Digital Trust in Mediating the Effect of User-Friendliness Among Users of the PLN Mobile App at PT. PLN UP3 North Banten

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Abstract

This study aims to analyze the role of digital trust in mediating the influence of user convenience on the digital loyalty of PLN Mobile app users at PT PLN UP3 Banten Utara. This study employs a quantitative approach using a survey method. Primary data was collected through a questionnaire administered to 220 customers who had downloaded and actively used the PLN Mobile app for at least the past three months. The sampling technique used was purposive sampling, while data analysis was conducted using the Partial Least Squares method with SmartPLS. The validity test results showed that all indicators had outer loading values above 0.60, thus being deemed valid. The reliability test results showed Cronbach's Alpha and Composite Reliability values above 0.70, so all instruments were deemed reliable. The R-Square value indicates that user-friendliness explains 16.6 percent of digital trust, while user-friendliness and digital trust together explain 48.2 percent of digital loyalty. The results of the hypothesis testing indicate that user-friendliness has a positive and significant effect on digital loyalty with a t-statistic of 2.387 and a p-value of 0.017. User-friendliness also has a positive and significant effect on digital trust, with a t-statistic of 8.608 and a p-value of 0.000. Digital trust has a positive and significant effect on digital loyalty with a t-statistic of 11.648 and a p-value of 0.000. Additionally, digital trust was found to mediate the effect of user convenience on digital loyalty with a t-statistic of 6.465 and a p-value of 0.000.

Keywords: User-Friendliness, Digital Trust, Digital Loyalty

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Introduction

Digital transformation has become one of the main directions for service renewal in various organizations, including state-owned enterprises that are directly related to public needs. In electricity services, digitization is no longer just about the use of technology, but also about efforts to build services that are easier, faster, more responsive, and accessible independently by customers. PT PLN (Persero) responds to these needs through the PLN Mobile app as a digital service channel that integrates various customer needs.

PLN Mobile offers a variety of services, such as paying electricity bills, purchasing tokens, self-reporting meter readings, reporting outages, applying for new connections, increasing power capacity, and accessing other electricity service information. The launch of this app demonstrates that PLN Mobile is not merely a supplementary app, but also a key component of PLN's customer service transformation strategy. Through this app, customers are expected to be able to access electricity services more conveniently without having to visit a service office in person.

Quantitatively, the growth of PLN Mobile has been quite strong. By 2023, the app had been downloaded approximately 47 million times. By December 2024, the number of downloads had risen to approximately 55 million users. In July 2025, PLN reported that PLN Mobile downloads had reached 58 million, with 76 million registered customer IDs. Meanwhile, the total number of PLN customers in 2024 was recorded at 92,877,292. This data indicates that adoption of PLN Mobile continues to rise over time.

However, an increase in the number of downloads does not necessarily indicate user digital loyalty. Customers may download the app for a specific need, but that doesn't necessarily mean they will continue to use the app actively and repeatedly. Digital loyalty places greater emphasis on users' willingness to continue using the app, make repeat transactions, recommend the app, and make it their primary choice for accessing PLN services. Thus, the success of PLN Mobile cannot be measured solely by the number of downloads, but also by the app's ability to retain users over the long term.

This phenomenon is significant because several studies indicate that active use of the PLN Mobile app still faces challenges. Umar and Pasaribu (2024) note that although the app has been in operation for several years, its usage rate remains suboptimal. At PLN Suluttenggo, customers who have installed the app account account for only about 52 percent of the total customer base. Putra et al. (2025) also emphasize that the low number of active users compared to the number of registered users indicates that there are still issues in encouraging sustained usage. This situation suggests that the main issue with PLN Mobile is no longer the availability of the app, but rather the factors that motivate customers to use the app consistently.

One factor that can influence digital loyalty is user-friendliness. User-friendliness describes the extent to which users feel that an app is easy to understand, easy to operate, not cumbersome, and helps users practically meet their service needs. In the context of PLN Mobile, user-friendliness can be seen in the ease of logging in, understanding the service menu, making payments, purchasing tokens, submitting complaints, and accessing electricity information. The easier the app is to use, the greater the likelihood that users will continue to use it.

User-friendliness is crucial because public service customers come from diverse backgrounds. Not all customers have the same level of digital literacy. Some users may be accustomed to using apps, but others still need an app that is simple, clear, and easy to understand. If PLN Mobile is easy to use, customers will find it helpful and feel more comfortable accessing services. Conversely, if the app is difficult to understand, users may be reluctant to use it again.

