can boost consumer satisfaction (Maharani et al., 2024). Promotions that accurately reflect reality can minimize the gap between expectations and actual outcomes, thereby generating customer satisfaction (Giawa et al., 2025). Conversely, excessive or misleading promotions can diminish customer satisfaction (Zepanya Putri et al., 2026).

Effective complaint handling contributes to increased customer satisfaction, as customers feel valued when their complaints are resolved appropriately (Sari et al., 2025). Resolving complaints by providing suitable solutions can enhance customer satisfaction (Sintia et al., 2024). Proper complaint handling can also strengthen customer trust and loyalty toward the company (Alyanas, 2024).

Furthermore, customer satisfaction can serve as an intervening variable in the relationship between product quality, promotion, and complaint handling and customer loyalty. Good product quality can enhance satisfaction, which in turn encourages customers to make repeat purchases or continue using the product (Sinurat & Arnanda, 2023). Satisfaction with product quality can also form the basis for customer loyalty (Daniswara & Rahardjo, 2023). Attractive promotions can boost satisfaction and subsequently strengthen customer loyalty (Kusuma et al., 2024). Customer satisfaction can also encourage repeat usage and prompt customers to recommend products or services to others (Aisyah et al., 2024). Meanwhile, improving the quality of

complaint handling can increase satisfaction and ultimately foster loyalty, as customers feel valued and see their rights upheld (Agung et al., 2026). The relationship between complaint handling, satisfaction, and loyalty also indicates that satisfaction can act as a mediating variable (Indrawati & Syafrida, 2024).

Based on the discussion in the framework above, this study has the following hypothesis:

- H1 : Product Quality is hypothesized to have a direct effect on Customer Satisfaction at PLN ULP Depok Kota.
- H2 : Product Quality is hypothesized to have a direct effect on Customer Loyalty at PLN ULP Depok Kota
- H3 : Promotion is hypothesized to have a direct effect on Customer Satisfaction at PLN ULP Depok Kota.
- H4 : Promotion is hypothesized to have a direct effect on Customer Loyalty at PLN ULP Depok Kota.
- H5 : The Complaint Handling variable is hypothesized to have a direct effect on Customer Satisfaction at PLN ULP Depok Kota.
- H6 : Complaint handling is hypothesized to have a direct effect on customer loyalty at PLN ULP Depok Kota.
- H7 : Customer satisfaction is hypothesized to have a direct effect on customer loyalty at PLN ULP Depok Kota.
- H8 : Product quality is hypothesized to affect customer loyalty through customer satisfaction as an intervening variable at PT. PLN (Persero) ULP Depok Kota.
- H9 : Promotion is hypothesized to affect customer loyalty through customer satisfaction as an

intervening variable at PT. PLN (Persero) ULP Depok Kota.

- H10 : Complaint handling is hypothesized to affect customer loyalty through customer satisfaction as an intervening variable at PT. PLN (Persero) ULP Depok Kota.

3. RESEARCH METHOD

This study used a quantitative method with a causal-associative approach. The population consisted of all electricity customers of PT PLN (Persero) ULP Depok Kota in 2026, totaling 319,964 customers: 140,577 postpaid and 179,387 prepaid customers.

3.1. Data Collection Techniques

The research method used in this study is quantitative. Data were collected through questionnaires distributed to respondents using Google Forms, interviews, and observations. The questionnaire used a five-point Likert scale to measure respondents' perceptions of product quality, promotion, complaint handling, customer satisfaction, and customer loyalty. The population in this study consisted of 319,964 customers of PT PLN (Persero) ULP Depok Kota, consisting of 140,577 postpaid customers and 179,387 prepaid customers. The sample used in this study was 250 respondents selected using purposive sampling based on predetermined criteria, namely customers of PT PLN (Persero) ULP Depok Kota aged at least 17 years, who had used PLN electricity services for daily activities and had previously submitted complaints regarding PLN ULP Depok Kota services.

3.2. Operational Definitions of

Variables

Exogenous (independent) variables, namely, (X1) Product Quality, (X2) Promotion, and (X3) Complaint Handling, Intervening variable (Y) is Customer Satisfaction, and Endogenous (dependent) variable (Z) is Customer Loyalty.

Product Quality (X1)

Product quality refers to the ability of a product to meet consumer needs and expectations, including durability, reliability, accuracy, ease of maintenance, and other valuable attributes (Chandra et al., 2020). Product quality involves efforts to meet or exceed customer expectations (Pahmi, 2024). Regarding the dimensions of the product quality variable, there are several aspects that can serve as information for assessing product quality; the product quality dimensions according to (Ainurrofqin, 2023) are as follows:

1. Product Function
2. Product Features
3. Product Reliability
4. Product Lifespan
5. Product Service
6. Perceived Product Quality

Promotion (X2)

Promotion is a marketing communication activity carried out by a company to inform, introduce, persuade, and convince consumers about the products or services offered (Ainurrofqin, 2023; Mursid, 2019). Promotion is also a policy used to communicate products to consumers (Ir. FI. Titik Wijayanti, 2017). This promotion variable is structured around two promotional objectives. According to (Ir. FI. Titik Wijayanti, 2017) and (Mursid, 2019), the promotional objectives are:

1. Hearing
2. Seeing

3. Becoming interested
4. Purchasing
5. Building the company's good name
6. Educating consumers
7. Creating a high reputation for a product
8. Announcing product changes or improvements

