DIJEFA: Dinasti International Journal of Economics, Finance & Accounting
E-ISSN: 2721-303X
P-ISSN: 2721-3021
https://dinastipub.org/DIJEFA dinasti.info@gmail.com +62 811 7404 455

DOI: https://doi.org/10.38035/dijefa.v6i5.5254
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Received: 20 July 2025 | **Revised:** 28 September 2025 | **Accepted:** 11 October 2025

The Influence of Digital Self Service and Social Media Promotion on Loyalty with Customer Satisfaction as an Intervening Variable Study on PT PLN (Persero) Customers

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Abstract: This paper aims to analyze the relationship between Digital Self-Service and social media promotion on customer loyalty with customer satisfaction as an intervening variable for PLN Mobile application customers in the UID Banten region. Quantitative with a survey method of 100 PLN Mobile customers in the UID Banten region. Data collection was carried out through a 7-point Likert scale questionnaire, then analyzed using SPSS to test validity, reliability, multiple linear regression, and Sobel mediation test to measure the relationship between variables. The results show that Digital Self-Service and Social Media Promotion have a positive effect on Customer Satisfaction, which then acts as a mediator in forming Customer Loyalty towards PLN Mobile services. The results show that Digital Self-Service and promotion through social media have a positive and significant effect on customer satisfaction. However, both do not have a significant direct effect on customer loyalty. On the contrary, customer satisfaction is proven to significantly influence loyalty, making it a key factor in forming user loyalty towards the PLN Mobile application. In addition, customer satisfaction also plays a significant role as a mediator in the relationship between digital services and promotions with customer loyalty.

Keywords: Customer Satisfaction, Intervening, Loyalty, Customers, PLN (Persero), Social Media Promotion, Digital Self-Service.

INTRODUCTION

In the midst of digital acceleration, Indonesia faces a number of challenges in the implementation of digital services, especially in the public sector such as electricity services through the PLN Mobile application. Although the government encourages digitalization to increase efficiency and public satisfaction, there are still various problems that hinder the optimization of digital services (Alim & Ibrahim, 2024). The digital divide between urban and rural areas leads to unequal access and technological literacy (Mulyanti, 2025), Meanwhile, the low digital literacy of the community in general makes many users not able to take full advantage of service features. In addition, the strong public dependence on conventional

services shows resistance to changes towards technology-based self-service (Tuakra, 2025). On the other hand, the inconsistent quality of digital services, such as technical glitches and lack of system responsiveness, also reduce user trust. The lack of effective promotion and education strategies also causes the public's understanding of the benefits of digital services to be limited, so their adoption and utilization are not optimal at all levels of society.

PT PLN (Persero) as the main provider of electricity services in Indonesia continues to be committed to innovating to answer the dynamics of customer needs, especially in facing the challenges of the digital era (Siregar & Putri, 2020). One form of strategic innovation developed is the PLN Mobile application, such as electricity bill payment, token purchase, disruption reporting, and real time electricity consumption monitoring. PLN innovates to become a modern energy provider company that emphasizes efficiency, ease of access, and digital technology-based services.

Even though the adoption rate of the PLN Mobile application has reached 87.7%, there is still potential that can be optimized, especially for customers who have not fully utilized all the features available in the application. Customers are more likely to use services, build loyalty, and recommend the app to others.

Digital self-service is related to customer satisfaction and loyalty, which is the technology to complete various services without the involvement of company employees (Jayanti, 2022). A number of previous studies have shown that Digital Self-service is related to customer satisfaction (Jayanti, 2022; Santoso et al., 2022; Latif & Priyanti, 2024), and also to customer loyalty (Girsang et al., 2021; Ramadhani & Pertiwi, 2023). However, Purba et al. (2022) found that this technology does not always have a significant impact on consumer loyalty.

On the other hand, social media promotion is to establish interaction and build relationships between companies and customers in the digital era. With more than 200 million social media users in Indonesia (We Are Social, 2023), social media provides a great opportunity for companies to increase customer awareness, engagement, and emotional closeness to the services offered. Research conducted by Olatunde (2024), Fauziah & Tjahjaningsih (2021), and Al-Dmour et al. (2023) concluded that promotions have a relationship with customer satisfaction. Meanwhile, Ali & Raza (2022) and Fathonah & Ruskan (2023) show that promotional strategies through social media can drive customer loyalty. However, several other studies such as Febrianto et al. (2024), Mubarok et al. (2023), and Meliana et al. (2023) online promotion have no relevance in it.