While ease of use can foster loyalty, this effect is not always immediate. In digital services, users also need to have digital trust in the app. Digital trust reflects users' confidence that the app is reliable, capable of delivering services as expected, safeguarding user data, and enabling secure transactions and complaints. On the PLN Mobile app, digital trust is crucial

because customers perform various activities related to personal data, payments, complaints, and electricity services through the app.

Digital trust can serve as a bridge between user-friendliness and digital loyalty. An easy-to-use app can create a positive experience. However, users may not necessarily be loyal if they do not trust the app. When ease of use is combined with the confidence that the app is reliable and secure, users will be more confident in continuing to use PLN Mobile. In other words, user-friendliness can strengthen digital trust, and that digital trust can drive digital loyalty.

Previous research has also shown that trust is closely linked to continued use and customer loyalty. Putra et al. (2025) found that trust has a significant positive effect on continuous intention, and that continuous intention has a significant effect on usage behavior. These findings indicate that trust is a key factor in driving the intention and behavior of continued use of the PLN Mobile app. Additionally, Saputra et al. (2023), in a study of PLN Mobile users at UP3 Malang, found that customer experience, customer satisfaction, and customer trust influence customer loyalty. The customer experience indicators in that study also relate to ease of use, convenience, timeliness, and a pleasant experience.

Research findings on PLN Mobile also show mixed results. Paramita et al. (2022) found that performance expectancy, effort expectancy, social influence, and facilitating conditions influence behavioral intention, whereas trust and information quality do not have a significant effect. However, Umar and Pasaribu (2024) found that performance expectancy, social influence, hedonic motivation, price value, and habit have a significant positive effect on behavioral intention, whereas effort expectancy and facilitating conditions are not significant. These differing results indicate that the explanatory model for the use of PLN Mobile still needs to be re-examined with a focus on more specific variables.

In the context of PT PLN UP3 North Banten, this study becomes increasingly relevant. Syaravina and Rivai (2025) have studied PLN Mobile at PT PLN UP3 North Banten, but they still treated service quality and customer value as initial variables, with customer trust—measured through customer satisfaction—as the model's focus. This means that previous research has not specifically examined how user convenience influences digital loyalty through digital trust among users of the PLN Mobile app in the PT PLN UP3 North Banten region.

The urgency of this research is further underscored by PLN's strategy to boost app user engagement. In May 2025, PLN launched the Gelegar PLN Mobile 2025 program as a token of appreciation for customers who actively conduct transactions and interact through the app. This program demonstrates that PLN not only wants customers to download the app but also encourages them to remain active users of PLN Mobile. Therefore, digital loyalty is a crucial aspect in strengthening PLN's digital service ecosystem.

Based on the above discussion, the study titled "Digital Trust as a Mediator of the Effect of Usability on Digital Loyalty Among Users of the PLN Mobile App at PT PLN UP3 North Banten" is important to conduct. This study is expected to provide an empirical explanation of the influence of user-friendliness on digital loyalty, as well as to explain the role of digital trust as a mediating mechanism in this relationship. The results of this study are also expected to serve as input for PT PLN UP3 Banten Utara in improving the user-friendliness of the application, strengthening customer digital trust, and building digital loyalty among PLN Mobile users.

Literature Review

Theoretical Framework

Digital Loyalty

Definition of Digital Loyalty

Singh et al. (2023): Digital loyalty is the result of a long-term relationship between users and digital platforms shaped by service quality, trust, and user satisfaction, and focuses on long-term relationships.

Indicators of Digital Loyalty

In the study by Singh et al. (2023), digital loyalty or *e-loyalty* was measured using the following key indicators:

1) *Repurchase/Reuse Intention*
   This indicator reflects users' desire to continue using a digital app on an ongoing basis. In the context of apps like PLN Mobile, users continue to choose the app for subsequent transactions.

2) *Commitment*
   This indicator describes the level of users' emotional and psychological attachment to the digital application. Users feel attached to and accustomed to using the application.
3) *Low Switching Intention*
   This indicator shows that users are not likely to switch to other apps or digital services. The lower the likelihood of switching, the higher the user loyalty.
4) *Word of Mouth*
   This indicator measures users' willingness to recommend the app to others. Satisfied and loyal users will suggest PLN Mobile to family, friends, or others.
5) *Continuous Usage*
   This indicator shows users' habit of continuing to use the app in their daily activities. The app has become part of users' digital routines.

