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The Influence of E-Service Quality and Brand Image on Customer E-Loyalty Through Customer E-Satisfaction Among PLN Mobile Users in PT. PLN UIW Bangka Belitung

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Abstract:
Background. This study examines the factors that influence digital consumer loyalty in public utility services. Specifically, it examines the impact of e-service quality and brand image on customer e-loyalty, with e-satisfaction mediating the relationship among PLN Mobile users at PT. PLN UIW Bangka Belitung. Despite PLN Mobile's high installation rates, active user involvement is relatively low, highlighting a discrepancy between uptake and ongoing utilization.
Methods. A purposive sample of 437 PLN Mobile customers at PT. PLN UIW Bangka Belitung was analyzed using an explanatory quantitative research approach. The data were collected through structured questionnaires and analyzed using Structural Equation Modeling based on Partial Least Squares to evaluate structural correlations and measurement.
Results. The findings indicate that customer e-satisfaction is significantly and positively influenced by the quality of e-services and the brand image. The direct influence of consumer e-satisfaction on customer e-loyalty is the most significant. The total effect study confirms that customer e-loyalty is substantially influenced by e-service quality and brand image through both direct and mediated channels. In a public utility environment, the structural model exhibits substantial predictive capability regarding digital loyalty behavior.
Conclusion. This research demonstrates that consumer e-loyalty is significantly influenced by e-service quality and brand image, with customer e-satisfaction mediating the relationship. In a public utility context, the primary explanatory factor that transforms digital service performance and brand perception into enduring loyalty behavior is customer e-satisfaction.
Implication. The findings suggest that it is essential to enhance the brand's legitimacy, the application's stability, and the personalization features to improve long-term digital engagement and retention on public-sector service platforms.

Keywords: Brand Image, Customer E-Loyalty, Customer E-Satisfaction, E-Service Quality, PLN Mobile

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INTRODUCTION

The global delivery of public services has been substantially altered by the rapid advancement of digital transformation. State-owned enterprises are being compelled to adopt digital platforms in order to improve the efficiency, transparency, and consumer experience. In this context, PT PLN (Persero), Indonesia's state-owned electricity company, introduced PLN Mobile, an integrated digital service platform that allows customers to conduct electricity transactions, submit complaints, monitor consumption, and request service modifications online. This initiative is indicative of PLN's strategic dedication to the transformation of service in a manner that is both customer-centric and innovative.

Since the launch of the New PLN Mobile in 2021, the application has experienced substantial growth, reaching 52.48 million downloads in 2024. Despite this impressive national adoption rate, user engagement remains inconsistent. Data from PLN UIW Bangka Belitung indicate that although 54.68% of total customers have installed the application, only 11.95% are categorized as active users in 2025. Transaction monitoring over the past six months further shows that most users engage only occasionally, with a relatively small proportion demonstrating regular usage behavior. These findings reveal a significant gap between application installation and sustained usage, suggesting that high download rates do not necessarily translate into customer loyalty.

The 2024 Customer Satisfaction Survey conducted at PLN UIW Bangka Belitung reinforces this issue, showing that less than half of customers familiar with PLN Mobile actively use it for electricity transactions. This phenomenon indicates that digital availability alone is insufficient to foster consistent engagement and loyalty. Customers may still prefer conventional service channels, highlighting the importance of understanding the underlying behavioral drivers of digital service usage (Surveyor Indonesia, 2024).

The impact of e-service quality on consumer happiness and loyalty has been thoroughly examined across multiple sectors, including banking, hospitality, and e-commerce. Nevertheless, there is a dearth of research investigating these relationships within the framework of public utility digital platforms, especially in developing countries. The moderating role of client e-satisfaction on e-loyalty in state-owned digital service contexts remains inadequately explored. Consumer loyalty may be affected by perceived satisfaction, brand perception, and service quality in essential service areas such as energy supply.

This study, based on consumer behavior theory in digital service environments, analyzes the links between E-Service Quality, Brand Image, Customer E-Satisfaction, and Customer E-Loyalty

among PLN Mobile users. The study examines the direct and indirect impacts of E-Service Quality and Brand Image on Customer E-Loyalty, including the indirect effects mediated by Customer E-Satisfaction. Furthermore, it examines the direct impact of Customer E-Satisfaction on Customer E-Loyalty. This study enhances the current knowledge in three specific ways. It initially broadens the e-service quality and digital loyalty frameworks to encompass the public utility sector within an emerging market scenario. Secondly, it offers empirical evidence from a state-owned digital platform, an area that has not been adequately explored in prior studies. Third, it elucidates the mediating function of e-satisfaction in enhancing consumer e-loyalty inside essential digital public services.