This work adopts the *Cognitive Motivational Relational* (CMR) theory put forward by Lazarus (1991), which explains the close relationship between individual cognitive assessment and emotional responses that arise in reaction to a particular event or situation (Akhtar et al., 2025; Cengiz, 2023). Such cognitive assessment includes consideration of individual values, beliefs, and goals, which then affect the form and intensity of the emotions felt. In the context of this study, CMR theory is used to explain the relationship between the use of digital self-service, promotion through social media, and customer satisfaction in forming loyalty to the PLN Mobile application. Digital services and promotional activities through social media act as a stimulus that triggers the cognitive evaluation process, which is influenced by customer expectations and perceptions of service quality. The evaluation will generate emotional reactions, such as satisfaction, trust, and commitment, which collectively encourage the formation of loyalty.

Kotler and Keller (2009) customer loyalty is a commitment between the two parties consistently, even when faced with various offers from competitors. This loyalty shows a deep emotional attachment to a brand (Budiarno et al., 2022; Lubis, 2019; Rafiah, 2019). Self-service technology, according to Latif and Priyanti (2024), refers to a system or device designed to allow customers to conduct transactions independently without having to interact

directly with officers (Latif & Priyanti, 2024). This technology provides convenience and efficiency in services, while helping companies increase productivity and reduce operational costs. Santoso et al. (2022) describe this service as an interface that allows customers to complete their own services independently (Puspito et al., 2022). *Digital self-service* is a special form of this technology, which utilizes digital platforms such as mobile apps or websites (Aljohi et al., 2024). This technology has two main dimensions, namely the technology system (with indicators of usability, convenience, security, privacy, and design) and independent transactions (with indicators of convenience and service adjustment).

Olatunde (2024) states that social media produces a form of communication in real company interactions with customers to improve emotional relationships between the two (Yinka et al., 2024). Meanwhile, Chen and Lin (2019) consider it an effective communication channel to attract consumer attention and provide a deeper understanding of marketing activities (Chen & Lin, 2019). Promotion through social media has several main dimensions, namely entertainment, interaction, current trends, and content adjustment. According to Kotler and Keller (2016), satisfaction is created from the results of the process (Nurhayati & Nurhalimah, 2019; R. Putra, 2021). When performance meets or exceeds expectations, customers will feel satisfied. This is also reinforced by the opinions of Sulistiyowati (2018) and Jayanti (2022), who stated that satisfaction arises when the services or products received are in accordance with the customer's initial expectations. Customer satisfaction includes service, price suitability, convenience in access and service, customer experience, speed of service response, and perceived value (Mooy et al., 2024).

Based on the results of initial observations at the Banten Distribution Main Unit (UID) of PT PLN (Persero), it is known that out of a total of 3,994,766 customers as of 2023, around 87.7% have downloaded and used the PLN Mobile application, but most of them have not taken full advantage of all digital features. There are still complaints related to the difficulty of using the application, limited feature information, and dissatisfaction with certain digital services, such as reporting interruptions that are slow to respond. On the other hand, PLN's promotion through social media is considered to have not fully reached various customer segments, especially the elderly group or people with low digital literacy.

Several previous studies have examined the influence of Digital Self-service and social media promotion on customer loyalty, but the results are still inconsistent. There are studies that show a significant positive relationship between self-service technology and customer loyalty, while others show the effect is insignificant. In addition, there have not been many studies that have comprehensively included customer satisfaction as an intervening variable to look at the role of mediation in the relationship between digital services, social media promotion, and loyalty. On the other hand, research in the context of state-owned enterprises in the energy sector in Indonesia, especially PT PLN (Persero), is also still very limited, even though this company is at the forefront of the digital transformation of public services.