Digital Trust

Definition of Digital Trust

According to Hamdan et al. (2025), digital trust (e-trust) is a user's belief that *a* digital *platform* has a secure, credible, and reliable system, thereby encouraging users to engage in *online* activities, including digital transactions. In the context of applications, digital trust is evident when users are willing to use an app because they perceive the system as trustworthy, capable of protecting personal data, and posing low usage risks.

Indicators of Digital Trust

Hamdan et al. (2025), in the context of app usage, explain that indicators of digital trust or *e-trust* can be observed through the following aspects:

1) Security
   Security reflects the level of confidence users have that an app can protect their data and transactions from digital threats, such as hacking, data breaches, or account misuse. Security measures can include encryption, authentication, and account protection.
2) Privacy
   Privacy describes users' perception that their personal data is not misused or shared without permission. This aspect relates to the clarity of privacy policies, transparency in data management, and the protection of users' personal information.
3) System Reliability
   System reliability indicates that the application runs smoothly, rarely encounters *errors*, and functions as users expect. Users will have greater confidence if the application system is reliable for various digital activities.

4) Credibility
   Credibility reflects users' confidence that the application provides accurate, clear, and non-misleading information. This aspect is typically linked to the application provider's reputation and the consistency of the information provided to users.
5) Integrity
   Integrity reflects users' confidence that the app provider acts honestly, fulfills its service commitments, and does not engage in manipulation or actions that harm users.
6) Perceived Risk

Perceived risk reflects users' perception of potential harm when using the app. The lower the perceived risk, the higher the user trust. Such risks may include data loss, financial loss, and misuse of personal information.

User Convenience

Definition of User Convenience

The *Technology Acceptance Model* explains that *perceived ease of use* is one of the key factors determining users' acceptance of technology. According to Jatimoyo et al. (2021), perceived ease of use refers to a person's level of confidence that a system can be used without requiring significant effort. The easier a technology is to understand and operate, the more likely users are to accept it and continue using it.

In line with this theory, Wang et al. (2023–2024) define user-friendliness as users' perception that an application system can be used easily without technical difficulties, thereby enhancing comfort, satisfaction, and the intention to use it again. In the context of digital services such as PLN Mobile, user-friendliness is a critical factor because users tend to continue using applications that are simple, efficient, and easy to understand.

User-friendliness is not limited to the technical aspects of an app; it also encompasses the overall *user experience*. Apps with clear navigation, simple transaction processes, and features that are easy to learn enhance user comfort, reduce barriers to use, and build trust in digital services. These factors can ultimately foster long-term digital loyalty among users.

Thus, user-friendliness can be understood as users' perception of how easy an application is to learn, understand, and operate effectively without requiring significant effort, thereby enhancing comfort, trust, and sustained use of digital applications

User Usability Indicators

User-friendliness of Use Indicators (Wang et al., 2023–2024)

1) *Ease of Learning*
   This indicator shows the extent to which users feel the application is easy to learn from the first time they use it. Users quickly understand features and menus without complex guidance.
2) *Ease of Use / Simplicity*
   This indicator describes how easy the app is to use on a daily basis. Users find the app simple and not confusing.
3) *Clear Navigation*
   This indicator shows how easily users can navigate between menus and features within the app. Menus such as payments, complaints, and information are easy to find in PLN Mobile.
4) *Ease of Interaction*
   This indicator relates to how easily users can interact with the app's system. Data entry, transactions, and service requests are straightforward.
5) *Efficiency of Use*
   This indicator shows the extent to which the app helps users complete tasks quickly and efficiently. Example: Electricity payments can be made in just a few steps.
6) *Low Effort*
   This indicator describes that users do not need significant effort or advanced technical skills to use the application. The application can be used by everyone.

Conceptual Framework

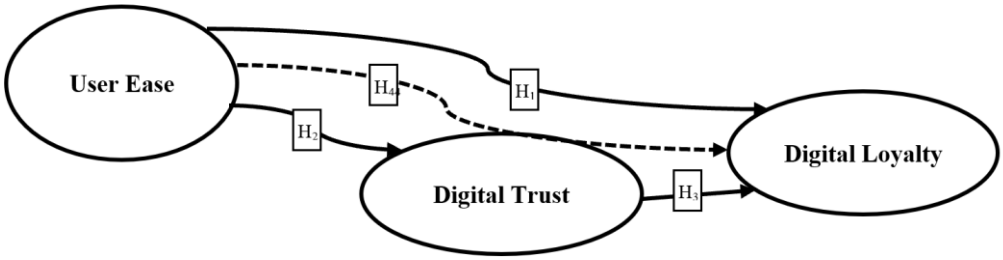

Figure 1. Conceptual Framework

Research Hypotheses

H_1: User-friendliness has a positive and significant effect on digital loyalty to PLN Mobile.
H_2: User-friendliness has a positive and significant effect on users' digital trust in PLN Mobile.
H_3 Digital trust has a positive and significant effect on digital loyalty to PLN Mobile.
H_4: Digital trust mediates the positive and significant effect of user convenience on digital loyalty toward PLN Mobile.

