Revitalizing Loyalty: Unveiling the Dynamics of E-Service Quality, Customer Satisfaction, and Trust in Amplifying User Engagement with Electricity Mobile Application

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ABSTRACT

Keywords: e-service quality; customer satisfaction; customer trust; repurchase intention; word of mouth.

The development of internet-based technology and the increasing use of smartphones have become essential tools for companies to enhance their online service quality. This research aims to analyze the influence of e-service quality, customer satisfaction, and customer trust on loyalty intention in optimizing the utilization of the PLN Mobile application. This study employs a quantitative approach using an online questionnaire to collect data from 386 respondents using the PLN Mobile application. The data are then analyzed using structural equation modeling. The results of this study reveal that e-service quality has a significant positive impact on customer satisfaction and customer trust. Furthermore, customer satisfaction and customer trust are found to have a positive and significant influence on repurchase intention and word of mouth in optimizing application usage. These findings have significant implications in the energy and information technology industries, particularly in developing strategies to enhance the utilization of electricity mobile applications.

Introduction

Almost all activities can be done and accessed using a smartphone (Ahmadi, 2019). Smartphones can be used by people to communicate with each other and are capable of various activities, such as internet access, social media applications, and document processing with good screen resolution (Almaiah et al., 2022). In recent decades, consumers worldwide have witnessed a dramatic and rapid increase in smartphone usage. Currently, Indonesia is the fourth-largest smartphone market in the world after China, India, and the United States (Dhingra, Gupta, & Bhatt, 2020). Indonesia is one of the largest mobile markets in Asia, characterized by its high degree of dynamism: by 2025, the number of smartphone users is expected to increase more than threefold compared to 2015. According to a survey report by Indonesiabaik.id that implies implications for the socio-cultural aspects of Indonesian society, nearly two-thirds of the Indonesian population already owns a smartphone. Furthermore, according to data from Indonesia.id,

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Indonesia ranks as the fourth-largest smartphone user in the world with a total of 192.15 million users as of 2022.

Moreover, throughout 2022, as many as 80% of Indonesia's population owned smartphones, and over 212 million users accessed the internet from their mobile phones. Indonesia is emerging as a mobile-first country and one of the fastest-growing app markets in the world, with revenues reaching $1.7 billion in 2022 (Han & Hyun, 2018). In 2021, mobile users in Indonesia downloaded 7.31 billion apps, which means that every minute, more than 13,000 apps were downloaded by mobile users in Indonesia, and on average, mobile users in Indonesia spent 5.4 hours per day using their mobile devices (Wu, Hwang, Sharkhuu, & Tsogt-Ochir, 2018). This significant increase in smartphone usage and mobile app usage in Indonesia can be leveraged by companies to engage more closely with their customers, enhance services, and increase profits by creating mobile apps that are fast and easy to access. PT Perusahaan Listrik Negara (Persero) is one of the companies that has harnessed this development by creating an app called PLN Mobile (Wang, Lin, & Liu, 2021).

PLN Mobile has become the primary provider for meeting the electricity needs of the public (PLN, 2021). This program is a flagship of PLN's digital platform to meet all customer needs, providing convenience and differentiated electricity services. The main goal of launching this app is to enhance customer focus and loyalty, which can be seen in active app usage, repeat purchases, and positive recommendations to other customers, ultimately expected to increase the company's profits. Since its launch in 2016, this app has been downloaded by more than 35 million users in Indonesia. The emergence of this app is also a form of PLN's transformation in providing the best services to the public (PLN, 2022).