Complaint Handling (X3)

Customer complaints arise when there is a gap between customer expectations and the actual performance of the product or service received (Kotler & Keller, 2016). A complaint represents an expression of a customer's views or dissatisfaction regarding a good or service whether conveyed verbally or in writing; therefore, effectively handling such complaints can foster greater satisfaction with the product or service (Hermansyah et al., 2023). The complaint handling variable in this study is constructed based on complaint handling strategies (Tjiptono, Fandy & Chandra, 2020) and the stages of handling complaints according to (Wardhanie, 2019), namely:

1. Empathy towards angry customers
2. Speed in handling each complaint
3. Fairness or equity in resolving issues or complaints
4. Ease for consumers to contact the company
5. Listening
6. Clarifying
7. Explaining
8. Apologizing
9. Solution
10. Agreement
11. Taking action

Customer Satisfaction (Y)

Customer satisfaction is a response whether emotional or cognitive involving factors such as expectations, the product itself, and experiences, which occurs at specific times (e.g., after consumption, following the selection of a product or

service, or based on accumulated experience) (Tjiptono, Fandy & Chandra, 2020). Meanwhile, (Wirtz & Lovelock, 2016) define customer satisfaction as an evaluation of a consumption experience, encompassing both a momentary assessment and an immediate response to that experience. Furthermore, according to (Ainurrofqin, 2023), customer satisfaction measures the extent to which customer needs and expectations are met after using products or services provided by a company. In this study, Customer Satisfaction is measured using four indicators according to (Ainurrofqin, 2023), namely:

1. Customer solution
2. Customer cost
3. Convenience
4. Communication

Customer Loyalty (Z)

Customer loyalty is a customer's willingness to maintain a long-term relationship with a company ideally an exclusive one and to recommend the company's products to friends and relatives (Wirtz & Lovelock, 2016). Furthermore, (Krispimandoyo et al., 2025) state that customer loyalty is the outcome of consistent value and satisfaction; loyal customers are those who not only continue to use a product or service but also recommend it to others. Meanwhile, (Hidayat et al., 2025) define customer loyalty as a customer's commitment to consistently purchase or use a specific company's products and services over the long term, despite the availability of numerous alternatives in the market. In this study, Customer Loyalty is measured based on factors influencing customer loyalty according to (Hidayat et al., 2025), namely:

1. Customer satisfaction
2. Trust
3. Service quality
4. Perceived value

5. Emotional involvement
6. Consistent, honest, and relevant marketing communication
7. Brand attachment

3.3. Sample Collection Techniques

A sample represents a subset of the population's size and characteristics (Sugiyono, 2023). This study employs a non-probability sampling method using the purposive sampling technique, wherein the sample is selected based on specific criteria. Respondents were chosen based on the following criteria: customers of PT PLN (Persero) ULP Depok Kota who were at least 17 years old, had used PLN's electricity services in their daily lives, and had previously lodged a complaint regarding PLN's services. The sample size determination followed the guidelines of (Hair, Jr. et al., 2022), which recommend a sample size of 5 to 10 times the number of indicators. Given the 50 indicators, the minimum required sample size was 250 respondents (50×5); consequently, this study utilized a sample of 250 respondents.

3.4. Data Analysis Techniques

Data analysis was conducted using Structural Equation Modeling-Partial Least Squares (SEM-PLS) with SmartPLS 4.1.1.8. The analysis consisted of evaluating the outer model, inner model, model fit, and predictive relevance. The outer model was assessed through convergent validity, discriminant validity, and reliability. The inner model was evaluated using Variance Inflation Factor (VIF), R-Square (R^2), F-Square (f^2), path coefficients, and specific indirect effects. Model fit was evaluated using the Standardized Root Mean Square Residual (SRMR), d_ULS , d_G , and Normed Fit Index (NFI). Predictive relevance was assessed using PLSpredict based on $Q^2_{predict}$, RMSE, and MAE.

4. RESULTS AND DISCUSSION

4.1. Results

Measurement Model

The measurement model evaluation was conducted to assess the validity and

reliability of the indicators in measuring each research construct. The outer model assessment encompassed convergent validity, discriminant validity, and construct reliability. The analysis was performed using SmartPLS 4.1.1.8.