Research on digital service platforms has increasingly emphasized the significance of e-service quality, brand image, customer e-satisfaction, and consumer e-loyalty in fostering lasting customer connections. Prior studies have consistently shown that the quality of e-services is a critical determinant of consumer pleasure and loyalty in digital contexts. Extensive research in digital commerce and online services indicates that consumer happiness is profoundly affected by characteristics including usability, responsiveness, security, and reliability. This consequently cultivates loyal behaviors, including favorable word-of-mouth and repeated usage. Furthermore, brand image is acknowledged as a significant psychological element influencing consumers' trust and impressions of a service provider. A positive brand image cultivates beneficial associations in consumers' memories and elevates the perceived reliability of digital services, thereby improving customer happiness and loyalty.

In digital service ecosystems, consumer e-satisfaction is widely acknowledged as a mediating mechanism that connects customer loyalty to brand perception and service quality. The cognitive–affective–conative consumer behavior model is frequently cited as the theoretical foundation. In this model, customers initially assess service attributes (cognitive stage), subsequently develop satisfaction or dissatisfaction (affective stage), and finally express behavioral intentions (conative stage) such as loyalty and continued usage.

Previous empirical studies have extensively tested these relationships in sectors such as:

1. E-commerce platforms
2. Online banking and fintech services
3. Digital marketplaces and travel applications
4. Hospitality and retail service platforms

Most of these research confirm that the quality of e-services significantly influences consumer happiness and loyalty, while brand image bolsters customer trust and sustained involvement with digital platforms. A recent study examined how service quality affects consumer loyalty in digital services through mediating variables, including e-trust and e-satisfaction. Nonetheless, empirical data is conflicting across contexts, especially concerning the direct effect of service quality on loyalty and the intermediary role of satisfaction.

LITERATURE REVIEW

Marketing management is a social and managerial process executed by individuals or organizations to meet their needs and desires by producing and exchanging value with other entities (Kotler et al., 2022). Digital marketing management (e-marketing) involves overseeing marketing activities that employ information technology to create, communicate, deliver, and exchange value with clients and stakeholders (Frost et al., 2022). According to Pascucci et al. (2023), advancements in digital technology have significantly altered the design and implementation of marketing strategies, resulting in a comprehensive reconfiguration of marketing mix management. The Marketing Mix is a set of tactical marketing instruments that a company implements in order to elicit the intended response from the target market. It includes the following: product, place, price, promotion, process, physical environment, and people (Kotler et al., 2022).

Kotler et al. (2022) contend that technology-based products and services are intangible, technology- and system-dependent, interactive, readily developed, and involve simultaneous production and consumption. Lolemo and Pandya's (2025) recent research suggests that the quality of e-services and the brand image have a substantial impact on consumers' perceptions of digital products. E-Service Quality is the ability of e-retailers to meet customer requirements through online services, with the objective of ensuring successful transactions (Riswanda & Millanyani, 2025; Venkatakrishnan et al., 2023). Responsiveness, simplicity of use, credibility, accessibility, personalization, and assurance are the indicators of E-Service Quality. According to Kotler et al. (2022), brand image is defined as the perceptions and opinions individuals hold about a brand, reflected in the associations they retain in memory. User satisfaction will be improved by the provision of high-quality e-services on PLN Mobile, characterized by user-friendliness, rapid access, security, and system reliability (Aditya et al., 2023). As a result, E-Service Quality is a determinant of consumer satisfaction in the context of digital transformation (Mahadevan & Joshi, 2022) and significantly influences consumer e-loyalty (Gautam & Sah, 2023).

