

The Role of Digital Marketing in Mediating the Effect of E-Service Quality on E-Satisfaction Among Users of the PLN Mobile App at PT. PLN UP3 Pematang Siantar

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Abstract

This study aims to analyze the role of digital marketing in mediating the effect of e-service quality on e-satisfaction among users of the PLN Mobile app at PT PLN UP3 Pematang Siantar. This study employs a quantitative approach using primary data collected via a questionnaire administered to 220 users of the PLN Mobile app. Data analysis was conducted using the Partial Least Squares method with SmartPLS. The research variables consist of e-service quality as the independent variable, digital marketing as the mediating variable, and e-satisfaction as the dependent variable. The results of the outer model test indicate that all indicators are valid with outer loading values above 0.70. The Cronbach's Alpha and Composite Reliability values for all constructs are also above 0.70; the research instrument is deemed reliable. The R-square results indicate that e-service quality explains 18.4 percent of the variance in digital marketing, while e-service quality and digital marketing together explain 52 percent of the variance in e-satisfaction. Hypothesis testing results show that e-service quality has a positive and significant effect on e-satisfaction with a t-statistic of 3.185 and a p-value of 0.002. E-service quality also has a positive and significant effect on digital marketing with a t-statistic of 7.737 and a p-value of 0.000. Digital marketing has a positive and significant effect on e-satisfaction with a t-statistic of 14.031 and a p-value of 0.000. Furthermore, digital marketing was found to mediate the effect of e-service quality on e-satisfaction, with a t-statistic of 6.630 and a p-value of 0.000. This study indicates that improving the quality of electronic services must be supported by effective digital marketing to enhance user satisfaction with the PLN Mobile app.

Keywords: E-satisfaction, E-service Quality, Digital Marketing

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Introduction

In the context of digital services, e-satisfaction serves as a key indicator for assessing an application's success in meeting users' needs and expectations. E-satisfaction describes users' evaluations after using a digital service. These evaluations encompass the user experience, perceived benefits, transaction convenience, ease of access, and the alignment of the service with user expectations. For the PLN Mobile app, e-satisfaction is crucial because the success of PLN's digital transformation cannot be measured solely by the number of downloads but also by the extent to which customers feel satisfied after using the app.

PLN Mobile is a digital service app developed by PT PLN (Persero) to make it easier for customers to access electricity services. Through this app, customers can pay their electricity bills, purchase tokens, report outages, apply for new connections, request a power upgrade, self-read their meters, and access other service information. The launch of PLN Mobile demonstrates that PLN is striving to transition most of its customer services from conventional systems to digital systems. However, digital services will only succeed if the app is able to provide a fast, easy, clear, stable, and satisfying experience for users.

At the corporate level, PLN reported that by July 2025, the PLN Mobile app had reached 58 million downloads and 76 million registered customer IDs. Meanwhile, the number of PLN customers at the end of 2024 stood at 92,877,292. These figures indicate that adoption of the PLN Mobile app continues to rise. However, a high number of downloads does not necessarily indicate high user satisfaction. Customers may download the app out of necessity for its services, but they may not be satisfied if the app experiences technical issues, features are difficult to understand, service information is unclear, or complaints are not handled effectively.

Research findings from the past five years also indicate that user satisfaction with PLN Mobile remains a significant issue. Luthfiani, Yuhefizar, and Sudiman (2024) found that e-service quality has a significant impact on customer satisfaction among PLN Mobile users in Padang Panjang. Lulu, Sutrisna, and Patimah (2024) also demonstrated that e-service quality has a positive and significant effect on customer satisfaction among PLN Mobile users at the Rajapolah ULP. Sarwindah, Mariska, and Marini (2025) similarly found that the quality of electronic services plays a crucial role in shaping the e-satisfaction of PLN Mobile users. These research results indicate that the satisfaction of PLN Mobile app users remains closely linked to the quality of electronic services received by users.