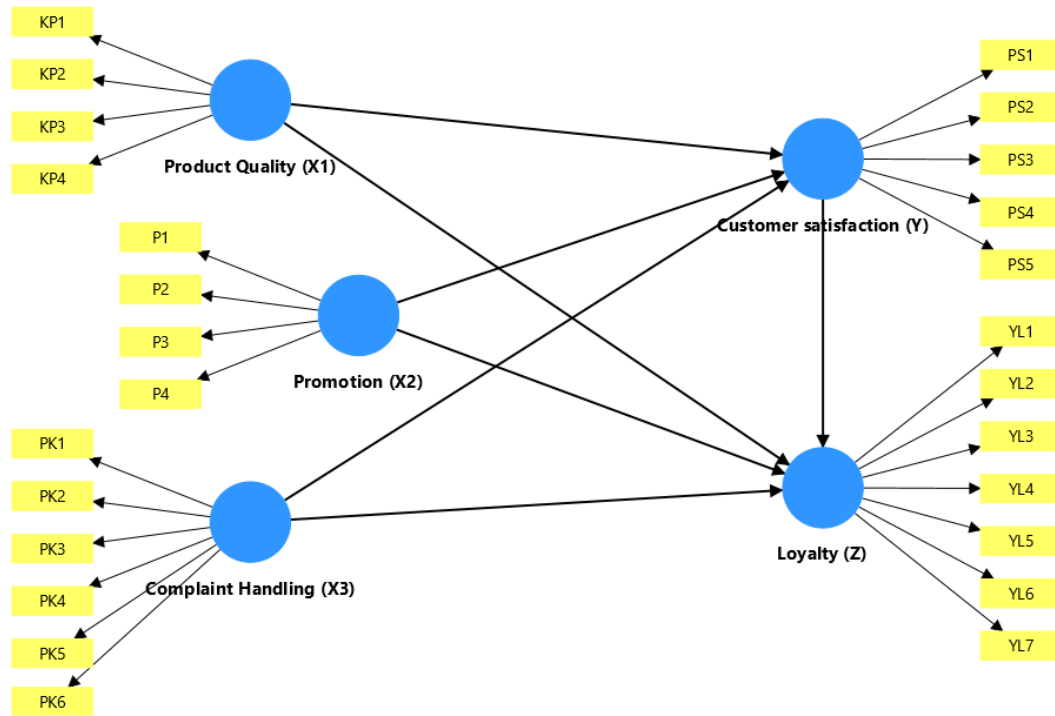


Figure 2 : SEM Modeling

Source : SmartPLS processed data, 2026

Convergen validity

Convergent validity testing was conducted based on outer loading values and the Average Variance Extracted (AVE). According to (Hair, Jr. et al., 2022), an indicator is considered to possess adequate

validity if the outer loading value is ≥ 0.708 , while an AVE value of ≥ 0.50 indicates that the construct has met the criteria for adequate convergent validity.

Table 2: Outer Loading

	Product Quality (X1)	Promotion (X2)	Complaint Handling (X3)	Customer Satisfaction (Y)	Loyalty (Z)
KP1	0.736				
KP2	0.818				
KP3	0.806				

	Product Quality (X1)	Promotion (X2)	Complaint Handling (X3)	Customer Satisfaction (Y)	Loyalty (Z)
KP4	0.801				
P1		0.725			
P2		0.796			
P3		0.864			
P4		0.813			
PK1			0.765		
PK2			0.740		
PK3			0.782		
PK4			0.821		
PK5			0.795		
PK6			0.772		
PS1				0.789	
PS2				0.766	
PS3				0.785	
PS4				0.814	
PS5				0.781	
YL1					0.794
YL2					0.797
YL3					0.757
YL4					0.739
YL5					0.763
YL6					0.767
YL7					0.789

Source : SmartPLS processed data, 2026

All remaining indicators have outer loading values above 0.708. This indicates that each indicator effectively measures the construct it represents and meets the criteria for convergent validity. Consequently, all research indicators are

deemed valid and reliable, making them suitable for analysis in the subsequent stage.

Table 3: Average Variance Extracted (AVE)

	Average variance extracted (AVE)
Product Quality (X1)	0.626
Promotion (X2)	0.642

Complaint Handling (X3)	0.608
Customer Satisfaction (Y)	0.620
Loyalty (Z)	0.597

Source : SmartPLS processed data, 2026

Based on the Average Variance Extracted (AVE) test results presented in Table IV.13, all research constructs exhibit AVE values exceeding the minimum threshold of 0.50, as recommended by Hair et al. (2022). The AVE values are 0.626 for Product Quality (X1), 0.642 for Promotion (X2), 0.608 for Complaint Handling (X3), 0.620 for Customer Satisfaction (Y), and 0.597 for Customer Loyalty (Z).

These values indicate that each construct accounts for more than 50% of the variance in its constituent indicators. Consequently, all constructs satisfy the criteria for convergent validity and are

deemed valid for use in subsequent analyses.

Discriminant Validity

Discriminant validity testing in PLS-SEM models can be conducted using several methods, including Cross-Loading values, the Fornell-Larcker criterion, and the Heterotrait-Monotrait (HTMT) ratio.

According to (Hair, Jr. et al., 2022), an indicator satisfies discriminant validity if its outer loading on the construct it measures is higher than its cross-loading values on other construct.

Table 4: Cross loading

	Product Quality (X1)	Promotion (X2)	Complaint Handling (X3)	Customer Satisfaction (Y)	Loyalty (Z)
KP1	0.736	0.524	0.460	0.455	0.436
KP2	0.818	0.600	0.570	0.558	0.550
KP3	0.806	0.511	0.501	0.451	0.498
KP4	0.801	0.499	0.518	0.506	0.558
P1	0.456	0.725	0.451	0.518	0.423
P2	0.558	0.796	0.550	0.509	0.488
P3	0.557	0.864	0.572	0.519	0.525
P4	0.588	0.813	0.507	0.499	0.507
PK1	0.468	0.547	0.772	0.534	0.543
PK2	0.517	0.459	0.765	0.606	0.651
PK3	0.433	0.424	0.740	0.544	0.552
PK4	0.519	0.557	0.782	0.577	0.552