However, technology-based application innovations alone are not enough to ensure that service quality is well met. Sustainable business growth must maintain high service quality (Jalilvand, Nasrolahi Vosta, Kazemi Mahyari, & Khazaei Pool, 2017). Online customers expect consistent service quality from the first click to the final product delivery, and service quality is directly related to a company's profitability (Zia, Rafique, Rehman, & Chudhery, 2023). According to Miranda et al. (2018), customer satisfaction is based on the experience with the service provider and the quality of service provided. This indicates that service quality is often associated with customer satisfaction. Jones and Suh (2000) concluded that customer satisfaction is based on the cumulative evaluation of service experience, while (Shaikh, Banerjee, & Singh, 2023) concluded that customer satisfaction is the evaluation of the customer's purchasing experience. On the other hand, customer satisfaction has been considered a primary goal of companies. It is closely related to customer loyalty, which in turn is related to profitability. Over the years, companies have invested measurable resources to measure and improve customer satisfaction. Satisfaction does not necessarily lead to customer retention, as existing findings have shown that satisfied customers also make purchases elsewhere. However, delivering value to customers is fundamental to marketing activities and effective competitive advantage.

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In their research, (Shafiee & Bazargan, 2018) found that e-service quality has a positive impact on three customer behavior intentions: purchase intention, site revisit, and Word of Mouth (WOM). Then, Blut (2016) stated that e-service quality has a positive effect on customer satisfaction, repurchase intention, and WOM for online customers in the United States. Several studies have shown that customer satisfaction has a positive influence on repurchase intention. According to (Mahadin, Akroush, & Bata, 2020), repeat purchase behavior occurs when customers form a positive attitude toward the products or services they purchase. Customers with high levels of satisfaction also tend to be loyal customers. These customers are more likely to spend more and are unlikely to switch suppliers in their future purchases. In a study by Law et al. (2022), customer satisfaction was also found to have a positive and significant impact on repeat purchases. Another study by Miao et al. (2021) on e-customer satisfaction also found its significant impact on repurchase intention. According to Chang et al. (2013), trust is the most important factor in attracting e-commerce buyers. However, there has been little research on the impact of service quality on trust, especially in the online business environment (Rita et al., 2019). Saleem et al. (2017) tested this in the aviation industry in Pakistan and found that trust plays a crucial role in driving repurchase intention for all business services. Blut et al. (2015) developed a hierarchical model of e-service quality to understand how this e-service quality model can better predict customer behavior than other instruments. The model was then empirically tested by Rita et al. (2019) to understand how the impact of e-service quality extends not only to customer satisfaction and repurchase intention but also to customer trust, Word of Mouth (WOM), and site revisit.

Thus, the goal of this research is also to test the e-service quality model on customer satisfaction, customer trust, repurchase intention, and WOM in the specific context of PLN Mobile. It is hoped that PLN Mobile can be used as the primary application that can facilitate customers in their lives, not only related to electricity but also other activities, and have a positive impact on the company.

Method

This research employed a quantitative method and used an online questionnaire for data collection. The study utilizes nonprobability sampling, specifically the purposive sampling technique, which is carried out by establishing specific criteria for research respondents according to the required data (Daniel, 2011). The criteria for respondents in this study are all active PLN (State Electricity Company) customers aged 17 and above at the time of questionnaire completion, who have used the PLN Mobile application within the last 6 months and have reported complaints, issues, or problems related to products and deliveries through the PLN Mobile application. The questionnaire is created using Google Forms and consists of 47 questions. The questionnaire link will be distributed through customers' mobile phone numbers, email, and social media. The

research data were collected from 386 respondents who are active users of the application and meet the pre-established criteria.

The questionnaire consists of several sections: (1) containing screening questions to ensure respondents meet the research criteria, (2) main questions about the tested variables using a 6-point Likert scale ranging from "strongly disagree" to "strongly agree," and (3) respondent profiles.

This study tests hypotheses using Partial Least Squares-Structural Equation Modelling (PLS-SEM). The software used is Smart PLS 3.0. The purpose of using SEM is to analyze the correlation between multiple variables so that hypotheses between these variables can be tested, both among indicators and constructs and vice versa. Additionally, PLS also supports various constructions, can explain complex model relationships by eliminating unacceptable solutions, and can handle small sample quantities. PLS can eliminate uncertainty factors and is capable of handling non-normally distributed data.

Table 1 illustrates the operationalization of variables, showing indicators representing the variables to be measured in the study. In this research, the independent variables include e-service quality with four dimensions: efficiency, fulfillment, system availability, and privacy/security. Additionally, e-recovery service quality with three dimensions: responsiveness, compensation, and contact, along with customer satisfaction and customer trust. Meanwhile, the dependent variables in this study are repurchase intention and word of mouth.