Research Methodology

Type of Research

This study employs a quantitative approach using a survey method. The research instrument consists of a questionnaire designed based on the indicators of each research variable. Data were measured using a 5-point Likert scale to determine the respondents' level of agreement with each statement. The measurement scale consists of: (1) strongly disagree, (2) disagree, (3) neutral, (4) agree, and (5) strongly agree. The Likert scale was chosen because it can systematically measure respondents' perceptions, attitudes, and evaluations regarding the variables under study, such as user-friendliness, digital trust, and digital loyalty.

Research Location and Time

The research was conducted at PT. PLN UP3 North Banten, located at Jalan Jenderal Sudirman RT.005/RW.013, Sukasari, Serang District, Serang City, Banten. 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, whose exact number is often *unknown*, and who share certain 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 times the number of indicators, so the sample size in this study is $10 \times 22 = 220$.

Sampling Technique

This study employs *purposive sampling*, a technique where samples are selected based on specific criteria aligned with the study's objectives. The sample consists of PLN customers in the UP3 North Banten region who have downloaded the PLN Mobile app and actively used it for at least the past three months. Selecting respondents based on these criteria ensures that the data obtained is relevant and valid, as only active users can provide accurate information regarding user-friendliness, digital trust, and digital loyalty. With this *purposive sampling* approach, the study can focus on the real-world experiences of app users and yield findings that accurately depict the behavior and perceptions of PLN Mobile users.

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:

Validity Test

The validity test aims to determine the extent to which indicators or statement items are able to accurately measure the variables under study. An instrument is considered valid if the questions in the questionnaire truly represent the research concepts. The validity test in this study is seen from the *outer loadings* values in the following table.

Table 1. *Outer Loadings* Values

	Digital Loyalty	Digital Trust	User-friendliness
X1.1			0.762
X1.2			0.645
X1.3			0.851
X1.4			0.739
X1.5			0.779
X1.6			0.815
Y.1	0.733		
Y.2	0.856		
Y.3	0.805		
Y.4	0.837		
Y.5	0.819		
Z.1		0.801	
Z.2		0.791	
Z.3		0.872	
Z.4		0.855	
Z.5		0.883	
Z.6		0.815	

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* ≥ 0.60. This indicates that each indicator is measured validly and strongly. Therefore, it can be concluded that all *items* in the questionnaire have met the validity criteria, as shown in the following figure.