Brand Image is defined as the consumer's perception of a brand based on its experiences, beliefs, and associations, which directly influences customer satisfaction and loyalty, according to the research conducted by Fu et al. (2025). The primary independent variable that influences e-satisfaction and e-loyalty among consumers of digital-based service platforms is brand image (Annisa Riyadi et al., 2023; Sun et al., 2024). These two variables significantly influence customer loyalty (Dam & Dam, 2021; Garzaro et al., 2021; Grazius et al., 2024; Herman et al., 2024). The perception of a brand by consumers, influenced by experiences, beliefs, and associations, is referred to as "Brand Image" in the research conducted by Fu et al. (2025). This perception directly impacts customer satisfaction and loyalty. The primary independent variable influencing e-satisfaction and e-loyalty among consumers of digital service platforms is brand image (Annisa Riyadi et al., 2023; Sun et al., 2024). These two variables are essential to consumer loyalty (Dam & Dam, 2021; Garzaro et al., 2021; Grazius et al., 2024; Herman et al., 2024).

Customer contentment results from an individual's evaluation of a product or service's actual performance relative to their expectations. Customer satisfaction occurs when performance meets or exceeds expectations, whereas dissatisfaction results when performance falls short (Kotler et al., 2022; Schiffman & Wisenblit, 2019; Solomon & Russell, 2024). Customer e-satisfaction is the emotional and psychological response that arises as a result of customers' evaluations of the quality of e-services, system design, reliability, security, and perceived brand image in the context of digital services (Dam & Dam, 2021; Lolemo & Pandya, 2025; Naufal et al., 2024; Prasetio et al., 2025; Venkatakrishnan et al., 2023). This satisfaction not only embodies the overall user experience but also functions as a critical intermediary that connects cognitive assessments of e-service quality and brand image to loyal behaviors (e-loyalty), such as enduring commitment to the brand, favorable recommendations, and reuse (Fachrizal et al., 2023; Lesmana & Balqiah, 2023).

Customer loyalty is a profound commitment to consistently acquiring or using a product or service in the future, regardless of situational factors or competitive marketing strategies that may encourage a transition (Kotler et al., 2022). In addition to repeated purchase behavior, loyalty is demonstrated by favorable attitudes, brand preference, trust, and emotional connections with the company (Fu et al., 2025; Molinillo et al., 2022). In the context of digital services, customer loyalty is defined as the user's inclination to continue using a service indefinitely, driven by positive experiences, ease of use, and established trust, rather than solely by the satisfaction of current needs (Lolemo & Pandya, 2025). In self-service digital public services, users consistently evaluate service quality, develop satisfaction levels, and demonstrate loyalty tendencies through intentions

to reuse, favorable perceptions, and trust in service providers. (Agritika et al., 2024; Yalçın & Çatlı, 2024).

Prior research has shown that the quality of E-services has a substantial impact on customer E-satisfaction, which in turn has a significant impact on customer E-loyalty (Alnaim et al., 2022; Hidayat et al., 2024; Karaca & Baran, 2023; Venkatakrishnan et al., 2023; Wattoo & Iqbal, 2022; Win et al., 2024). In their PLN Mobile research, Triatmojo et al. (2025) uncovered that Customer E-Loyalty is significantly influenced by E-Service Quality. Additionally, Juwaini et al. (2022) discovered that E-Loyalty was not significantly influenced by E-Service Quality in online purchasing contexts. E-Satisfaction did not mediate the effect of E-Service Quality on Customer E-Loyalty, as discovered by Ashiq & Hussain (2024) and Lolemo & Pandya (2025). Customer loyalty is significantly and directly influenced by customer satisfaction (Al-Qkaily, 2025; Alzaydi, 2024; Qatawneh et al., 2024; Sang & Anh, 2025; Wattoo & Iqbal, 2022; Yum & Yoo, 2023). Furthermore, previous research suggests that brand image has a direct and significant influence on customer e-loyalty (Chen & Wu, 2022; Fu et al., 2025; Lolemo & Pandya, 2025; Tri Cuong, 2021; Win et al., 2024). Brand Image influences Customer Loyalty through Customer Satisfaction, serving as a mediating variable (Anandan & Saritha Mol, 2025; Lolemo & Pandya, 2025; Osman et al., 2024; Tri Cuong, 2021; Win et al., 2024).