Table 1
Variable Operational Definitions

Variable	Dimension	Indicator	Item	Source
E-Service Quality	Efficiency (EFF)	EFF1	1. The PLN Mobile application makes it easy for me to find what I need.	Parasuraman et al. (2005)
		EFF2	2. It is easy for me to access any menu and services within the PLN Mobile application.	
		EFF3	3. The PLN Mobile application allows me to complete any transactions, including electricity services, quickly and efficiently.	
		EFF4	4. The information in the PLN Mobile application is well-managed.	
		EFF5	5. The PLN Mobile application is very fast in loading its interface.	
		EFF6	6. The PLN Mobile application is user-friendly.	
		EFF7	7. The PLN Mobile application allows me to access it quickly.	
		EFF8	8. The PLN Mobile application is well-maintained.	

Fulfillment (FUL)	FULL 1	1. The PLN Mobile application responds to complaints and issues as promised.		
	FULL 2	2. The PLN Mobile application provides easy access to submit complaints and issues within the appropriate timeframe.		
	FULL 3	3. The PLN Mobile application delivers the products/services I ordered promptly and effectively.		
	FULL 4	4. The PLN Mobile application responds to electricity services promptly and effectively.	Parasuraman et al. (2005)	
	FULL 5	5. The PLN Mobile application follows up on the complaints and issues I report regarding electricity products and services.		
	FULL 6	6. The PLN Mobile application has service support as promised by the company.		
	FULL 7	7. All information about the products and services presented in the PLN Mobile application is accurate.		
	FULL 8	8. The PLN Mobile application provides accurate estimates for product and electricity service delivery.		
System Availability (SYS)	SYS1	1. The PLN Mobile application is always available for business and service needs.		
	SYS2	2. The PLN Mobile application can be opened and input the required information quickly.	Parasuraman et al. (2005)	
	SYS3	3. The PLN Mobile application operates without issues.		
	SYS4	4. The PLN Mobile application does not freeze or hang when I input information related to electricity products or service needs.		

Results and Discussion
Respondent Characteristics

The criteria for respondents in this study are all active PLN customers who use the PLN Mobile application, aged 17 and above at the time of filling out the questionnaire, have used the PLN Mobile application in the last 6 months, and have reported complaints, feedback, or issues related to products and services through the PLN Mobile application. These two criteria serve as screening questions that respondents must pass. If respondents meet all of these criteria, they can proceed to answer the core questionnaire. However, if

any of these criteria are not met, respondents will be directed to the closing page and do not need to continue the questionnaire process.

Based on the data collection conducted, 386 respondents who meet the criteria were obtained and can be used as data for testing in the main test of the research. This also exceeds the minimum sample size according to the criteria set by Hair et al. (2019) for 47 questionnaire indicators. Overall, the profile of the 386 respondents who meet the research criteria can be summarized in Table 2.

Table 3 summarizes the outer model analysis, wherein the analysis of the outer model, values is generated for the statistical validity analysis of the measurement models. The results of the validity test can be observed in the recommended outer loading values (> 0.708), indicating that the constructs explain more than 50 percent of the indicator variations, thus providing acceptable item reliability.

The next step is to assess internal consistency reliability, most commonly using Jöreskog's (1971) composite reliability, where higher values generally indicate higher levels of reliability. For instance, reliability values between 0.60 and 0.70 are considered "acceptable in exploratory research," while values between 0.70 and 0.90 range from "satisfactory to good." Cronbach's alpha is another measure of internal consistency reliability, assuming similar thresholds, but producing lower values than composite reliability.

Subsequently, convergent validity is examined, measurable with Average Variance Extracted (AVE). The AVE value should be ≥ 0.5 to be acceptable, indicating that the construct explains at least 50 percent of the variations in its indicators (Hair et al., 2019). AVE is obtained by summing the reliabilities of the indicators for a construct and then taking the average. This metric measures the average variance shared between the construct and its indicators.