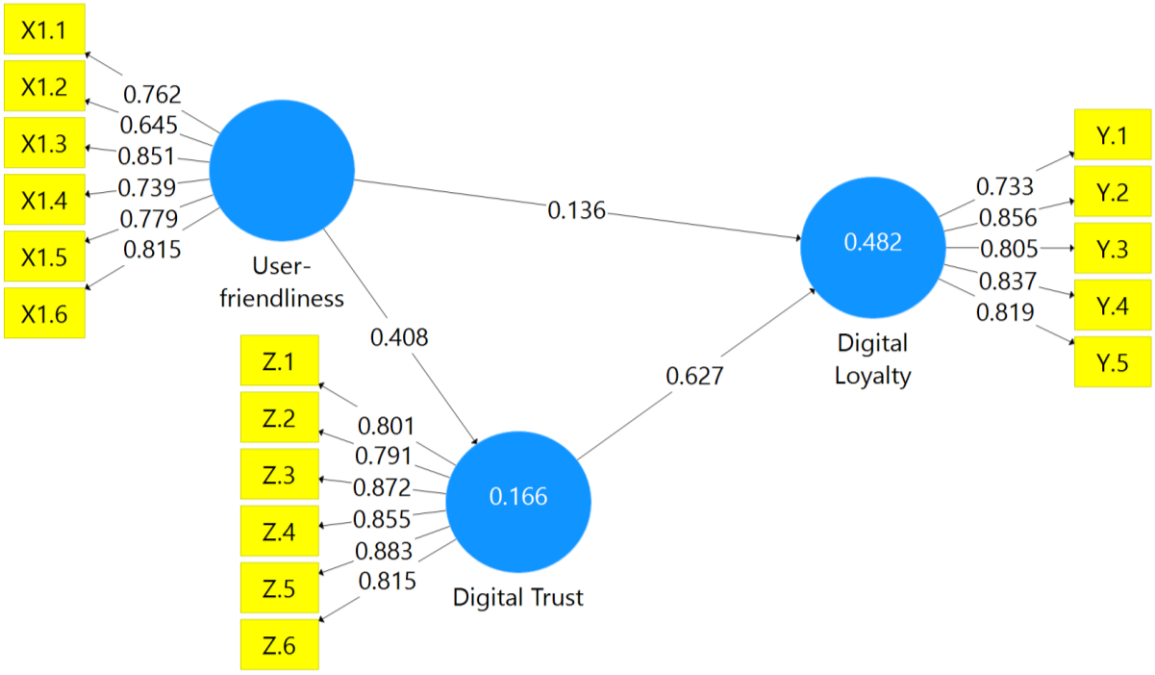

Figure 2. Outer Loadings

Reliability Test

The reliability test aims to determine the consistency of the research instrument. A reliable instrument means it provides stable and consistent results when used repeatedly. In SmartPLS, reliability is tested using:

a) *Cronbach's Alpha*
   Measures internal consistency among indicators within a single variable. A good value is ≥ 0.70
b) *Composite Reliability (CR)*
   Measures construct reliability more accurately in PLS-SEM. A good value is ≥ 0.70

The higher the reliability score, the more consistent the indicator is in measuring the research variable. For further clarification, the reliability test results for this study are presented in the following table.

Table 2. *Construct Reliability and Validity* Test

	Cronbach's Alpha	*rho_A*	*Composite Reliability*	*Average Variance Extracted (AVE)*
Digital Loyalty	0.869	0.875	0.906	0.658
Digital Trust	0.914	0.920	0.933	0.700
User-friendliness	0.862	0.879	0.895	0.589

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 (R^2)

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 obtained using SmartPLS.

Table 3. *R-Square* Results

	R-Square	Adjusted R-Square
Digital Trust	0.166	0.163
Digital Loyalty	0.482	0.477

Source: Smart PLS, 2025

Table 3 shows the *R-squared* values for both dependent variables. For the digital trust variable, the *R-squared* value is 0.166; this means that the effect of user-friendliness is 0.166, or 16.6%. The remaining variation is attributed to other variables outside the model. The *R-squared* value for digital loyalty is 0.482, meaning that the combined influence of user-friendliness and digital trust is 0.482 or 48.2%; 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
User-friendliness -> Digital Loyalty	0.136	2.387	0.017	Accepted
User-friendliness -> Digital Trust	0.408	8.608	0.000	Accepted
Digital Trust -> Digital Loyalty	0.627	11,648	0.000	Accepted

Source: SmartPLS data analysis results, 2026

Table 4 shows the following direct effect values:

1. The Effect of Usability on Digital Loyalty
   The research results indicate that user-friendliness has a positive and significant effect on digital loyalty, with a t-statistic value of 2.387 (>1.96) and a significance level of 0.017 (<0.05). This finding reinforces the Technology Acceptance Model developed by Jatimoyo et al. (2021), which explains that the perception of user-friendliness of use will increase the acceptance and continued use of technology. Thus, the easier the application is to use, the higher the user loyalty in repeatedly using digital services. These results are also consistent with previous research, namely that user-friendliness has a positive and significant effect on digital loyalty (Brian, 2024).
2. The Effect of User-friendliness of Use on Digital Trust
   User-friendliness of use has a positive and significant effect on digital trust with a t-statistic value of 8.608 (>1.96) and a significance level of 0.000 (<0.05). This indicates that ease in operating the application enhances users' trust in the digital system. User-friendly applications create the perception that the system is more transparent, stable, and reliable, thereby increasing users' digital trust.
3. The Effect of Digital Trust on Digital Loyalty
   Digital trust has a positive and significant effect on digital loyalty with a t-statistic value of 11.648 (>1.96) and a significance level of 0.000 (<0.05). These results align with previous research, which found that user-friendliness has a positive and significant effect on digital loyalty (Kumala et al., 2025). Digital trust is a key factor in shaping loyalty, as the higher users' trust in the system, the greater their tendency to continue using the service consistently.