	Product Quality (X1)	Promotion (X2)	Complaint Handling (X3)	Customer Satisfaction (Y)	Loyalty (Z)
PK5	0.542	0.538	0.821	0.597	0.593
PK6	0.554	0.522	0.795	0.559	0.604
PS1	0.448	0.448	0.550	0.789	0.559
PS2	0.429	0.467	0.565	0.766	0.599
PS3	0.517	0.544	0.584	0.785	0.618
PS4	0.501	0.503	0.576	0.814	0.586
PS5	0.557	0.540	0.603	0.781	0.622
YL1	0.540	0.463	0.589	0.622	0.794
YL2	0.434	0.439	0.526	0.648	0.797
YL3	0.479	0.451	0.511	0.568	0.757
YL4	0.572	0.484	0.574	0.594	0.739
YL5	0.523	0.509	0.614	0.558	0.763
YL6	0.500	0.479	0.625	0.581	0.767
YL7	0.455	0.460	0.609	0.533	0.789

Source : SmartPLS processed data, 2026

Based on the test results in Table IV.14, all indicators for Product Quality (X1), Promotion (X2), Complaint Handling (X3), Customer Satisfaction (Y), and Customer Loyalty (Z) exhibit higher outer loading values for their respective constructs compared to other constructs. Thus, all indicators meet the

discriminant validity criteria based on cross-loading.

According to (Hair, Jr. et al., 2022), the Fornell-Larcker criterion is met when the square root of a construct's AVE exceeds its correlation with other constructs.

Table 5: Fornell Larcker

	Product Quality (X1)	Promotion (X2)	Complaint Handling (X3)	Customer Satisfaction (Y)	Loyalty (Z)
Product Quality (X1)	0.791				
Promotion (X2)	0.675	0.801			
Complaint Handling (X3)	0.650	0.651	0.779		

	Product Quality (X1)	Promotion (X2)	Complaint Handling (X3)	Customer Satisfaction (Y)	Loyalty (Z)
Customer Satisfaction (Y)	0.626	0.638	0.732	0.787	
Loyalty (Z)	0.649	0.608	0.750	0.760	0.773

Source : SmartPLS processed data, 2026

Based on Table IV.15, the square root of the AVE values is 0.791 for Product Quality, 0.801 for Promotion, 0.779 for Complaint Handling, 0.787 for Customer Satisfaction, and 0.773 for Customer Loyalty. All these values exceed the correlations with other constructs. Thus, all constructs meet the discriminant

validity criteria according to the Fornell-Larcker criterion.

According to (Hair, Jr. et al., 2022), an HTMT value below 0.90 can serve as the threshold for constructs sharing conceptual similarities, whereas a value below 0.85 can be used for conceptually distinct constructs.

Table 6: Heterotrait-Monotrait Ratio (HTMT)

	Product Quality (X1)	Promotion (X2)	Complaint Handling (X3)	Customer Satisfaction (Y)	Loyalty (Z)
Product Quality (X1)					
Promotion (X2)	0.836				
Complaint Handling (X3)	0.774	0.775			
Customer Satisfaction (Y)	0.754	0.768	0.850		
Loyalty (Z)	0.764	0.715	0.849	0.874	

Source : SmartPLS processed data, 2026

Based on Table IV.16, all HTMT values are below 0.90, ranging from 0.715 to 0.874. The highest value is observed in the relationship between Customer Satisfaction (Y) and Customer Loyalty (Z), at 0.874. Thus, all constructs

meet the discriminant validity criteria based on HTMT.

Overall, the results from cross-loading, Fornell-Larcker, and HTMT analyses indicate that the indicators and constructs in this study satisfy the discriminant validity criteria. Therefore,

the measurement model is deemed to possess discriminant validity and is suitable for structural model analysis.

Reliability

Reliability testing was conducted to ensure the consistency of the indicators in

measuring the research constructs. According to (Ghozali, 2023) and (Hair, Jr. et al., 2022), a construct is considered reliable if the Cronbach’s Alpha value exceeds 0.70 and the Composite Reliability values (rho_A and rho_C) fall within the 0.70–0.95 range.

Table 7: Cronbach's Alpha dan Composite Reliability

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)
Product Quality (X1)	0.800	0.807	0.870
Promotion (X2)	0.812	0.815	0.877
Complaint Handling (X3)	0.871	0.872	0.903
Customer Satisfaction (Y)	0.846	0.847	0.891
Loyalty (Z)	0.887	0.888	0.912

Source : SmartPLS processed data, 2026

Based on the test results in Table IV.17, all constructs meet the reliability criteria. Cronbach’s Alpha values range from 0.800 to 0.887, Composite Reliability (rho_A) values range from 0.807 to 0.888, and Composite Reliability (rho_C) values range from 0.870 to 0.912. All these values exceed the required thresholds, indicating that

the indicators for Product Quality (X1), Promotion (X2), Complaint Handling (X3), Customer Satisfaction (Y), and Customer Loyalty (Z) demonstrate good internal consistency. Consequently, all constructs are deemed reliable and suitable for further analysis.

