

## **Pentingnya E-Crm Pada Aplikasi Mobile PLN untuk Meningkatkan Loyalitas E-Customer Melalui Peningkatan E-Service Quality Dan E-Customer Satisfaction**

### ***The Importance Of E-Crm on PLN Mobile Applications to Increase E-Customer Loyalty by Improving E-Service Quality and E-Customer Satisfaction***

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#### **Abstrak**

PT Perusahaan Listrik Negara (Persero) atau PLN, merupakan Badan Usaha Milik Negara Indonesia yang bergerak di bidang ketenagalistrikan untuk penyediaan energi listrik di Indonesia. Sebagai salah satu perusahaan strategis di bidang energi, PLN memiliki peran penting dalam mendukung pertumbuhan ekonomi di seluruh Indonesia sebagai pelanggannya. Untuk meningkatkan efisiensi operasional dan memberikan pengalaman yang lebih baik kepada pelanggan, PLN terus berinovasi melalui teknologi digital, yaitu dengan meluncurkan aplikasi PLN Mobile yang dirancang untuk memudahkan pelanggan. Dalam konteks digitalisasi layanan, implementasi E-CRM dan peningkatan E-Service Quality menjadi prioritas strategis PLN. Penelitian ini diberikan oleh 255 responden dengan mengisi kuesioner dalam bentuk google form pada bulan Agustus hingga Oktober oleh pengguna aplikasi PLN Mobile di Provinsi Banten. Data diolah dengan metode analisis data yang digunakan untuk menguji validitas dan reliabilitas menggunakan adalah Structural Equation Modeling (SEM) PLS. Melalui strategi ini, PLN bertujuan untuk meningkatkan E-Customer Satisfaction dan E-Customer Loyalty yang pada akhirnya mendukung keberlangsungan bisnis perusahaan. Penelitian ini bertujuan untuk menganalisis pengaruh E-CRM dan E-Service Quality terhadap E-Customer Satisfaction dan E-loyalty pada aplikasi PLN Mobile, sebagai upaya untuk memahami efektifitas strategi digital perusahaan dalam memberikan pelayanan yang optimal kepada pelanggan.

**Kata Kunci:** Manajemen E-Customer; Kualitas E-Service; Kepuasan E-Customer; Loyalitas E-Customer.

#### **Abstract**

PT Perusahaan Listrik Negara (Persero) or PLN, is an Indonesian State-Owned Enterprise engaged in the electricity sector for the provision of electrical energy in Indonesia. As one of the strategic companies in the energy sector, PLN has an important role in supporting economic growth throughout Indonesia as its customers. To improve operational efficiency and provide a better experience to customers, PLN continues to innovate through digital technology, namely by launching the PLN Mobile application designed to facilitate customers. In the context of service digitalization, the implementation of E-CRM and improving E-Service Quality are PLN's strategic priorities. This research was provided by 255 respondents by filling out a questionnaire in the form of a google form from August to October by users of the PLN Mobile application in Banten Province. The data was processed with the data analysis method used to test the validity and reliability using is Structural Equation Modeling (SEM) PLS. Through this strategy, PLN aims to increase E-Customer Satisfaction and E-Customer Loyalty which ultimately supports the company's business sustainability. This study aims to analyze the effect of E-CRM and E-Service Quality on E-Customer Satisfaction and E-loyalty in the PLN Mobile application, as an effort to understand the effectiveness of the company's digital strategy in providing optimal service to customers.

**Keywords:** E-Customer Relationship Management; E-Service Quality; E-Customer Satisfaction; E-Customer Loyalty.

DOI: <https://doi.org/10.51849/j-p3k.v6i2.818>

#### **Rekomendasi mensitasi :**

Revda, A. (2025), *The Importance Of E-Crm on PLN Mobile Applications to Increase E-Customer Loyalty by Improving E-Service Quality and E-Customer Satisfaction*. Jurnal Penelitian Pendidikan, Psikologi dan Kesehatan (J-P3K), 6 (2): 1054-1063.