To obtain an initial overview of the empirical conditions of the study, a pre-survey was conducted among 20 users of the PLN Mobile app within the operational area of PT PLN UP3 Pematang Siantar. This pre-survey was designed to examine respondents' perceptions regarding three main variables: e-satisfaction, digital marketing, and e-service quality. The results of the pre-survey for the e-satisfaction variable are presented in the following table.

Table 1. Pre-Survey of the E-Satisfaction Variable

No	Statement	Agree	Disagree	Total
1	I am satisfied with the PLN Mobile app	11	9	20
2	PLN Mobile helps me meet my electricity service needs effectively	12	8	20
3	My overall experience using PLN Mobile has been satisfactory	10	10	20
4	I am willing to continue using PLN Mobile because I am satisfied	9	11	20

Source: Pre-survey results, 2026

Based on Table 1, the level of e-satisfaction among users of the PLN Mobile app at PT PLN UP3 Pematang Siantar is not yet fully established. Some respondents stated they were satisfied and felt assisted in meeting their electricity service needs. However, there are still 8 to 11 respondents who have not yet fully experienced satisfaction. Regarding the indicator of willingness to continue using the app due to satisfaction, the number of respondents who

disagreed was greater than those who agreed. This indicates that user satisfaction with PLN Mobile's electronic services still requires further in-depth analysis.

One factor believed to influence e-satisfaction is e-service quality. In app-based services, e-service quality refers to the ability of a digital system to provide services that are fast, clear, responsive, easy to understand, stable, and tailored to user needs. In the PLN Mobile app, e-service quality can be assessed based on the app's speed, the ease of understanding service information, the smooth operation of features, and the quality of complaint handling or service requests.

The pre-survey results for the e-service quality variable are presented in the following table.

Table 2. Pre-Survey of the E-Service Quality Variable

No	Statement	Agree	Disagree	Total
1	The PLN Mobile app provides fast service when used	12	8	20
2	The service information on the PLN Mobile app is easy to understand	13	7	20
3	The features in the PLN Mobile app work well when used	11	9	20
4	Complaints or service requests submitted through the app are handled well	10	10	20

Source: Pre-survey results, 2026

Based on Table 2, respondents' perceptions of e-service quality are not yet fully optimal. Twelve respondents rated the app as providing fast service, and 13 respondents rated the service information as easy to understand. However, there are still 8 to 10 respondents who believe that the digital services within the app are not yet fully fast, stable, and satisfactory. Regarding the indicator for handling complaints or service requests, the number of respondents who agreed and disagreed was equal. This indicates that the quality of PLN Mobile's electronic services still faces issues regarding service consistency.

This issue is important to study because e-service quality is a key factor in determining user satisfaction. Users are more likely to be satisfied if the app operates quickly, service information is easy to understand, features function smoothly, and complaints are handled effectively. Conversely, if the app is slow, features are unstable, or issues are not addressed promptly, users are likely to feel disappointed. Thus, e-service quality has a significant impact on user e-satisfaction with the PLN Mobile app.

In addition to e-service quality, this study identifies digital marketing as a mediating variable. Digital marketing is not merely understood as promotional activities. It also encompasses the communication of feature information, education on app usage, communication of service benefits, and the strengthening of relationships between the company and customers through digital channels. In the context of PLN Mobile, digital marketing can be conducted through social media, the official website, app notifications, educational content, digital campaigns, and service information that helps customers understand how to use the app.

Digital marketing is important because high-quality e-services do not necessarily lead to immediate satisfaction if users do not understand the features and benefits of the application. Users may encounter obstacles not only due to the application system itself, but also because the information they receive is unclear or unengaging. Therefore, digital marketing can serve as a bridge between e-service quality and e-satisfaction. When high-quality electronic services are supported by clear and engaging digital communication, users will find it easier to understand the application's benefits. This understanding can enhance user satisfaction.

The results of the pre-survey for digital marketing variables are presented in the following table.