Structural model

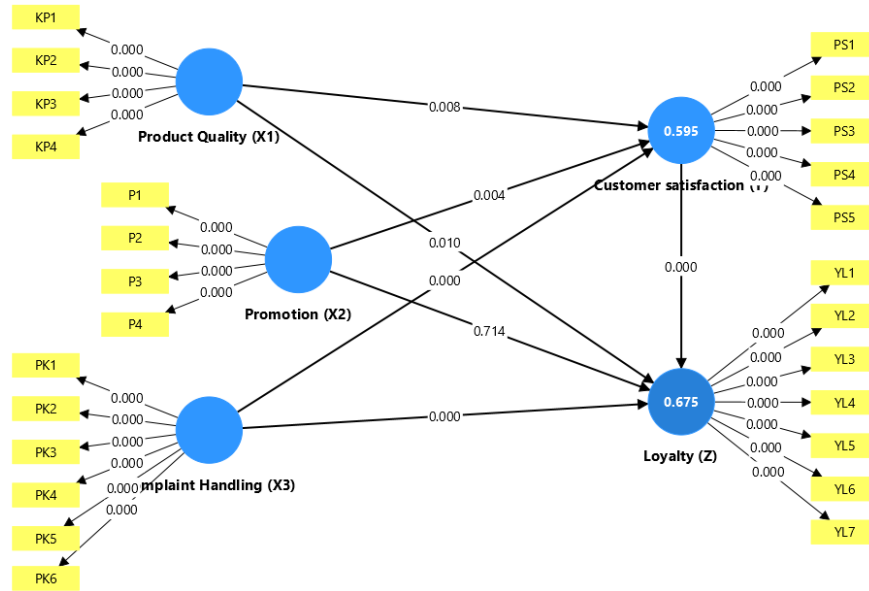


Figure 3 : Bootstrapping Results

Source : SmartPLS processed data, 2026

Once the measurement model meets the criteria for validity and reliability, the next stage is the evaluation of the structural model (inner model). According to (Hair, Jr. et al., 2022), the evaluation of the inner model aims to assess the model's ability to explain the relationships between constructs and to test hypotheses. This evaluation is conducted using the Variance Inflation

Factor (VIF), R-square, effect size (f^2), path coefficients, and specific indirect effects.

Collinearity Statistics (VIF)

According to (Hair, Jr. et al., 2022), a VIF value below 5 indicates the absence of collinearity issues, whereas a value below 3 indicates a favorable condition.

Table 8: Variance Inflation Factor (VIF)

Relationships Between Constructs	VIF
Customer Satisfaction (Y) -> Loyalty (Z)	2.467
Product Quality (X1) -> Customer Satisfaction (Y)	2.142
Product Quality (X1) -> Loyalty (Z)	2.212

Relationships Between Constructs	VIF
Complaint Handling (X3) -> Customer Satisfaction (Y)	2.022
Complaint Handling (X3) -> Loyalty (Z)	2.611
Promotion (X2) -> Customer Satisfaction (Y)	2.145
Promotion (X2) -> Loyalty (Z)	2.250

Source : SmartPLS processed data, 2026

Based on Table IV.18, all VIF values fall within the range of 2.022–2.611 and are below 3. Thus, the structural model does not exhibit multicollinearity issues and meets the collinearity criteria.

Koefisien Determinasi (*R-Square*)

According to (Hair, Jr. et al., 2022), R-square values of 0.25, 0.50, and 0.75 indicate weak, moderate, and strong explanatory power, respectively.

Table 9: R-Square

	R-square	R-square adjusted
Customer Satisfaction (Y)	0.595	0.590
Loyalty (Z)	0.675	0.669

Source : SmartPLS processed data, 2026

Based on Table IV.19, the R-square value for Customer Satisfaction (Y) is 0.595, and for Customer Loyalty (Z) it is 0.675. This means the model explains 59.5% of the variation in Customer Satisfaction and 67.5% of the variation in Customer Loyalty, while the remainder is explained by factors outside

the model. The adjusted R-square values are 0.590 and 0.669, respectively.

Effect Size (*f*²)

According to (Hair, Jr. et al., 2022), *f*² values of 0.02, 0.15, and 0.35 indicate small, medium, and large effects.

Table 10: Effect size (f -Square)

	Product Quality (X1)	Promotion (X2)	Complaint Handling (X3)	Customer Satisfaction (Y)	Loyalty (Z)
Product Quality (X1)				0.033	0.039
Promotion (X2)				0.049	0.001
Complaint Handling (X3)				0.291	0.134
Customer Satisfaction (Y)					0.191
Loyalty (Z)					

Source : SmartPLS processed data, 2026

Based on Table IV.20, the effects of Product Quality on Customer Satisfaction (0.033) and Customer Loyalty (0.039), as well as the effects of Promotion on Customer Satisfaction (0.049) and Customer Loyalty (0.001), are small to negligible. Complaint Handling has a moderate effect on Customer Satisfaction (0.291) and a small effect on Customer Loyalty

(0.134), while the effect of Customer Satisfaction on Customer Loyalty is moderate (0.191).

Path Coefficient (Direct Effect)

According to (Hair, Jr. et al., 2022), path coefficient testing is used to determine the direction and magnitude of the relationship between constructs, with a significant effect if the t-statistic is > 1.96 and the p-value is < 0.05.