## INTRODUCTION

Increased e-customer satisfaction and e-customer loyalty have a direct impact on the success of applications such as PLN Mobile (Mokha & Kumar, 2022; Raza et al., 2020). By understanding the influence of e-CRM and e-service quality, companies can optimize their digital marketing strategies and improve user satisfaction, ultimately strengthening customer loyalty (Al-Dmour et al., 2019; Hwang, 2022).

PLN Mobile offers relevant features for research related to e-CRM and e-service quality, such as bill management, fault reports, and online customer service (Aditya et al., 2023). Previous research has not explained the effect of E-crm variables on Loyalty so that the object of research is relevant. This makes it an ideal platform to analyze the influence of e-CRM on customer satisfaction and loyalty (Ahmad et al., 2017).

Effective E-CRM provides a better customer experience, such as easy access, responsive service, and personalized interactions, thus increasing customer satisfaction (Mokha & Kumar, 2022; Dehghanpouri et al., 2020). By increasing satisfaction, E-CRM also fosters loyalty, as customers feel valued and tend to choose applications that provide the best experience on an ongoing basis (Ali & Alfayez, 2024). Good service quality will increase the user's positive image of the service, which in turn will increase satisfaction. Customers who are satisfied with the quality of service will be more likely to continue using the service, thereby increasing loyalty to the use of the PLN Mobile application (Putri & Lestari, 2024; Supriyanto et al., 2021). E-Customer

Satisfaction also acts as a mediator between E-CRM, E-Service Quality and E-Customer Loyalty. This means that the effect of E-CRM and E-Service Quality on E-Customer Loyalty is mainly through increased customer satisfaction (Hwang, 2022; Kingshott et al., 2018).

This study aims to analyse the unique characteristics of utility applications (such as PLN Mobile) that affect the implementation of E-CRM and e-service quality in increasing e-customer satisfaction and e-loyalty (Farmania et al., 2021). Previous research has not explained the relationship between e-crm and customer satisfaction which will give positive value to user loyalty in the PLN Mobile application, so it is hoped that the E-CRM and E-Service Quality variables can analyze their combined effect on customer satisfaction and loyalty. this research is supposed to focus on the use of mobile applications can provide new insights into how application features affect customer experience.

Paragraph 4 contains research gaps. Gaps in this study must include previous research, with at least one of the previous studies having the most recent year (Mariana & Fadli, 2022; Supriyanto et al., 2021).

Implementation of E-CRM and E-Service Quality on e-satisfaction and e-loyalty of customers. This research makes a new contribution theoretically by filling the research gap regarding the role of PLN Mobile applications in the digital lifestyle. Practically, the results of this study are useful for companies to understand how their digital strategies can be optimized to improve customer experience. Thus, this research aims to provide a deeper

understanding of the key factors that determine customer satisfaction and loyalty in the context of digital services, as well as provide strategic recommendations to improve the capabilities of the PLN Mobile application.

E-Customer Relationship Management (E-CRM) is an evolution of the concept of Customer Relationship Management (CRM) that uses digital technology to improve customer relationships. E-CRM is defined as a strategy for managing customer relationships through electronic platforms such as websites, mobile applications, and other digital channels (Mokha & Kumar, 2022). With E-CRM, companies can provide customers with a more personalized, interactive, and responsive experience, increasing customer satisfaction and loyalty (Mang'uni et al., 2018). E-CRM is an effort for companies to be able to provide good service, to build long-term relationships and to increase the profits of the company (Kumar & Mokha, 2022).

E-Service Quality is a service offered through technological devices (Al-dweeri et al., 2017). E-service quality is an interactive process in which companies provide customized products and services based on information obtained from consumers, on the other hand, the service process performed and the delivery of e-service quality can be achieved through information interaction with service providers (Ahmad et al., 2017). E-Service Quality refers to the quality of service provided to consumers through application-based technology which is evaluated on the quality of this service including aspects of sophistication, ease of access, completeness or reliability of the

system, as well as confidentiality and security in the implementation of transactions and the process of delivering products or services (Putri., 2024).