Table 3. Pre-Survey of Digital Marketing Variables

No	Statement	Agree	Disagree	Total
1	Promotional information or features of PLN Mobile are easy to find on digital media	12	8	20
2	PLN's digital content about PLN Mobile caught my attention	9	11	20
3	PLN's social media or digital channels helped me understand the benefits of PLN Mobile	10	10	20
4	PLN's digital promotions encourage me to use PLN Mobile more often	8	12	20

Source: Pre-survey results, 2026

Based on Table 3, PLN Mobile's digital marketing has not yet yielded entirely strong results. A total of 12 respondents stated that promotional information or features of PLN Mobile on digital media are easy to find. However, regarding the indicator of digital content appeal, only 9 respondents agreed, while 11 respondents disagreed. Regarding the indicator of social media or digital channels' assistance in understanding the benefits of PLN Mobile, the number of respondents who agreed and disagreed was equal. Furthermore, regarding the indicator of digital promotions encouraging more frequent use of PLN Mobile, only 8 respondents agreed, while 12 respondents disagreed.

These results indicate that PLN Mobile's digital marketing efforts are not yet fully effective in capturing attention, enhancing understanding, and encouraging more frequent use of the app. Yet digital marketing plays a crucial role in shaping users' perceptions of digital services. Clear information, engaging content, and consistent digital communication can help users understand the app's benefits. With a better understanding, users can more strongly appreciate the value of the service and are likely to experience higher levels of satisfaction.

Research by Putri and Kusuma (2025) shows that the use of PLN Mobile in the Balongdowo Thematic Village program is part of PLN UP3 Sidoarjo's digital marketing implementation to improve public understanding of PLN's digital services. Iryantini and Tjahjaningsih (2025) also found that digital self-service and social media promotion have a positive and significant impact on customer satisfaction. These findings suggest that digital marketing can help companies build customer understanding, engagement, and satisfaction with digital services.

Based on the above discussion, digital marketing should be considered a mediating variable in the relationship between e-service quality and e-satisfaction. Good e-service quality can create a positive service experience. However, that experience will be stronger if supported by digital marketing that can explain the benefits of the app, convey service information, and encourage users to make optimal use of the PLN Mobile features. Thus, digital marketing can strengthen the influence of e-service quality on the e-satisfaction of PLN Mobile app users.

At PT PLN UP3 Pematang Siantar, this study is important because the results of the preliminary survey indicate that user e-satisfaction is not yet fully optimal, e-service quality still faces issues regarding service consistency, and digital marketing has not been fully effective in promoting understanding and usage of the application. These conditions indicate the presence of empirical issues that need to be systematically examined. Furthermore, previous research over the past five years has primarily focused on the direct impact of e-service quality on customer satisfaction or e-satisfaction. Research specifically examining digital marketing as a mediating variable among PLN Mobile users at PT PLN UP3 Pematang Siantar still needs to be developed.

Thus, the study titled "The Role of Digital Marketing in Mediating the Effect of E-Service Quality on E-Satisfaction Among Users of the PLN Mobile App at PT PLN UP3 Pematang Siantar" is important to conduct. This study is expected to provide an empirical explanation of the influence of e-service quality on e-satisfaction, as well as to explain the role of digital marketing as a mediating mechanism in this relationship. The results of this study are also

expected to serve as input for PT PLN UP3 Pematang Siantar in improving the service quality of the PLN Mobile app, strengthening digital marketing strategies, and enhancing the satisfaction of users of PLN's digital services.

Literature Review

Theoretical Framework

E-Satisfaction

Definition of E-Satisfaction

According to Lesmana & Balqiah (2023), the study of PLN Mobile e-satisfaction refers to the level of customer satisfaction with digital services (the PLN Mobile app) arising from the experience of using electronic services and the quality of services received online.

E-Satisfaction Indicators

E-satisfaction indicators according to Lesmana & Balqiah (2023).