Table 11: Path Coefficient (Direct Effect)

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
Product Quality (X1) -> Customer Satisfaction (Y)	0.169	0.166	0.064	2.648	0.004
Product Quality (X1) -> Customer Loyalty (Z)	0.168	0.169	0.065	2.580	0.005

	<i>Original sample (O)</i>	<i>Sample mean (M)</i>	<i>Standard deviation (STDEV)</i>	<i>T statistics (O/STDEV)</i>	<i>P values</i>
Promotion (X2) -> Customer Satisfaction (Y)	0.205	0.209	0.071	2.894	0.002
Promotion (X2) -> Customer Loyalty (Z)	0.025	0.033	0.069	0.367	0.357
Complaint Handling (X3) -> Customer Satisfaction (Y)	0.489	0.493	0.073	6.672	0.000
Complaint Handling (X3) -> Customer Loyalty (Z)	0.338	0.346	0.069	4.877	0.000
Customer Satisfaction (Y) -> Customer Loyalty (Z)	0.391	0.376	0.096	4.065	0.000

Source : SmartPLS processed data, 2026

Based on the table above, the direct effect can be explained as follows:

H1: Product Quality (X1) has a positive and significant direct effect on Customer Satisfaction (Y). The original sample is 0.169, with a T-statistic value of 2.648 > 1.96 and a P-value of 0.004 < 0.05. Thus, H1 is accepted, indicating that better product quality leads to higher customer satisfaction.

H2: Product Quality (X1) has a positive and significant direct effect on Customer Loyalty (Z). The original sample is 0.168, with a T-statistic value of 2.580 > 1.96 and a P-value of 0.005 < 0.05. Thus, H2 is accepted, indicating that better product quality leads to higher customer loyalty.

H3: Promotion (X2) has a positive and significant direct effect on Customer Satisfaction (Y). The original sample is 0.205, with a T-statistic value of 2.894 > 1.96 and a P-value of 0.002 < 0.05. Thus, H3 is accepted, indicating that more effective promotion leads to higher customer satisfaction.

H4: Promotion (X2) has no significant direct effect on Customer Loyalty (Z). The original sample is 0.025, with a T-statistic value of 0.367 < 1.96 and a P-value of 0.357 > 0.05. Thus, H4 is rejected, indicating that promotion does not directly increase customer loyalty.

H5: Complaint Handling (X3) has a positive and significant direct effect on Customer Satisfaction (Y). The original sample is 0.489, with a T-

statistic value of $6.672 > 1.96$ and a P-value of $0.000 < 0.05$. Thus, H5 is accepted, indicating that better complaint handling leads to higher customer satisfaction.

H6: Complaint Handling (X3) has a positive and significant direct effect on Customer Loyalty (Z). The original sample is 0.338, with a T-statistic value of $4.877 > 1.96$ and a P-value of $0.000 < 0.05$. Thus, H6 is accepted, indicating that better complaint handling leads to higher customer loyalty.

H7: Customer Satisfaction (Y) has a positive and significant direct effect

on Customer Loyalty (Z). The original sample is 0.391, with a T-statistic value of $4.065 > 1.96$ and a P-value of $0.000 < 0.05$. Thus, H7 is accepted, indicating that higher customer satisfaction leads to higher customer loyalty.

Specific Indirect Effect (Uji Mediasi)

Menurut (Hair, Jr. et al., 2022), pengaruh tidak langsung dalam PLS-SEM dapat diuji melalui prosedur *bootstrapping*, dengan pengaruh dinyatakan signifikan apabila *t-statistic* $> 1,96$ atau *p-value* $< 0,05$.

Table 12: Specific Indirect Effect

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
Product Quality (X1) -> Customer Satisfaction (Y) -> Customer Loyalty (Z)	0.066	0.063	0.031	2.108	0.018
Promotion (X2) -> Customer Satisfaction (Y) -> Customer Loyalty (Z)	0.080	0.078	0.033	2.436	0.007
Complaint Handling (X3) -> Customer Satisfaction (Y) -> Customer Loyalty (Z)	0.191	0.183	0.047	4.058	0.000

Source : SmartPLS processed data, 2026

Based on the table above, the indirect effect can be explained as follows:

H8: Product Quality (X1) has a positive and significant indirect effect on Customer Loyalty (Z) through Customer Satisfaction (Y). The

original sample is 0.066, with a T-statistic value of $2.108 > 1.96$ and a P-value of $0.018 < 0.05$. Thus, H8 is accepted, indicating that Customer Satisfaction mediates the effect of Product Quality on Customer Loyalty.

H9: Promotion (X2) has a positive and significant indirect effect on Customer Loyalty (Z) through Customer Satisfaction (Y). The original sample is 0.080, with a T-statistic value of $2.436 > 1.96$ and a P-value of $0.007 < 0.05$. Thus, H9 is accepted, indicating that Customer Satisfaction mediates the effect of Promotion on Customer Loyalty.

H10: Complaint Handling (X3) has a positive and significant indirect effect on Customer Loyalty (Z) through

Customer Satisfaction (Y). The original sample is 0.191, with a T-statistic value of $4.058 > 1.96$ and a P-value of $0.000 < 0.05$. Thus, H10 is accepted, indicating that Customer Satisfaction mediates the effect of Complaint Handling on Customer Loyalty.

Evaluasi Model Fit

According to Hair et al. (2022), the evaluation of model fit in PLS-SEM serves as supporting information for assessing the overall quality of the model.

Table 13: Model fit

	<i>Saturated model</i>	<i>Estimated model</i>
SRMR	0.058	0.058
d_ULS	1.199	1.199
d_G	0.482	0.482
Chi-square	681.606	681.606
NFI	0.821	0.821

Source : SmartPLS processed data, 2026

Based on Table IV.23, the SRMR value of 0.058 which is below the 0.08 threshold indicates that the model has good fit. The d_ULS value of 1.199 and d_G value of 0.482 also indicate a relatively low level of discrepancy. Meanwhile, the NFI value of 0.821 remains below the 0.90 benchmark; however, NFI is not a primary measure in PLS-SEM evaluation. Thus, overall, the model demonstrates adequate fit with the empirical data.