Table 2
Validity and Reliability of Variables

Variable	Dimension	Cronbach's Alpha	Composite Reliability	AVE
E-Service Quality	Efficiency	0.906	0.924	0.604
	Fulfillment	0.922	0.937	0.650
	System Availability	0.839	0.892	0.675
	Privacy/Security	0.852	0.910	0.771
	Responsiveness	0.900	0.926	0.715
	Compensation	0.901	0.938	0.835
	Contact	0.857	0.913	0.777
Customer Satisfaction		0.851	0.899	0.691
Customer Trust		0.875	0.923	0.800
		0.882	0.927	0.809

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Repurchase Intention			
Word of Mouth (WOM)	0.930	0.955	0.877

Source: Processed Data (2023)

The study indicates that the indicators measuring dimensions and variables can be considered effective in measuring both, as evidenced by the Average Variance Extracted (AVE) values exceeding ≥ 0.5 for all variables, signifying good convergent validity. Furthermore, it can be concluded that all variables in this model meet the reliability criteria, with Cronbach's Alpha and Composite Reliability (CR) values exceeding 0.70.

Furthermore, Table 4 presents the attainment of discriminant validity values measurable through the Heterotrait-Monotrait Ratio (HTMT). Discriminant validity aims to determine the extent to which a construct empirically differs from other constructs in the structural model. The heterotrait-monotrait Ratio (HTMT) is defined as the average correlation between items across constructs compared to the average (geometric mean) correlation between items measuring the same construct. An HTMT correlation ratio value below 0.9 is considered acceptable.

Based on Table 4, it can be concluded from the discriminant validity testing that all variables in the model meet the criteria according to Fornell-Larcker, with the square root of AVE being greater (>) than the inter-construct correlations. Similarly, the results of the HTMT Ratio Approach indicate that most constructs have good discriminant validity, as their HTMT ratios are below the accepted threshold of 0.9. Although some values are somewhat high (for example, between CS and CT), these results can be considered acceptable. However, further examination and deeper interpretation may be conducted to ensure that discriminant validity can be deemed good.

Table 3
Heterotrait-Monotrait (HTMT) Ratio

	COM	CON	CS	CT	EFF	FULL	PRI	RI	RES	SYS	WOM
HTMT Ratio Approach											
COM											
CON	0.574										
CS	0.582	0.632									
CT	0.498	0.612	0.898								
EFF	0.548	0.582	0.787	0.731							
FULL	0.559	0.636	0.808	0.764	0.840						

PRI	0.535	0.621	0.608	0.695	0.586	0.592				
RI	0.489	0.567	0.770	0.855	0.710	0.674	0.570			
RES	0.667	0.666	0.841	0.829	0.746	0.855	0.736	0.751		
SYS	0.627	0.615	0.764	0.705	0.848	0.828	0.689	0.652	0.792	
WOM	0.424	0.508	0.749	0.824	0.681	0.709	0.604	0.799	0.770	0.641

Source: Processed Data (2023)

Table 3 presents hypothesis testing involving the evaluation of the extent to which empirical data supports or rejects hypotheses proposed in a structural model. Hypothesis testing is conducted by analyzing the P-value in the structural model, and a hypothesis is considered accepted if the P-value is less than (<) 0.05. The magnitude of the influence and how significant it is can also be observed from the t-statistic, where to determine positive significance, we can check if the t-statistic is greater than the positive threshold, typically taken as 1.96 at a significance level of 0.05. Conversely, if the t-statistic is less than 1.96, it indicates that the coefficient is not statistically significant at a 95% confidence level. If the P-value is > 0.05, the hypothesis is rejected.