1) **Expectation-Performance Fit**

This indicator measures the extent to which an app's performance meets users' expectations before they use the service. In the context of PLN Mobile, users will be satisfied if the available features—such as bill payment or checking electricity information—function as they expect. The greater the alignment between expectations and experience, the higher the level of user satisfaction.

2) **Overall Satisfaction**

This indicator reflects users' general assessment after using the app. Overall satisfaction is a comprehensive evaluation of the user experience, not just a single feature. If users feel that the services provided by PLN Mobile are high-quality and meet their needs, they will give a positive overall rating.

3) **Enjoyable Experience**

This indicator relates to feelings of comfort and enjoyment while using the app. A good experience is demonstrated through ease of use, an attractive interface, and minimal obstacles during the usage process. In this context, user experience (UX) is a key factor influencing satisfaction levels with digital services.

4) **The Right Decision to Use the App**

This indicator reflects users' confidence that choosing PLN Mobile was the right decision. When users feel that the app offers benefits, efficiency, and convenience compared to other alternatives, they will assess that their decision to use the app was correct, which ultimately increases satisfaction.

5) **Intention to use again**

This indicator shows users' tendency to use the app again in the future. Although often associated with loyalty, in this study, the desire to use the app again remains part of a reflection of user satisfaction. Positive experiences will encourage users to continue using the PLN Mobile service consistently.

Digital Marketing

Definition of Digital Marketing

According to Chaffey (2022), digital marketing in the context of mobile app usage involves the use of digital technologies and channels to communicate value, promote services, and build and maintain relationships with users through mobile devices in an effective and measurable manner. In the context of the PLN Mobile app, digital marketing encompasses strategies such as leveraging social media, search engines, digital advertising, email marketing, and online partnerships to increase awareness, drive app usage, and strengthen user engagement with PLN's digital-based services.

Digital Marketing Indicators

According to Chaffey (2022), the use of digital mobile apps like PLN Mobile is measured by the following indicators:

- 1) Search Engine Marketing (SEM)
This indicator relates to how mobile apps can be found through search engines like Google. In the context of the PLN Mobile app, this includes the ease with which users can find information about the app, its services, and features through online searches. The easier the app is to find and access, the more effective the digital marketing strategy is.
- 2) Online Public Relations (Online PR)
This indicator describes how a company builds its image and reputation through digital media. In the context of mobile apps, Online PR can take the form of positive information about PLN Mobile on the official website, news portals, or other online media. A good image will increase user trust and interest in using the app.
- 3) Online Partnerships
This indicator reflects collaboration with other parties in the digital ecosystem, such as partnerships with payment platforms, e-commerce sites, or influencers. In the context of PLN Mobile, these partnerships can simplify transactions for users or expand the app's reach.
- 4) Interactive Advertising
This indicator relates to the use of interactive digital advertising, such as ads on social media, promotional videos, or digital banners. In mobile apps, engaging and interactive ads can increase user interest in downloading and using the PLN Mobile app.
- 5) Opt-in Email Marketing
This indicator refers to the use of email as a marketing communication tool for users who have given their consent. In the context of mobile apps, email can be used to provide information on electricity bills, promotions, or app feature updates, thereby maintaining a relationship with users.
- 6) Social Media Marketing
This indicator relates to the use of social media to promote the app and interact with users. In the context of PLN Mobile, social media is used to convey information and education, as well as to respond quickly to user complaints or questions.

E-Service Quality

Definition of E-Service Quality

According to Wang et al. (2023–2024), E-service quality is users' assessment of digital service performance, which includes the app's speed, ease of use, security, and reliability. In PLN Mobile: fast access, smooth transactions, and a secure system.

E-Service Quality Indicators

Wang et al. (2023–2024) emphasize that e-service quality in mobile applications is measured through the following key aspects:

- 1) Speed of Service
This indicator shows how quickly the application responds to users. In the context of mobile applications, access speed, transaction processing, and feature loading are important factors in shaping perceptions of service quality.
- 2) Ease of Use
This indicator describes the extent to which the app is easy for users to understand and operate. Apps with simple navigation and clear features will enhance the perception of digital service quality.
- 3) System Reliability
This indicator relates to the consistency of the app's performance in delivering services without errors or disruptions. Users will rate the quality as high if the app is stable and accessible at any time.