Predictive Assessment

According to Hair et al. (2022), a model's predictive capability can be evaluated using $Q^2_{predict}$, RMSE, and MAE. A model possesses good predictive capability if the $Q^2_{predict}$ value is greater than 0 and the majority of the PLS-SEM RMSE values are lower than those of the linear model.

Table 14: PLSpredict MV summary

	$Q^2_{predict}$	PLS-SEM_RMSE	PLS-SEM_MAE	LM_RMSE	LM_MAE
PS1	0.300	0.540	0.397	0.567	0.424
PS2	0.322	0.556	0.394	0.576	0.432

	Q ² predict	PLS-SEM_RMSE	PLS-SEM_MAE	LM_RMSE	LM_MAE
PS3	0.378	0.490	0.333	0.514	0.361
PS4	0.354	0.489	0.336	0.507	0.358
PS5	0.402	0.500	0.354	0.529	0.375
YL1	0.374	0.444	0.288	0.468	0.325
YL2	0.271	0.512	0.334	0.533	0.384
YL3	0.286	0.541	0.385	0.572	0.412
YL4	0.376	0.515	0.377	0.533	0.399
YL5	0.401	0.442	0.315	0.466	0.328
YL6	0.389	0.453	0.320	0.476	0.339
YL7	0.355	0.484	0.326	0.511	0.356

Source : SmartPLS processed data, 2026

Based on Table IV.24, all Q²predict values fall within the range of 0.271–0.402 and are positive. Furthermore, all PLS-SEM RMSE and MAE values are lower than those of the Linear Model. These results indicate that the model possesses high predictive power and is capable of generating accurate predictions for the observed data.

4.2. Discussion

Product Quality (X1) has a positive and significant direct effect on Customer Satisfaction (Y). The original sample is 0.169, the T-statistic value is $2.648 > 1.96$, and the P-value is $0.004 < 0.05$. Thus, H1 is accepted. The results of this study are in line with previous research by (Manadona & Wadud, 2026) and (Ridwan, 2025), which stated that product quality has a positive and significant effect on customer satisfaction. This result indicates that good product or service quality can provide convenience and a positive experience for customers. At PT PLN (Persero) ULP Depok Kota, reliable electricity services, easy access to services, and fast service processes can increase customer satisfaction.

Product Quality (X1) has a positive and significant direct effect on Customer Loyalty (Z). The original sample is 0.168, the T-statistic value is $2.580 > 1.96$, and the P-value is $0.005 < 0.05$. Thus, H2 is accepted. The results of this study are in line with previous research by (Daniswara & Rahardjo, 2023) and (Hartini & Heriputranto, 2025), which stated that product quality has a positive and significant effect on customer loyalty. This result indicates that good service quality, including easy access, reliability, and consistent service, can create positive customer experiences and strengthen customer perceptions of the quality of services provided.

Promotion (X2) has a positive and significant direct effect on Customer Satisfaction (Y). The original sample is 0.205, the T-statistic value is $2.894 > 1.96$, and the P-value is $0.002 < 0.05$. Thus, H3 is accepted. The results of this study are in line with previous research by (Giawa et al., 2025) and (Taufik Harijanto et al., 2023), which stated that promotion has a positive and significant effect on customer satisfaction. This result indicates that promotion that builds a positive reputation can increase customer confidence in the products or

services offered. At PT PLN (Persero) ULP Depok Kota, positive promotional information can strengthen customers' confidence in using PLN services and contribute to their satisfaction.

Promotion (X2) does not have a significant direct effect on Customer Loyalty (Z). The original sample is 0.025, the T-statistic value is $0.367 < 1.96$, and the P-value is $0.357 > 0.05$. Thus, H4 is rejected. This result is not in line with previous research by (Basuki & Tami, 2022) and (Say & Arsita, 2025), which stated that promotion has a positive and significant effect on customer loyalty. However, this result is in line with (Wahyuningtyas & Prabowo, 2024) and (Wijayanti et al., 2025), which found that promotion does not have a positive effect on customer loyalty. This result indicates that promotional information alone is not sufficient to directly build customer loyalty. Customer loyalty is also related to service experience, service consistency, and customer trust.

Complaint Handling (X3) has a positive and significant direct effect on Customer Satisfaction (Y). The original sample is 0.489, the T-statistic value is $6.672 > 1.96$, and the P-value is $0.000 < 0.05$. Thus, H5 is accepted. The results of this study are in line with previous research by (Alyanas, 2024), (Christiana Iman Kalis et al., 2025), and (Odang & Yohanes, 2026), which stated that complaint handling has a positive and significant effect on customer satisfaction. This result indicates that sincere apologies in handling customer complaints can reflect the company's concern and responsibility, thereby creating a more positive service experience. At PT PLN (Persero) ULP Depok Kota, appropriate complaint handling can provide comfort and convenience for customers in interacting with and obtaining services.