The novelty in this study lies in a comprehensive approach that combines the influence of Digital Self-service and social media promotion in the context of the PLN Mobile application. In addition, this research was conducted in the strategic SOE sector which is intensively carrying out digital transformation, but has not been widely studied academically, especially in the Banten UID area which has a high application adoption rate but with various challenges in service utilization. This research is relevant to the actual conditions of digitization of public services in Indonesia, especially in the electricity sector involving millions of customers. The hope of this work is to design innovation and make a practical contribution to PT PLN (Persero) in designing strategies to improve the quality of digital services and promotions in the midst of increasing competition and expectations in the digital era.

METHODS

The quantitative survey method, which is focused on PLN customers using the PLN Mobile application in the Banten Distribution Main Unit (UID) area (Sarwono & Handayani, 2021; Syahroni, 2022). Primary data is a questionnaire that has met certain criteria, while secondary data is collected from various sources of official publications, company reports, and relevant documentation regarding digital service usage and customer behavior. This research was carried out over a period of time using *a cross-sectional* or *one-shot case study* research design, which aims to capture specific and current factual conditions. The population in this study includes all PLN customers in the Banten UID area who use the PLN Mobile application in 2023, with a total of around 3,370,000 customers. The sample criteria include: (1) being a PLN UID Banten customer, (2) over 17 years old, (3) active as a customer in the 2022–2024 period, and (4) having used the PLN Mobile application. Developed by Simamora (2022). This instrument contains measurable indicators that represent variables.

The collected data is then analyzed in several stages. The first stage is descriptive analysis to explain the characteristics of respondents and provide an overview of each variable. The central tendency measure (such as *the mean*) and the dispersion measure (such as standard deviation) are used to see the tendency of the respondents' answers. Furthermore, a validity test was carried out on the questionnaire instrument using the product moment correlation technique. The reliability test is carried out by calculating *Cronbach's Alpha* value to determine the internal consistency of the instrument. The entire validity and reliability test process was processed using SPSS software version 26.

Once the data was declared valid and reliable, multiple linear regression analysis was used to test the direct relationship between Digital Self-service and social media promotion to customer loyalty. Partial test with t-test, simultaneous test through F test, 5% significance. To determine the strength of the prediction model, a determination coefficient (R^2) is used. In addition, to test the indirect influence, namely whether customer satisfaction mediates the relationship between Digital Self-service and social media promotion on customer loyalty, a mediation test was carried out with the Sobel Test approach as explained by Preacher and Hayes (2004). The calculation of the Sobel test is carried out using an online calculator that is widely available and accessible to determine the significance of the mediation pathway.

For the hypothesis, Digital Self-Service has a positive effect on Customer Satisfaction because it provides convenience, speed, and service efficiency. Promotions are related to Customer Satisfaction because they create interactive and responsive communication. Digital Self-Service has a direct impact on customer loyalty because it is able to provide a convenient and flexible user experience. Social media promotion helps increase customer loyalty through attractive promotions and building emotional relationships with consumers. Customer satisfaction has a relationship with loyalty. Customer Satisfaction mediates the relationship between Digital Self-Service and customer loyalty, as satisfaction is a bridge to stronger loyalty. Similarly, Customer Satisfaction also mediates the relationship between social media promotions and customer loyalty, as a satisfying promotion will encourage customers to remain loyal.