- 4) Service Security
This indicator shows the level of protection for users' personal data and transactions. The more secure an application is, the higher the perceived quality of service experienced by users.
- 5) Service Responsiveness
This indicator describes the ability of the system or customer service to respond to user needs, questions, or complaints quickly and accurately.
- 6) Interaction Quality
This indicator assesses how users interact with the system or support services within the application, including customer service features, chatbots, or digital help centers.

Conceptual Framework

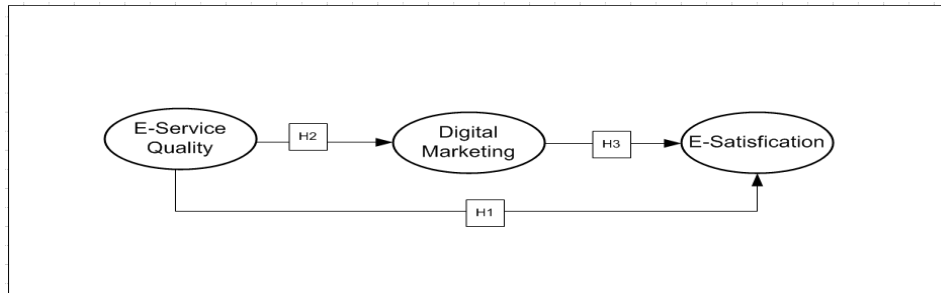


Figure 1. Conceptual Framework

Research Hypotheses

- H₁: E-service quality has a positive and significant effect on e-satisfaction at PT. PLN UP3 Pematang Siantar.
- H₂: E-service quality has a positive and significant effect on digital marketing at PT. PLN UP3 Pematang Siantar.
- H₃: Digital marketing has a positive and significant effect on e-satisfaction at PT. PLN UP3 Pematang Siantar.
- H₄: E-service quality has a positive and significant effect on e-satisfaction through digital marketing as a mediating variable at PT. PLN UP3 Pematang Siantar.

Research Methodology

Type of Research

The type of research used is quantitative research. According to Sugiyono (2022), quantitative research is defined as a method grounded in the philosophy of positivism, used to study a specific population or sample; sampling techniques are generally conducted randomly; data collection uses research instruments; and data analysis is quantitative/statistical in nature, to test established hypotheses. This type of quantitative research was conducted to create a study aimed at examining the relationship between E-Service Quality and E-Trust and their impact on user E-Satisfaction with the PLN Mobile App, with Digital Marketing serving as a mediating variable (Case Study at PT PLN UP3 Pematang Siantar).

Research Location and Time

The research was conducted at PT PLN UP3 Pematang Siantar, located at Jalan Kapten M.H. Sitorus No. 1, Timbang Galung, Siantar Barat District, Pematang Siantar City, North Sumatra. The research was conducted over a period of 3 months, from April to July 2026.

Population and Sample

According to Hair et al. (2022), the population refers to the totality of elements, subjects, or consumers under study, the exact number of which is often unknown, possessing specific characteristics. Hair emphasizes the use of a rule of thumb for determining the sample size, namely, 5–10 times the number of indicators or latent variables used in the study. In this study,

there are 22 indicators. The researcher selected 10 indicators, so the sample size in this study is $10 \times 22 = 220$ customers.

Research Data Sources

The data source used in this study is primary data.