In light of the inconsistent empirical findings and the limited research on public digital utility platforms, this study proposes a comprehensive conceptual framework to investigate the direct and mediating relationships among E-Service Quality, Brand Image, Customer E-Satisfaction, and Customer E-Loyalty. It cites the research of Lolemo & Pandya (2025), which investigates these relationships in Ethiopia's digital banking sector. The study observes that the behavior of PLN Mobile users is similar to that of digital bank customers in Ethiopia. Despite users being registered and having access to mobile banking in Ethiopia, these digital services are used infrequently, primarily for basic transactions, such as balance inquiries or small transfers, according to numerous studies (Karaca & Baran, 2023; Lolemo & Pandya, 2025). A comparable pattern is observed among PLN Mobile users, who use the application situationally, primarily to purchase tokens, settle debts, or register for specific services, rather than as a platform they visit continuously.

The proposed framework is illustrated in Figure 1.

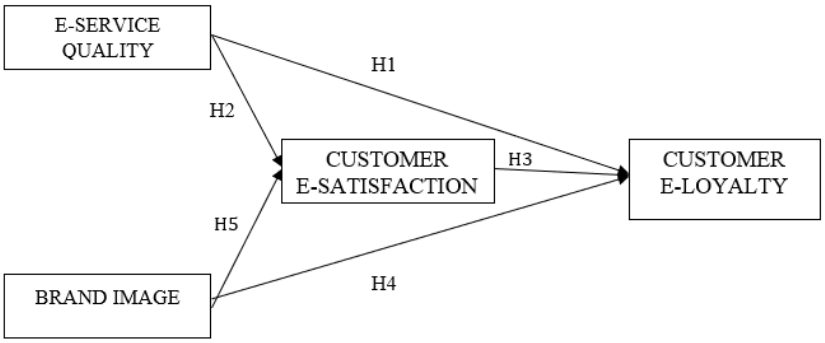

Figure 1. Conceptual Framework

Despite the extensive literature on digital service quality and customer loyalty, several important research gaps remain.

1. Sectoral Gap (Public Utility Digital Services)

Most previous studies focus on commercial digital services such as e-commerce, banking, and hospitality, while public utility digital platforms remain underexplored. Digital platforms developed by state-owned enterprises, such as electricity service applications, operate in a mandatory service environment where customers may continue using the service regardless of satisfaction levels. This unique context may influence the formation of digital loyalty differently from that in competitive commercial markets.

2. Contextual Gap in Emerging Markets

Empirical evidence on digital loyalty behavior in emerging markets, particularly within public service sectors, remains limited. Existing studies are predominantly conducted in developed economies or private-sector platforms, leaving a lack of understanding of customer behavior in state-owned digital service ecosystems in developing countries.

3. Adoption–Usage Gap in Digital Public Platforms

Many digital public services experience high installation rates but relatively low active usage, indicating a discrepancy between adoption and sustained engagement. Understanding the determinants that transform application adoption into consistent digital loyalty behavior remains insufficiently explored.

4. Mediating Mechanism Gap

Although customer satisfaction is frequently proposed as a mediating variable between service quality and loyalty, empirical findings are inconsistent. Some studies report that satisfaction significantly mediates the relationship, while others find no mediating effect, suggesting the need for further investigation in different contexts.

5. Limited Empirical Evidence on Integrated Models

Few studies have simultaneously investigated the integrated relationship between e-service quality, brand image, customer e-satisfaction, and customer e-loyalty within a single structural model in public-sector digital platforms.

METHOD

In order to examine the interrelations among E-Service Quality, Brand Image, Customer E-Satisfaction, and Customer E-Loyalty, this study employs descriptive research with a quantitative framework employed a causal methodology. The research employs a quantitative technique that is rooted in the positivism philosophy, as per Sugiyono (2025). The objective is to objectively measure variables and test proposed causal linkages.

The study represents a conceptual replication of the model developed by Lolemo & Pandya (2025), applied in a different context, namely, users of PLN Mobile under PT PLN (Persero). Data were collected using a cross-sectional survey strategy targeting individual customers as the unit of analysis in a naturalistic (non-contrived) setting without researcher intervention, where respondents completed structured questionnaires independently.