E-Customer Satisfaction is a subjective evaluation made by customers after interacting with digital services or products received through digital services (Hwang, 2022). This satisfaction is influenced by various factors that include service quality, ease of use, speed, and service availability. According to (Kotler & Keller, 2021) customer satisfaction occurs when the perceived performance of a product or service meets or exceeds customer expectations. In the digital context, E-Customer Satisfaction focuses on customers' assessment of their experience when interacting with a digital website or application, which includes aspects such as functionality, convenience, speed, and responsiveness of the platform. E-customer satisfaction can be defined as the level of user satisfaction in relation to the purchase experience they have had with a particular company (Putri & Lestari, 2024).

E-customer loyalty is broadly defined as a user's positive online attitude and commitment that results in repeat purchase behavior (Anderson & Srinivasan, 2003; Farmania et al., 2021). Electronic Customer Loyalty (E-CL) refers to the level of customer loyalty built through digital interactions between customers and service or product providers on online platforms. E-CL describes a customer's intention to continue using a digital product or service from a particular company in the long term, despite the many alternatives available in the market (Hwang, 2022).

This loyalty can be created through the positive experiences they feel, such as high satisfaction, consistent service quality, and the added value they receive from digital platforms (Putri & Lestari, 2024).

Effective E-CRM enables companies to understand customer needs more deeply, provide personalised services, and build closer relationships with customers through digital interactions (Dehghanpouri et al., 2020). E-CRM designed to provide relevant and personalized services will increase customers positive perceived digital services, thus directly affecting customer satisfaction (Kumar & Mokha, 2022). When it comes to creating a fulfilling experience on digital platforms, elements of E-CRM such as ease of use, reliability and responsiveness play an important role (Hwang, 2022).

H1: E-CRM has a Positive effect on E-customer Satisfaction

E-Service Quality includes aspects such as reliability, efficiency, responsiveness, and security that directly affect the customer's perception of the service. When service quality meets or exceeds customer expectations, it increases E-Customer Satisfaction (Kashif et al., 2015; Zygiaris et al., 2022). E-service quality includes aspects such as reliability, efficiency, responsiveness, and security that directly affect the customer's perception of the service. When service quality meets or exceeds customer expectations, it increases eCustomer Satisfaction (Putri & Lestari, 2024).

H2: E-Service Quality has a positive effect on E-Customer Satisfaction

By creating a positive, consistent and reliable service experience. Customers who feel satisfied with the speed, safety

and convenience of the service tend to show loyalty by continuing to use the service and recommending it to others (Mariana & Fadli, 2022). High service quality, such as ease of access and responsiveness, directly increases customer loyalty in a digital environment (Dam & Dam, 2021; Mariana & Aidil Fadli, 2022).

H3: E-Service Quality has a Positive Effect on E-Customer Loyalty

By providing personalized services, the right E-CRM technology leads to customer loyalty (Kumar & Mokha, 2022). A successfully implemented E-CRM strategy can be successful in creating strong and long-lasting relationships with customers (Ali & Alfayez, 2024). E-CRM contributes significantly to improving customer loyalty through consistent and relevant digital interactions (Farmania et al., 2021).

H4: E-Service Quality has a Positive Effect on E-Customer Loyalty

Because loyalty is reflected in user behavior such as repeat usage and referrals, customer satisfaction is a key factor in customer retention. User repeat visits and repeat purchases, can improve the sustainable competitiveness of the enterprise, especially in the retail and service marketing industry, so enterprises must make persistent efforts to increase e-loyalty to electronic media, in accordance with the rapid trend of e-commerce (Hwang, 2022). Customers who are satisfied with their experience tend to have a closer relationship with the service or platform, which ultimately increases loyalty (Vijay et al., 2019).

H5: E-Customer satisfaction has a positive effect on E-customer loyalty

## RESEARCH METHOD

This research uses a quantitative approach with a survey method. Quantitative research was chosen to measure the relationship between variables such as E-CRM, E-Service Quality, E-Customer Satisfaction and E-Customer Loyalty. The instrument used was a Likert scale (1-5) questionnaire that asked respondents to rate their level of agreement with statements related to the research variables. The Likert scale is a model questionnaire divided into three parts, the first of which analyzes the purpose and objectives of the study for respondents, and the second of which collects their demographic data.