Table 4
Structural Relationship Test Result

Hyp	Path	Original Sample (O)	Sample Mean (M)	Std. Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values	Result
H1	E-S-QUAL -> CS	0.499	0.502	0.063	7.902	0.000	Accepted
H2	E-RECS-QUAL -> CS	0.326	0.326	0.062	5.254	0.000	Accepted
H3	E-S-QUAL -> CT	0.486	0.494	0.066	7.357	0.000	Accepted
H4	E-RECS-QUAL -> CT	0.311	0.306	0.067	4.658	0.000	Accepted
H5	CS -> RI	0.225	0.230	0.080	2.805	0.003	Accepted
H6	CS -> WOM	0.246	0.254	0.085	2.874	0.002	Accepted
H7	CT -> RI	0.578	0.576	0.078	7.389	0.000	Accepted
H8	CT -> WOM	0.553	0.546	0.086	6.435	0.000	Accepted

Source: Processed Data (2023)

Based on the research findings, it is known that the dimensions forming e-service quality, consisting of E-S-Qual and E-Recs-Qual, have a significant positive impact on

customer satisfaction and customer trust. As shown in Table 5, E-S-Qual correlates positively with customer satisfaction (B = 0.499, t = 7.902, p<0.05), and E-Recs-Qual correlates positively with customer satisfaction (B = 0.326, t = 5.254, p<0.05). Furthermore, E-S-Qual correlates positively with customer trust (B = 0.486, t = 7.357, p<0.05), and E-Recs-Qual correlates positively with customer trust (B = 0.311, t = 4.658, p<0.05).

Next, customer satisfaction and customer trust have a significant positive impact on repurchase intention and word of mouth. As seen in Table 5, customer satisfaction correlates positively with repurchase intention (B = 0.225, t = 2.805, p<0.05), and customer satisfaction correlates positively with word of mouth (B = 0.246, t = 2.874, p<0.05). Similarly, customer trust correlates positively with repurchase intention (B = 0.578, t = 7.389, p<0.05), and customer trust correlates positively with word of mouth (B = 0.553, t = 6.435, p<0.05). Therefore, based on the obtained results, it can be concluded that E-S-Qual and E-Recs-Qual play a significant role in increasing customer satisfaction and customer trust, while customer satisfaction and customer trust also have a substantial impact on increasing repurchase intention and word of mouth.

E-Service Quality on Customer Satisfaction

The research findings indicate that the e-service quality variable has a positive and significant impact on customer satisfaction. From these results, it can be concluded that changes in the e-service quality variable can significantly affect positive changes in the level of customer satisfaction. In other words, it can be interpreted that when a company or electronic service provider enhances or improves their electronic service quality, it is likely to increase customer satisfaction. Conversely, a decrease in electronic service quality can hurt customer satisfaction. This is also consistent with the study by Zia et al. (2022), which states that e-service quality has a positive and significant impact on customer satisfaction, where overall service quality and customer satisfaction are positive and significant when consumers perceive high-quality service and believe that service delivery meets or exceeds customer expectations. The research data indicates that the e-recovery service quality variable has a positive and significant impact on customer satisfaction. From these results, it can be said that improvements in the company's ability to recover electronic service quality will have a positive effect on increasing customer satisfaction. This is mentioned by Shafiee and Bazargan (2018) in their research, where e-recovery service quality influenced by responsiveness, compensation, and contact can enhance customer satisfaction.

E-Service Quality on Customer Trust

The research results indicate that the e-service quality variable has a positive and significant impact on customer trust. Based on these findings, it can be interpreted that when a company improves or enhances its electronic service quality, it not only increases customer satisfaction, as obtained in the previous results but also builds a level of trust among customers towards the company or brand. In their study, Wu et al (2018) also state

that e-service quality influences trust, and retailers should consider service quality as a priority in attracting customers because providing good service quality can enhance customer trust. Meanwhile, the research results indicate that the e-recovery service quality variable also has a positive and significant impact on customer trust. The presence of this positive and significant influence suggests that improvements in e-recovery service quality can be associated with an increase in customer trust, where a company's efforts to enhance the quality of electronic service recovery after a failure can contribute positively to the level of customer trust.

Customer Satisfaction on Repurchase Intention

The research results indicate that the variable of customer satisfaction has a positive and significant impact on repurchase intention. This suggests that customer satisfaction can contribute positively to the level of customer trust in the company. Consumers are likely to make repeat purchases when they have a positive experience with the brand/company.