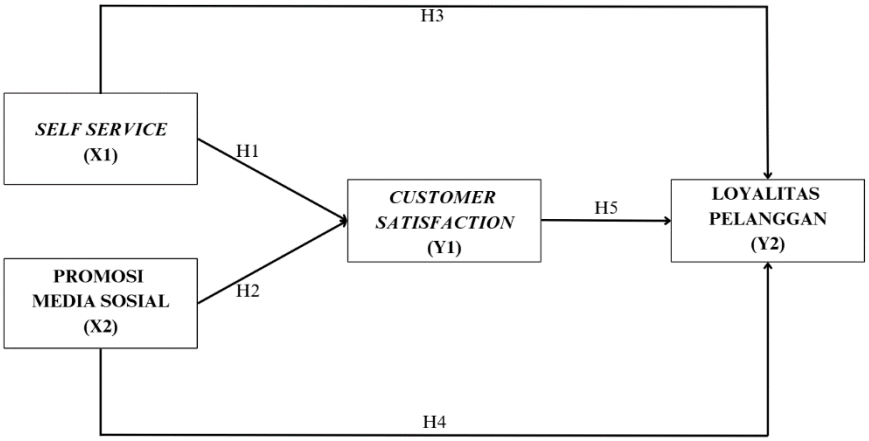


Figure 1. Research Model

RESULTS AND DISCUSSION

Results

Description of Respondents and Variables

100 respondents who are PLN customers who use the PLN Mobile application in the Banten Main Distribution Unit (UID) area. The majority of respondents were female, which was 59%, and dominated by the young age group, especially 16 to 25 years old who reached 49% of the total respondents. When viewed from the type of work as an employee in State-Owned Enterprises (SOEs) with a percentage of 38%, while in terms of education level, the majority have a bachelor's education background (S1), which is as much as 50%. This shows that the respondents generally come from young people who are productive, highly educated, and have a good level of technological literacy. The result was that all variables obtained a score above 5.8, which indicates a positive response from the respondents. The Digital Self-Service variable obtained the highest average score of 6.07, followed by the Customer Satisfaction variable with a value of 5.99, Customer Loyalty of 5.95, and Social Media Promotion of 5.83. In addition, the low standard deviation values for each variable showed that respondents' perceptions were relatively uniform and consistent with the aspects studied.

Validity and Reliability Tests

Based on the KMO values which are all above 0.5 and Bartlett's Test is significant, it shows that the construct of the instrument is valid. The KMO value of each variable is between 0.762 and 0.900, and the entire item is declared valid because the calculated r value is greater than the table r (0.197). Reliability tests using Cronbach's Alpha showed very high results, with all variables having values above 0.90. This proves that the research instrument has excellent validity and reliability.

Multiple Linear Regression Test Analysis

Table 1. Multiple Linear Regression

The Influence of Digital Self Service and Social Media Promotion on Customer Satisfaction

Y1 = 0.341 + 0.608(X1) + 0.338(X2) + e

Independent Variables	*Adj R^2*	Anova		*Standardized Coefficients*		Information
		F	Sig.	Beta	Sig.	
Self Service Digital	0.846	272.283	.000	0.608	0.000	H1 accepted
Social Media Promotion				0.338	0.000	H2 accepted

The Influence of Digital Self Service, Social Media Promotion, and Customer Satisfaction on Customer Loyalty

Y2 = 0.080 + 0.079(X1) + 0.135(X2) + 0.646(Y1) + e

Independent Variables	*Adj R²*	Anova		*Standardized Coefficients*		Information
		F	Sig.	Beta	Sig.	
Self Service Digital	0.697	76.825	0.000	0.079	0.590	H3 rejected
Social Media Promotion				0.135	0.293	H4 rejected
Customer Satisfaction				0.646	0.000	H5 accepted

Source: SPSS processed data, 2025

In Model I, the Adjusted R² value of 0.846 shows that Digital Self Service and Social Media Promotion are able to explain 84.6% variation in Customer Satisfaction, with both variables having a positive and significant effect. The F test confirms that the regression model is statistically valid. In Model II, the Adjusted R² value of 0.697 indicates that all three variables are able to explain 69.7% variation in Customer Loyalty. However, only Customer Satisfaction has a significant effect on Loyalty, while Digital Self Service and Social Media Promotion do not have a significant direct effect.

Mediation Test Results

Table 5. Sobel Test Results

Relationship Between Variables	Indirect Effect Sig.	Sig.
Digital Self Service towards customer loyalty through Customer Satisfaction	0,7242	0,0000
Social media promotion of customer loyalty through Customer Satisfaction	0,6928	0,0000

Source: SPSS processed data, 2025

Customer Satisfaction significantly mediates the influence of Digital Self-Service and Social Media Promotion on Customer Loyalty. Satisfaction has an important meaning as an intermediary that strengthens the relationship between the use of digital services and promotional strategies on social media with the level of user loyalty to PLN Mobile services.