Results

Outer Model Analysis

The *Outer Model* analysis using *the PLS Algorithm* yielded the following results:

Validity Test

Table 1. Outer Loadings Values

	Digital Marketing	E-Satisfaction	E-Service Quality
X1.1			0.784
X1.2			0.797
X1.3			0.877
X1.4			0.814
X1.5			0.795
X1.6			0.807
Y.1		0.741	
Y.2		0.850	
Y.3		0.751	
Y.4		0.859	
Y.5		0.810	
Z.1	0.751		
Z.2	0.735		
Z.3	0.842		
Z.4	0.821		
Z.5	0.881		
Z.6	0.801		

Source: SmartPLS data analysis results, 2026

Based on the values in Table 1 above, the results of the outer model test using factor loadings/outer loadings indicate that all indicators for each variable have loadings ≥ 0.70 . This indicates that each measured indicator is valid and robust. Therefore, it can be concluded that all items in the questionnaire meet the validity criteria, as shown in the following figure.

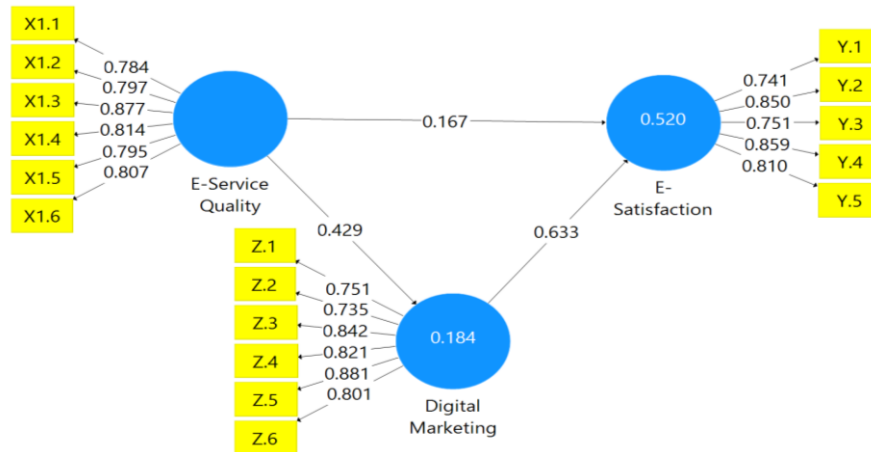


Figure 1. Outer Loadings

Reliability Test

Table 2. Construct Reliability and Validity Test

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Digital Marketing	0.892	0.902	0.918	0.651
E-Satisfaction	0.862	0.868	0.901	0.646
E-Service Quality	0.897	0.899	0.921	0.661

Source: SmartPLS data analysis results, 2026

From Table 2 above, the reliability test results show that the Cronbach's Alpha and Composite Reliability values for all constructs are above 0.70. This indicates that all indicators have high internal consistency and are reliable in measuring their respective constructs. Therefore, the research instrument is deemed reliable and suitable for use in structural equation modeling.

Coefficient of Determination (R²)

When evaluating a model using PLS, the process begins by examining the R-squared for each latent dependent variable. The table below presents the estimated R-square values using SmartPLS.

Table 3. R-Square Results

	R-Square	Adjusted R-Square
Digital Marketing	0.184	0.181
E-Satisfaction	0.520	0.515

Source: SmartPLS data analysis results, 2026

Table 3 shows the R-squared values for both dependent variables. For the digital marketing variable, the R-squared value is 0.184; this means that the influence of e-service quality is 0.184 or 18.4%. The remainder is attributed to other variables outside the model. The R-squared value for e-satisfaction is 0.520, meaning that e-service quality and digital marketing account for 0.520 or 52%; the remainder is attributed to other variables outside the model.

Structural Model Testing (Inner Model)

Hypothesis Testing

Direct Effects Between Variables

Direct effects between variables can be seen in the *path coefficient* values. The data analysis results show that the direct effect values can be seen in the following table.