The statement instrument regarding the research variables consists of 19 statements, each of which measures the E-customer relationship management (ECRM) variable consists of 5 statements adopted from (Mokha & Kumar, 2022). Then for the variable E-service quality (E-SQ) consists of 4 statements adopted from (Rokbeh, 2022; Blut, 2016; Rita et al., 2019). Then for the variable E-customer satisfaction (E-CS) consists of 5 statements adopted from (Hwang, 2022; Kim et al., 2009; Rodríguez et al., 2020). And for the variable E-customer loyalty (E-CL) consists of 5 statements adopted from (Hwang, 2022; Mokha & Kumar, 2022; Sivasankaran, 2017). Thus, the total measures to be used consist of 19 statements.

Primary data is collected directly from the respondents through the completion of a questionnaire. This research was conducted from August 2024 to October 2024. The population used is the population of PLN Mobile users who

have downloaded at least 3 (three) months earlier and are actively using PLN Mobile. To analyze the relationship between the variation of variables in the target population and the variation of the same variables in the research sample is the purpose of sampling. (Firmansyah & Dede, 2022). Active users who use PLN Mobile on their own mobile phones, because there are still many users who download the PLN Mobile application but are not actively used, so there are no transactions. Where the number of respondents in this study was 10 x 19 (number of statements), which means 190 respondents, but because using the sampling method will be more will provide better results (Sarstedt et al., 2020). The age range of users was 18 years and older. The research used stratified sampling to ensure good representation in terms of geography and level of use. In this study, we used 19 statements in the questionnaire. Out of a total population of 258 respondents, 255 respondents successfully completed the questionnaire. The aspects studied were e-customer relationship management, e-service quality, e-customer satisfaction and e-customer loyalty.

This study adopts confirmatory factor analysis to test the validity of the data, which is carried out by examining the Kaiser-Meyer-Olkin value of sampling (KMO) and measure of sampling adequacy (MSA), a data is considered valid if the KMO and MSA values are greater than 0.5 ( $>0.5$ ) and can be declared reliable if the Cronbach 'alpha value exceeds 0.6 ( $>0.6$ ). Based on the results of pretest data processing for all variables from a total of 19 statements, it is declared valid and reliable. After analyzing the data, it can be

concluded that of the 19 statements tested, all were declared valid for use as questionnaires in this study. This is based on KMO and MSA values  $> 0.5$  and Cronbach's alpha value  $> 0.6$ . The data analysis method used in this study is Structural Equation Model (SEM). Kaiser-Meyer-Olkin (KMO) and Measure of Sampling Adequacy (MSA) were used to assess validity. In the validity test, the value obtained must be greater than 0.5000, this value indicates that the factor analysis can be used and further processed (Doll et al., 1994). The reliability test is carried out using Cronbach's alpha measurement, where the Cronbach's alpha value close to 1 indicates a better level of reliability. (Hair et al., 2014).

## RESULT AND DISCUSSION

Out of 258 respondents to whom questionnaires were distributed, only 255 users filled in the questionnaire with information about downloading PLN Mobile. The results of the research with

255 respondents who use PLN Mobile application show that the majority of users are 23-35 years old, namely 158 people (61.6%). From the educational level, the majority of respondents are SMA / SMK, namely 113 people (44.2%) and S1 as many as 125 people (49%). In terms of employment, most of the respondents work as private employees, as many as 165 people (65%). The characteristics of respondents based on the length of time using the PLN Mobile application, namely 142 people (56%) are users who use the PLN Mobile application for a span of 1-3 years.

The results of the factor loading tests and t-statistics show that all variables out of a total of 19 statements are valid. In addition, the E-Service Quality variable consisting of 5 statements is also fully valid. In the E-Customer Satisfaction variable of 4 statements, all statements are declared valid. In the E-Customer Loyalty variable, all 5 (five) proposed statements are declared valid.