Table 1. Research Characteristics

Aspect	Description
Research Objectives	Causal
Research Paradigm	Positivism
Nature of the Research	Conceptual Replication
Research Methodology	Quantitative
Research Approach	Deductive
Research Strategy	Survey Method (Questionnaire)
Unit of Analysis	Individual (Active PLN Mobile Users)
Research Involvement	Minimal
Research Setting	Naturalistic Setting
Research Timeline	Cross-sectional

The population utilized in this study consisted of 37,894 active consumers of the PLN Mobile application at the Bangka Belitung Regional Main Unit of PT. PLN (Persero). Purposive sampling was implemented as the sampling methodology. Purposive sampling is a sampling technique that is predicated on specific considerations, as per Sugiyono (2025). Customers of the PLN Bangka Belitung Regional Main Unit and active users of the PLN Mobile application who

had completed at least one transaction within the previous six months constituted the sample in this study. A six-month period is adequate to assess the short- and medium-term effects on customer loyalty, as per Nishio & Hoshino (2024), Myftaraj & Trebicka (2023), and Ozkan & Kocakoc (2021).

The sample population (Transactions, Complaints, Connection Services) consisted of 579,717 clients of PLN UIW Bangka Belitung, of whom 317,033 had installed PLN Mobile and 37,894 were utilizing its features. The Slovin method was used to determine a minimum sample size of 396, and the data collection approach involved distributing questionnaires via an online form developed by the researcher, with a 5% margin of error. Partial Least Squares-based Structural Equation Modeling (PLS-SEM) was implemented in this investigation as a quantitative data analysis methodology. Hair et al. (2021) contend that PLS-SEM is a variance-based methodology suitable for both predictive and exploratory research. This methodology is capable of estimating models with modest sample sizes, non-normal data, and a variety of indicators. The analysis implemented a two-step methodology: initially, the measurement model was assessed to verify the constructs' reliability and validity; subsequently, the structural model was examined to evaluate the proposed linkages.

DISCUSSION

A total of 505 responses were obtained. In accordance with the established research criteria, 437 responses were deemed eligible and included in the final analysis after sifting. Approximately 64.1% of respondents were male, while 35.9% were female, according to the demographic profile. The age distribution of the respondents was as follows: 44% were between the ages of 31 and 40, 41.8% were between the ages of 21 and 30, 9.7% were between the ages of 41 and 50, 4.1% were under the age of 20, and 0.5% were over the age of 50. This implies that respondents aged 31-40 comprised the majority. 44.9% of the population completed senior high school (SMA/SMK), 33.4% obtained a diploma (D3), 20.5% earned a bachelor's degree (S1/D4), and 1.1% earned a master's degree (S2). This information is based on educational attainment. This implies that the majority of the population has successfully completed secondary school. In terms of employment, the workforce comprised 54.9% private-sector employees, 23.7% employees of state-owned or regional firms (BUMN/BUMD), 9.5% entrepreneurs, 5.6% students, and 4.3% civil servants (PNS). A plurality of respondents were employed by the private sector.

The monthly income levels indicated that the majority of individuals fell within the IDR 1–5 million income range, with 58.5% earning between IDR 1,000,000 and IDR 5,000,000, 15.3%

earning IDR 5,000,001–10,000,000, 12.6% earning IDR 10,000,001–15,000,000, 7.9% earning above IDR 15,000,000, and 5.6% earning below IDR 1,000,000. Respondents were geographically dispersed throughout Bangka Belitung Province, with 32.8% located in East Belitung Regency, 26.2% in Pangkalpinang City, 24.5% in Belitung Regency, 8.1% in Bangka Regency, 3.1% in Central Bangka, 2.9% in West Bangka, and 2.3% in South Bangka. In terms of utilization behavior, 44.1% of respondents had used the PLN Mobile application for more than 2 years, 25.8% for 6–12 months, 21% for 1–2 years, and 9.1% for less than 6 months. This suggests that the majority of respondents were experienced users. In terms of transaction frequency, 39.3% of users had conducted more than 10 transactions through the application, 26.2% had conducted 6–10 transactions, 25.6% had conducted 2–5 transactions, and 8.9% had conducted only one transaction. This distribution indicates that the majority of respondents were relatively active platform users.