Table 4. Path Coefficients (Direct Effects)

	Original Sample	T Statistics	P-Values	Conclusion
E-Service Quality -> E-Satisfaction	0.167	3.185	0.002	Accepted
E-Service Quality -> Digital Marketing	0.429	7.737	0.000	Accepted
Digital Marketing -> E-Satisfaction	0.633	14,031	0.000	Accepted

Source: SmartPLS data analysis results, 2026

Table 4 shows the following direct effect values:

1. E-service quality has a positive and significant effect on e-satisfaction with a t-statistic value of 3.185 above 1.96 and a significance level of 0.002 below 0.05, meaning that e-service quality has a positive and significant effect on e-satisfaction because the significance value is below 0.05. These findings align with previous research, which also found that e-service quality has a positive and significant effect on e-satisfaction (Jameel et al., 2021).

2. E-service quality has a positive and significant effect on digital marketing with a t-statistic value of 7.737 above 1.96 and a significance level of 0.000 below 0.05, meaning that e-service quality has a positive and significant effect on digital marketing because the significance value is below 0.05. These findings align with previous research, which indicates that e-service quality has a positive and significant effect on digital marketing (Fadila, 2025).
3. Digital marketing has a positive and significant effect on e-satisfaction with a t-statistic value of 14.031 above 1.96 and a significance level of 0.000 below 0.05. This means that digital marketing has a positive and significant effect on e-satisfaction because the significance level is below 0.05. These findings align with previous research, which also found that digital marketing has a positive and significant effect on e-satisfaction (Zaraswati & Setyawati, 2023).

Indirect Effects Between Variables

The indirect effects between variables can be seen in the *specific indirect effects* values. The data analysis results show that the indirect effect values are presented in Table 5 below.

Table 5. *Specific Indirect Effects*

	Original Sample	T Statistics	P Values	Conclusion
E-Service Quality → Digital Marketing → E-Satisfaction	0.272	6.630	0.000	Accepted

Source: Smart PLS, 2025

Table 5 shows an indirect effect between variables: e-service quality has a positive and significant effect on e-satisfaction through digital marketing, with a t-statistic of 4.720 (above 1.96) and a significance level of 0.000 (below 0.05). This means that digital marketing acts as an intervening variable between e-service quality and e-satisfaction.

Conclusion

1. E-service quality has a positive and significant effect on e-satisfaction at PT. PLN UP3 Pematang Siantar.
2. E-service quality has a positive and significant effect on digital marketing at PT. PLN UP3 Pematang Siantar.
3. Digital marketing has a positive and significant effect on e-satisfaction at PT. PLN UP3 Pematang Siantar.
4. E-service quality has a positive and significant effect on e-satisfaction through digital marketing as a mediating variable at PT. PLN UP3 Pematang Siantar.

Recommendations

1. E-satisfaction is the primary focus of this study, as it reflects the extent to which the PLN Mobile app can meet customer expectations and needs. To improve user satisfaction, PT. PLN UP3 Pematang Siantar needs to ensure that every transaction on the app runs smoothly, quickly, and securely. Users should also be allowed to provide direct feedback through short surveys or ratings after completing a transaction. Prompt responses to complaints or issues reported through the app will strengthen customer satisfaction. Additionally, periodic evaluation of user satisfaction data is necessary to identify trends, obstacles, and opportunities for improving the app's services.
2. Digital marketing serves as a mediating variable linking service quality and user trust to user satisfaction. Digital marketing strategies should be implemented through social media platforms and digital channels that are close to customers, such as Instagram, Facebook, TikTok, WhatsApp broadcasts, and the official website. The content created should be educational, visual, and practical, such as tutorials on feature usage, transaction guides, and app usage tips. Information regarding the app's benefits must also be clearly communicated to encourage users to actively use PLN Mobile. Monitoring interactions and feedback from

- digital content will help tailor promotional strategies to user needs.
3. E-service quality encompasses ease of use, access speed, system stability, and clarity of information on the PLN Mobile app. Service quality can be improved by ensuring that every app feature is user-friendly and stable, as well as by providing user guides in the form of videos, digital posters, or FAQs. Regular monitoring of technical issues, such as login failures, payment errors, or delayed notifications, is a crucial step in maintaining the app's reliability. Periodic evaluation of the user experience helps identify features that need to be fixed or improved to keep the quality of electronic services optimal.

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