Complaint Handling (X3) has a positive and significant direct effect on Customer Loyalty (Z). The original sample is 0.338, the T-statistic value is $4.877 > 1.96$, and the P-value is $0.000 < 0.05$. Thus, H6 is accepted. The results of this study are in line with previous research by (Agung et al., 2026) and (Hermawati, 2023), which stated that complaint handling has a positive and significant effect on customer loyalty. This result indicates that sincere complaint handling can reflect the company's concern and commitment, thereby creating positive perceptions of service quality. At PT PLN (Persero) ULP Depok Kota, empathetic, responsive, and professional complaint handling can provide a positive experience and strengthen customer trust in PLN services.

Customer Satisfaction (Y) has a positive and significant direct effect on Customer Loyalty (Z). The original sample is 0.391, the T-statistic value is $4.065 > 1.96$, and the P-value is $0.000 < 0.05$. Thus, H7 is accepted. The results of this study are in line with previous research by (Farouk, 2024) and (Pasaribu & Simanjuntak, 2023), which stated that customer satisfaction has a positive and significant effect on customer loyalty. This result indicates that convenience in accessing, obtaining, and using services can create positive experiences and strengthen customers' perceptions of service quality. At PT PLN (Persero) ULP Depok Kota, easy access, service availability, and fast service processes can increase customer satisfaction and strengthen customer loyalty.

Product Quality (X1) has a positive and significant indirect effect on Customer Loyalty (Z) through Customer Satisfaction (Y). The original sample is 0.066, the T-statistic value is $2.108 > 1.96$, and the P-value is $0.018 < 0.05$. Thus, H8 is accepted. The results of this

study are in line with previous research by (Hardini, 2024) and (Yudra, 2024), which stated that customer satisfaction can mediate the effect of product quality on customer loyalty. This result indicates that good perceptions of product quality can increase customer satisfaction because the products or services are considered capable of meeting customer needs and expectations. The resulting satisfaction can then strengthen customers' attachment to the company and encourage continued use of its services.

Promotion (X2) has a positive and significant indirect effect on Customer Loyalty (Z) through Customer Satisfaction (Y). The original sample is 0.080, the T-statistic value is $2.436 > 1.96$, and the P-value is $0.007 < 0.05$. Thus, H9 is accepted. The results of this study are in line with previous research by (Iryantini & Tjahjaningsih, 2025) and (Khairia et al., 2025), which stated that customer satisfaction can mediate the effect of promotion on customer loyalty. This result indicates that promotion that builds a positive reputation can increase customer confidence and create a satisfying service experience. The satisfaction obtained can then strengthen customers' perceptions of service quality and encourage customer loyalty.

Complaint Handling (X3) has a positive and significant indirect effect on Customer Loyalty (Z) through Customer Satisfaction (Y). The original sample is 0.191, the T-statistic value is $4.058 > 1.96$, and the P-value is $0.000 < 0.05$. Thus, H10 is accepted. The results of this study are in line with previous research by (Adha et al., 2025), (Odang & Yohanes, 2026), and (Sintia et al., 2024), which stated that customer satisfaction can mediate the effect of complaint handling on customer loyalty. This result indicates that sincere, responsive, and professional complaint handling can

improve customer satisfaction and strengthen customers' perceptions of service quality, which ultimately supports customer loyalty toward PT PLN (Persero) ULP Depok Kota.

5. CONCLUSION

Based on the research findings regarding the influence of product quality, promotion, and complaint handling on customer loyalty with customer satisfaction acting as an intervening variable at PT PLN (Persero) ULP Depok Kota, the following conclusions can be drawn:

- 1) Product quality has a direct influence on customer satisfaction at PT PLN (Persero) ULP Depok Kota. This indicates that the better the quality of the product and electricity services perceived by customers, the higher the level of customer satisfaction.
- 2) Product quality has a direct influence on customer loyalty at PT PLN (Persero) ULP Depok Kota. This means that improving the quality of the product and electricity services can encourage customers to continue using PLN's services.
- 3) Promotion has a direct influence on customer satisfaction at PT PLN (Persero) ULP Depok Kota. This indicates that promotions conducted effectively and in alignment with customer needs can enhance customer satisfaction.
- 4) Promotion does not have a direct influence on customer loyalty at PT PLN (Persero) ULP Depok Kota. This means that promotion has not yet been able to directly increase customer loyalty.
- 5) Complaint handling has a direct influence on customer satisfaction at PT PLN (Persero) ULP Depok Kota. This indicates that complaint handling that is fast, accurate, and responsive to customer needs can increase customer satisfaction.

- 6) Complaint handling has a direct influence on customer loyalty at PT PLN (Persero) ULP Depok Kota. This means that the better the company handles customer complaints, the greater the likelihood that customers will continue using PLN's services.
- 7) Customer satisfaction has a direct influence on customer loyalty at PT PLN (Persero) ULP Depok Kota. This indicates that the higher the satisfaction experienced by customers, the stronger their loyalty to the company.
- 8) Product quality influences customer loyalty through customer satisfaction acting as an intervening variable. Thus, customer satisfaction mediates the influence of product quality on customer loyalty.
- 9) Promotion influences customer loyalty through customer satisfaction, which acts as an intervening variable. This indicates that although promotion does not directly affect customer loyalty, it can influence loyalty through customer satisfaction.
- 10) Complaint handling influences customer loyalty through customer satisfaction, which acts as an intervening variable. This means that effective complaint handling can enhance customer satisfaction, thereby strengthening customer loyalty at PT PLN (Persero) ULP Depok Kota.

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