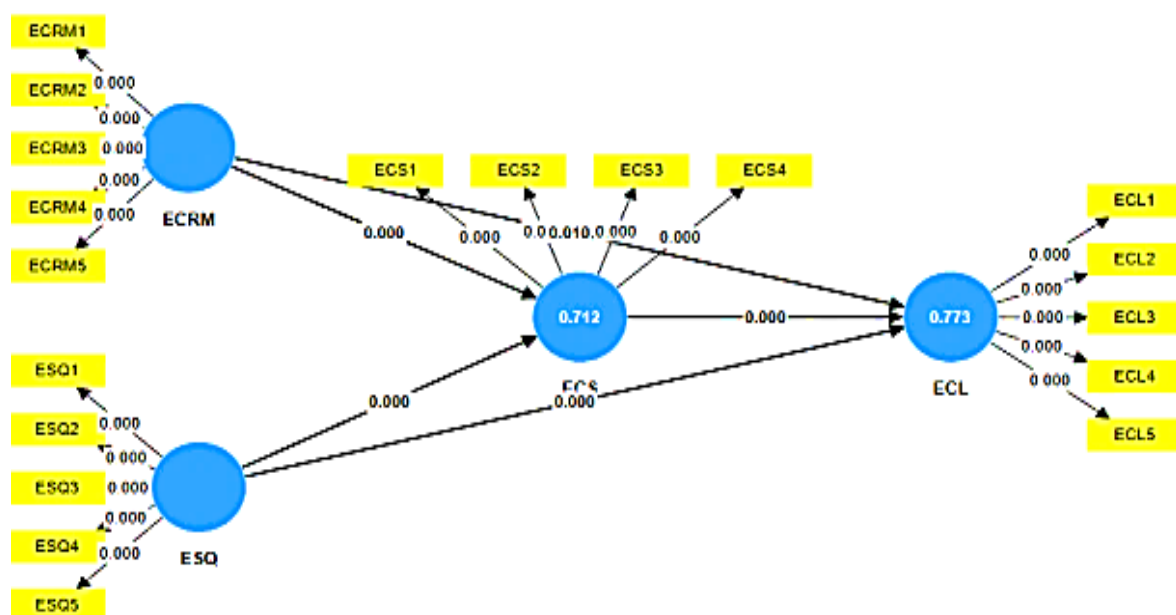


Figure 1. PLS-SEM Output View

In the measurement results comparing discriminate validity with Average Variance Extracted (AVE), the model has good enough discriminant validity if the AVE value for each construct is greater than the correlation between other constructs. The eligible Average Variance Extracted (AVE) value has been set at  $\geq 0.5$  as well as the discriminant validity value  $> 0.6$  (Fornell & Larcker, 1981). The results on Average Variance Extracted (AVE) serve to determine whether the average variance in the indicators for each variable is homogeneous or not from each in this study. and from this study obtained Average Variance Extracted (AVE) and discriminant validity values for all variables in this study have met the homogeneity requirements, where the data values obtained show that the AVE value  $> 0.5$  and discriminant validity  $> 0.6$ , so that all variables can be considered valid.

Table 1. AVE and Discrimination Validity

	AVE	Discriminant Validity
ECL	0,591	0,769
ECRM	0,547	0,740
ECS	0,623	0,789
E-SQ	0,584	0,764

Table 2. Reliability Test of Research Variable Constructs

	Cronbach's Alpha	Composite Reliability
ECL	0,827	0,827
ECRM	0,793	0,794
ECS	0,798	0,798
E-SQ	0,822	0,823

Based on Table 2 above, it can be concluded that the construct reliability of the variables in this study meets the requirements. This is shown by the Cronbach's alpha and composite reliability values possessed by all the research variables, each of which is greater than 0.7, in accordance with the recommendations that suggest a minimum value of 0.6

(Leguina, 2015). For the analysis of the relationship between constructs, it is important to pay attention to the significance value and R-square value in the research model. The R-squared value for ECL is 0.773, which means that the construct variables ECRM, E-SQ, and ECS can explain 77.3% of the variable ECL.

Table 3. R Square Results

	R Square	R Square Adjusted
ECL	0,773	0,771
ECS	0,712	0,709

In addition, the R-squared value for ECS is 0.712, indicating that the construct variable can be explained by the construct variables ECRM, E-SQ, and ECS by 71.2%.