Indirect Effects Between Variables

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

Table 5. *Specific Indirect Effects*

	Original Sample	T Statistics	P-Values	Conclusion
User-friendliness -> Digital Trust -> Digital Loyalty	0.256	6.465	0.000	Accepted

Source: Smart PLS, 2025

Table 5 shows an indirect effect between variables, namely that user-friendliness has a positive and significant effect on digital loyalty through digital trust with a t-statistic value of 5.154 (>1.96) and a significance value of 0.000 (<0.05). These results indicate that digital trust acts as an intervening variable in the relationship between user-friendliness of use and digital loyalty. This finding reinforces the Technology Acceptance Model developed by Fred Davis, which explains that perceptions of user-friendliness of use not only directly influence usage intentions and behavior but also foster trust, which subsequently drives user loyalty. Thus, the easier an application is to use, the higher the user's trust, ultimately enhancing digital loyalty.

Conclusion

Theoretical Implications:

1. The results of this study reinforce the concept that users' digital loyalty to an application is influenced not only by user-friendliness but also by digital trust.
2. The findings of this study indicate that user-friendliness of use plays a crucial role in shaping trust and loyalty among PLN Mobile users. The easier the app is to use, the greater the likelihood that users will trust it and continue using it over time.
3. This study confirms that digital trust acts as a mediating variable in the relationship between user convenience and digital loyalty.
4. Theoretically, the findings of this study can serve as a basis for developing a digital loyalty model for public service applications, particularly by positioning digital trust as a key variable in building user loyalty.

Practical Implications:

1. PT PLN (Persero) needs to continue improving the user-friendliness of the PLN Mobile app. Improvements can be made through a simple interface, easy-to-understand menus, a streamlined transaction process, and clear usage instructions.
2. The developers of PLN Mobile need to ensure that the app can be used by a wide range of users, including those who are not yet familiar with digital services. This is important so that the app's user-friendliness can be experienced by a broader audience.
3. User digital trust must be built through consistent service, accurate billing information, a stable app system, and quick, responsive complaint handling.
4. PT PLN (Persero) must prioritize digital trust as the primary focus in the development of PLN Mobile. Users who trust the app are more likely to use it repeatedly and recommend it to others.
5. Efforts to improve user loyalty to the PLN Mobile app should not be limited to simply adding new features. PLN needs to ensure that every feature provides a user experience that is easy, secure, and trustworthy.

Recommendations

Recommendations for the Company:

1. The digital loyalty of PLN Mobile app users needs to be continuously improved, as loyalty indicates users' willingness to continue using the app over the long term. PT. PLN UP3 Banten Utara is expected to maintain a positive, seamless, and consistent user experience, so that customers not only use the app once but also make it their primary choice for accessing electricity services. Efforts to improve loyalty can be made by providing fast digital services, offering features that meet customer needs, and ensuring that every complaint or transaction through the app receives a clear follow-up. The better the user experience with PLN Mobile, the more likely users are to remain loyal and recommend the app to others.
2. Digital trust needs to be strengthened because it serves as a mediating factor linking user convenience with digital loyalty. PLN needs to build user confidence that the PLN Mobile app is reliable, secure, transparent, and capable of delivering services that meet customer expectations. Digital trust can be enhanced through clear transaction information, certainty regarding report status, protection of personal data, and consistent service delivery via the app. If users feel confident in the app, they will be more comfortable using PLN Mobile repeatedly and will be more likely to remain loyal.
3. User-friendliness is a key aspect that must be addressed, as users will be more inclined to use the app if its features are easy to understand and operate. PT. PLN UP3 Banten Utara can enhance the user-friendliness of PLN Mobile by simplifying the app's interface, providing clear user guides, and ensuring that service processes—such as bill payment, token purchase, reporting outages, and checking electricity information—can be completed in a few simple steps. Additionally, customer education on how to use the app needs to be

improved, especially for users who are not yet accustomed to digital services. The easier the app is to use, the greater the likelihood that users will trust and continue using PLN Mobile.

Suggestions for Further Research:

Future research is recommended to include other relevant variables, such as digital service quality, user satisfaction, perceived benefits, and user experience. Future studies could also expand the research scope beyond PT PLN UP3 Banten Utara so that the findings can be compared with those from other PLN service areas. Additionally, using a larger sample size and different research methods, such as qualitative approaches or mixed-methods designs, could provide a deeper understanding of the factors influencing users' digital loyalty to the PLN Mobile app. Future research could also examine the role of user satisfaction as a mediating or moderating variable to make the research model more comprehensive.

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