Customer Satisfaction on Word of Mouth

In the same study, it was also found that customer satisfaction has a positive and significant impact on word of mouth (WOM). This indicates that the higher the level of customer satisfaction, the greater the likelihood that they will provide positive recommendations about the product or service to others. In other words, the company's success in improving customer satisfaction can contribute to an increase in word of mouth (WOM), which can help enhance the company's reputation in the eyes of customers. Satisfied customers positively influence their WOM intentions (Kitapci et al., 2014). Additionally, Sanchez-Garcia et al. (2012) stated that customer satisfaction is crucial in repurchase intention behavior, where satisfied consumers are more likely to make future purchases compared to dissatisfied consumers.

Customer Trust on Repurchase Intention

The research results indicate that the variable of customer trust has a positive and significant impact on repurchase intention. This can be interpreted as the higher the level of customer trust in the company, the greater the likelihood that they will make a repurchase. In their study, Javed and Wu (2020) also found that trust has a positive and significant relationship with repurchase intention. Additionally, consumers' positive interest in purchasing or making repeat purchases of products or services is related to trust.

Customer Trust on Word of Mouth

On the other hand, the research results show that the variable of customer trust has a positive and significant impact on word of mouth (WOM). This can be interpreted as the higher the level of customer trust in the company, the greater the likelihood that they will provide positive recommendations to others. These findings align with the research conducted by Rita et al. (2019), who found that customer trust has a positive impact on WOM.

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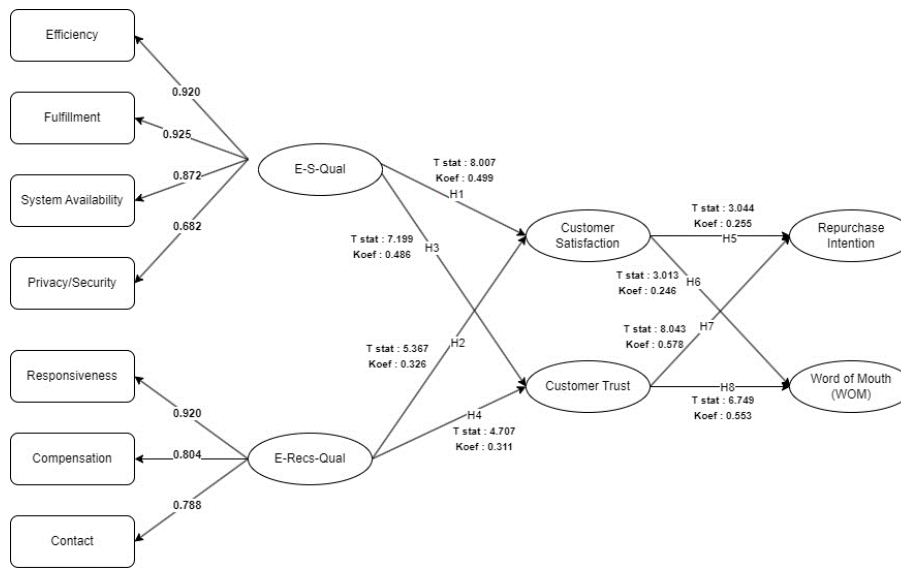Application

Figure 2
Estimated Model

Conclusion

Regarding e-service quality itself, the findings in this research confirm the importance of efficiency, fulfillment, system availability, and security/privacy, as well as responsiveness, compensation, and contact as part of service recovery to address customer issues that can drive customer satisfaction and customer trust. Ultimately, the improvement of electronic service quality will have a positive impact, either directly or indirectly, on satisfaction and trust, which then also influences repurchase intention and word of mouth by providing positive recommendations to others or fellow customers.

These findings provide insights for managers to better understand how electronic service quality is shaped and the importance of each attribute and dimension in ensuring customer satisfaction and trust. In the end, this can help retain customers, enhance the company's image through positive recommendations to others, and increase profits through online services. Companies should ensure that all attributes influencing online service quality and recovery systems are met so that the provided online services will be optimal. This includes ease of application use, product availability, data security, and quick response in the event of service failures.

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