Evaluate the goodness of fit of the model based on the predictive relevance value (Q2) using the R-squared value according to the following formula:

$$Q2 = 1 - (1 - R^2_1)(1 - R^2_2)$$

$$Q2 = 1 - (1 - 0.5975)(1 - 0.5069)$$

$$Q2 = 1 - 0.198441$$

$$Q2 = 0.8015$$

Based on the results of the analysis, the score value of predictive relevance in this study is 80.15%, which shows that the model is able to explain the phenomenon under study. From these results, it can be concluded that the model has good predictive value and can be used for hypothesis testing. The complete results of hypothesis testing obtained the following results:

Table 4. Hypothesis Test of Research Models

	Variable	T Statistic (1.96)	P Values (0.05)	Result
H1	ECRM - ECS	5.483	0.000	Accept
H2	E-SQ - ECS	7.379	0.000	Accept
H3	E-SQ - ECL	4.580	0.000	Accept
H4	ECRM - ECL	2.585	0.010	Accept
H5	ECS - ECL	5.489	0.000	Accept

This research supports previous findings that a good implementation of an E-CRM system can increase customer satisfaction (Kumar & Mokha, 2022). This

is a testament to the importance of personalized service, responsive interactions, and ease of access in building long-term customer relationships. This study shows that E-Customer Relationship Management (E-CRM) and Electronic Service Quality (E-SQ) have a positive and significant influence on Electronic Customer Satisfaction (E-CS) and Electronic Customer Loyalty (E-CL) on the use of PLN Mobile application. Research also shows that E-SQ has a significant impact on E-CS and E-CL, suggesting that speed, reliability, convenience, and security are critical elements in improving customer perceptions of digital services. This research underscores the importance for companies to continuously improve the quality of PLN Mobile to meet customer expectations in the digital age.

The role of E-CS as a mediator in the relationship between E-CRM and E-SQ with E-CL suggests that customer satisfaction is a key factor linking service quality and customer relationship management with E-Customer Loyalty in PLN Mobile. This research provides guidance for companies to prioritize the development of E-CRM and E-SQ in their digital strategy. This is important for the sustainability of company-customer relationships and improved competitiveness. This research enriches the literature on the relationship between E-CRM, E-SQ, E-CS and E-CL, especially in the context of PLN mobile applications, which are still less explored. It is also expected to suggest future research directions, such as further exploring other dimensions of E-CRM and E-SQ, as well as testing similar models in different or broader sectors or geographical areas.

## CONCLUSION

Effective implementation of E-CRM, such as personalized services, responsive interactions, and ease of access, increases customer satisfaction with the services provided. This satisfaction ultimately contributes to customer loyalty. To ensure that users are truly loyal when using the PLN Mobile application, e-Customer Satisfaction is used as a benchmark for the PLN Mobile application. Therefore, the results of this study can be used as a reference for future research to identify other factors that influence the variable of E-Customer Loyalty beyond E-Customer Satisfaction, which serves as a moderator in the relationship between E-CRM and E-Service Quality, in order to develop a more effective research model.

E-service quality, which includes aspects such as speed, security, reliability, and convenience, significantly increases customers' positive perceptions of the service. This increases customer satisfaction and loyalty. In addition, customer satisfaction was shown to mediate the effect of E-CRM and E-SQ on customer loyalty. In other words, customers who are satisfied with the services they receive through E-CRM and E-SQ tend to be more loyal. This research confirms the importance of optimizing E-CRM and E-SQ to increase customer satisfaction and loyalty. This strategy not only supports the sustainability of the company's relationship with its customers, but also improves PLN Mobile applications. This conclusion provides a strong basis for companies, especially for PLN, to continue to innovate in providing quality digital services oriented towards customer satisfaction and loyalty. This research also

makes a theoretical contribution to the literature related to E-CRM, E-SQ, E-CS and E-CL by identifying the relationship between these variables in the context of utility service applications.

The limitations in this study are first, this research only discusses up to a certain limit, namely e-customer relationship management, e-service quality, e-satisfaction, and e-loyalty with the population used as respondents represented by PLN Mobile customers in Banten Province. In the future, the same research can be conducted by expanding the research area not only in Banten Province, but all over Indonesia, considering that PLN customers are located all over Indonesia. Where the PLN mobile application, which has provided various conveniences, still has challenges in handling interference with the application, so it is hoped that further research can provide a better response to improve it. Secondly, based on the results of this study, it is hoped that further research can expand the scope of the study and add other variables. By making a broader publication, it is expected that different or better results will be obtained.

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