Discussion

The Effect of Digital Self Service on Customer Satisfaction in PLN Mobile Users

Digital Self Service has a positive and significant effect on customer satisfaction with a significance value of 0.000. So statistically the relationship is stated to be strong and significant. This means that the higher the quality of independent digital services such as ease of accessing services, security when transacting, and time flexibility. This technology-based self-service provides flexibility for customers to manage their needs without having to rely on the assistance of an attendant, thus increasing convenience and creating a more positive service experience (Utami et al., 2019).

The results of this work have similarities with several works such as Latif & Priyanti (2024) which emphasizes that the optimal use of self-service technology can improve efficiency and overall service quality (Latif & Priyanti, 2024). Girsang et al. (2020) who stated that the quality of the self-service system is directly proportional to the level of customer satisfaction (R. M. Girsang et al., 2024). Studies from Jayanti (2022), Rahman et al. (2022), Santoso et al. (2022), and Leon et al. (2020) also reinforce these findings, all of which conclude that self-service technology contributes significantly to improving customer satisfaction

(Jayanti, 2022; Santoso & Dewi, 2022; Sinaga & Rofianto, 2024). Based on this exposure, the first hypothesis in this study can be accepted and empirically proven.

The Effect of Social Media Promotion on Customer Satisfaction on PLN Mobile User Customers

Based on the results of the analysis, it was found that it was related to customer satisfaction of PLN Mobile application users. The t-value of 4.014 is 0.000 significance, which is that promotional strategies carried out through social media such as Instagram and Twitter are effective in shaping customer satisfaction. Social media has become a responsive, transparent, and informative communication channel, so that customers feel more cared for and appreciated. This ultimately strengthens the positive perception of PLN's services.

Quick interaction in responding to questions and complaints, as well as providing relevant information such as service programs, discounts, and education about using the application. There is the support of many works, namely Firmansyah et al. (2023) and Febrianto & Kusmayadi (2024), which states that digital promotion through social media can increase customer trust and satisfaction (Elfiqi & Aesthetika, 2024; Firmansyah et al., 2025). These results are also strengthened by findings from Fauziah & Tjahjaningsih (2021), Al-Dmour et al. (2023), Olatunde (2024), and Ramanathan et al. (2015) have a correlation between customer satisfaction (Kusherawati & Fadli, 2023; Nuraini et al., 2025; A. P. Putra, 2025).

The Influence of Digital Self Service on PLN Mobile User Customer Loyalty

It has no relevance to customer loyalty because the significance value is 0.590. This means that the convenience and efficiency offered by independent digital services have not been able to form customer loyalty directly. These findings reinforce the results of previous research by Purba et al. (2022) which revealed that self-service technology does not automatically create customer loyalty. Although the technology used is sophisticated and efficient, it does not necessarily create an emotional attachment or long-term relationship between customers and service providers. In this case, even though the PLN Mobile application provides various digital features such as self-meter recording, outage reporting, and electricity token purchases, customers do not seem to have felt significant enough benefits to increase their loyalty.

Customer loyalty is determined not only by the ease of access to technology, but also by other factors such as trust, ongoing satisfaction, and a positive emotional experience. Without these elements, the self-service services offered are only practical facilities, not binders that strengthen the relationship between the customer and the company. Therefore, in order to build stronger loyalty, PLN needs to develop additional strategies that include a more personalized approach, effective communication, and overall service quality improvement.

The Effect of Social Media Promotion on Customer Loyalty of PLN Mobile Users

Social Media Promotion was not found to have a significant effect on PLN Mobile customer loyalty. These findings suggest that while social media promotions are able to reach consumers and convey the information they need, they are not yet effective enough in building emotional bonds that drive long-term loyalty. In practice, PLN's promotion through social media such as Instagram or Twitter tends to be only informative, such as notifications related to bills, blackout schedules, or customer appreciation programs. This pattern of communication is more one-way, without deep involvement. This is different from the approach of commercial brands that actively build interactions, create meaningful experiences, and foster emotional closeness with their audiences.

This condition is a logical reason why PLN's social media promotion has not been fully able to grow customer loyalty directly. This finding is also in line with the results of studies

from Makna & Amron (2023), Meliana et al. (2023), and Mubarok et al. (2023) that not all social media promotion strategies are able to influence loyalty (Makna & Amron, 2023; Meliana et al., 2024; Mubarok et al., 2024). In the end, loyalty is more determined by the overall customer experience, consistent quality of service, and emotional relationships formed through interactions and the value felt by customers of a dimension that PLN Mobile still seems to need to strengthen.

The Influence of Customer Satisfaction on PLN Mobile User Customer Loyalty

Customer satisfaction was found to have a significant and positive effect on customer loyalty. The fifth hypothesis is declared proven. This finding indicates that customers are increasingly satisfied with PLN Mobile services. This satisfaction is generally driven by several aspects, such as ease of accessing services, speed of response, transparency of bill information, ease of purchasing electricity tokens, and effectiveness of handling complaints.

Loyal behavior tends to be formed when customers feel satisfied with the service received. This is strengthened by the research results of Tjahjaningsih (2013) and Pangastuti and Tjahjaningsih (2023), satisfaction is the foundation for building loyalty (Anggraini & Budiarti, 2020; Azhari & Tjahjaningsih, 2023). In line with that, Girsang et al. (2020) and Manyanga et al. (2022) also emphasized that it is not only the end result of customer interaction, but also plays an important role in forming long-term relationships (Ahmudin & Ranto, 2023; N. M. D. Girsang, 2024). Therefore, efforts to improve the quality of digital services, develop more user-friendly features, and a fast and solution complaint handling system are strategic steps for PLN to maintain the loyalty of its customers.

The role of Customer Satisfaction as an intervening variable in the influence of Digital Self Service on customer loyalty of PLN Mobile users

Customer satisfaction was found to be significantly mediated in the relationship between Digital Self-service and customer loyalty. This means that the existence of self-service technology through the PLN Mobile application has not been able to directly increase customer loyalty, but it will have a positive impact if the service is able to bring satisfaction to its users. Although various digital features such as purchasing electricity tokens, checking bills, and filing complaints are available in the application, it does not necessarily create customer loyalty. New loyalty will be formed if customers are satisfied with the ease of access, process speed, and effectiveness of the digital service. When customers have a pleasant and efficient experience, they tend to feel valued and have a tendency to continue using and recommending PLN's services. This work has great interest supported by several similarities, namely Girsang et al. (2020) and Shalsabila & Safitri (2024), which affirm that the effectiveness of self-service technology will only have an impact on increasing loyalty if it is accompanied by satisfaction felt by customers (R. M. Girsang et al., 2024).

The role of Customer Satisfaction as an intervening variable in the influence of social media promotion on customer loyalty of PLN Mobile users

Customer satisfaction was found to be significantly mediated in the relationship between social media promotion and customer loyalty. This means that promotions carried out through social media platforms strengthen customer loyalty. In the context of using the PLN Mobile application, promotional strategies such as delivering discount information, application use education, and interactive content have been proven to be able to increase customer awareness and engagement. With the support of works such as Malik et al. (2022) and Al-Dmour et al. (2023), digital marketing through social media can encourage customer loyalty by first building strong satisfaction (Malik et al., 2023; A. P. Putra, 2025).

CONCLUSION

The result of this work, namely Digital Self Service services, has a positive and significant impact on customer satisfaction. This shows that the better the quality of independent services provided through the PLN Mobile application, the higher the level of customer satisfaction. Similarly, promotion through social media has been proven to have a positive and significant influence on customer satisfaction, which means that PLN's digital promotion strategy is able to form a good perception among users. However, the results of the study also revealed that neither Digital Self Service services nor promotions through social media had a significant direct influence on customer loyalty. These findings indicate that while customers are comfortable with attractive digital services and promotions, they are not enough to create loyalty without satisfaction. On the contrary, customer satisfaction has been proven to have a significant influence on loyalty, making it a determining factor in building and maintaining customer loyalty to PLN Mobile. Furthermore, the results of the mediation test showed that customer satisfaction was significantly able to bridge the influence between Digital Self Service and Social Media Promotion on customer loyalty. Thus, customer satisfaction plays an important role in transforming digital experiences and promotional strategies into the basis for forming customer loyalty to PLN Mobile services.

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