Table 2. Descriptive Statistics of Research Variables

Variabel	Mean	Percentage	Standard Deviation	Category
E-Service Quality	4.17	83.40%	0.796	Good
Brand Image	4.23	84.60%	0.787	Very Good
Customer E-Satisfaction	4.15	83.00%	0.797	Good
Customer E-Loyalty	4.10	82.00%	0.842	Good

Descriptive statistics for the research variables are presented in Table 2. The mean scores of all variables were reasonably high, ranging from 4.10 to 4.23 on a five-point Likert scale, suggesting that respondents generally held favorable attitudes. Brand Image was rated "Very Good" by respondents, indicating they consider the brand credible, reliable, and well-positioned. The mean value was the highest (M = 4.23; 84.60%). This suggests that consumers clearly recognize the symbolic and reputational aspects of the service. Both Customer E-Satisfaction (M = 4.15; 83.00%) and E-Service Quality (M = 4.17; 83.40%) were classified as "Good" and exhibited elevated average ratings. The results suggest that respondents consider the digital service's performance, system reliability, ease of use, and responsiveness satisfactory and in line with their expectations. The increased level of satisfaction indicates that the service experience meets or exceeds user expectations. Customer E-Loyalty was classified as "Good" with a mean score of 4.10 (82.00%).

The standard deviation varies from 0.787 to 0.842, signifying significant response dispersion. The comparatively low standard deviations indicate that respondents' perceptions are largely uniform, demonstrating consistent assessments throughout the sample. Customer E-

Loyalty shows the largest standard deviation (0.842), indicating marginally greater variability in behavioral intentions than in assessments of service quality and company image. Discriminant validity was assessed using the Fornell–Larcker criterion. For each construct (Brand Image = 0.922; Customer E-Loyalty = 0.936; Customer E-Satisfaction = 0.927; E-Service Quality = 0.902), the square root of AVE surpasses its correlations with other constructs. This indicates that the variance of each construct relative to its indicators is greater than that of the other variables in the model. Additionally, the Heterotrait–Monotrait Ratio (HTMT) was implemented to evaluate it. The HTMT values of the constructs range from 0.822 to 0.862, with the strongest association observed between Brand Image and E-Service Quality (0.862), followed by Customer E-Satisfaction and Brand Image (0.853), and Customer E-Loyalty and Customer E-Satisfaction (0.844). This suggests that discriminant validity has been established, as all values are below the recommended threshold of 0.90.

Table 3. Reliability and Convergent Validity Assessment

Variabel	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)	Keterangan
Brand Image	0.944	0.945	0.944	0.850	*Valid and Reliable*
Customer E-Loyalty	0.966	0.966	0.966	0.875	*Valid and Reliable*
Customer E-Satisfaction	0.973	0.973	0.973	0.859	*Valid and Reliable*
E-Service Quality	0.963	0.964	0.963	0.814	*Valid and Reliable*

The results of the internal consistency, reliability, and convergent validity evaluations for all latent constructs are presented in Table 3. The internal consistency and reliability of all structures are exceptional. The Cronbach's alpha scores indicate a high degree of internal consistency among the indicators, exceeding the recommended minimum of 0.70. Specifically, they range from 0.944 to 0.973. This confirms the constructs' reliable measurement, as the Composite Reliability (rho_c) values range from 0.944 to 0.973, substantially exceeding the acceptable threshold of 0.70. In terms of convergent validity, all conceptions exhibit AVE values exceeding the minimum required threshold of 0.50, ranging from 0.814 to 0.875.

This implies that the indicators of each construct account for more than 50% of the variance, thereby confirming its robust convergent validity. Customer E-Satisfaction exhibits the highest reliability and Average Variance Extracted ($\alpha = 0.973$; AVE = 0.859) among the constructs, suggesting that its indicators effectively encapsulate the underlying latent construct. In the same

vein, Brand Image (AVE = 0.850), Customer E-Loyalty (AVE = 0.875), and E-Service Quality (AVE = 0.814) exhibit robust measurement characteristics. These results confirm that all constructs in the model are reliable and valid.

Table 4. Coefficient of Determination (R^2)

Variabel	R-square	R-square adjusted
Customer E-Loyalty	0.776	0.775
Customer E-Satisfaction	0.757	0.756

The explanatory power of the structural model was evaluated using the coefficient of determination (R^2). R^2 is the proportion of variance in endogenous constructs that is explained by their respective exogenous variables, as stated by Hair et al. (2021). The results suggest that Customer E-Loyalty has an R^2 of 0.776, which accounts for 77.6% of its variation. E-Service Quality, Brand Image, and Customer E-Satisfaction also account for 77.6% of the variation, while the remaining 22.4% is due to extraneous factors not included in the model. The variation in Customer E-Satisfaction is 75.7% accounted for by E-Service Quality and Brand Image, as indicated by an R^2 value of 0.757. The remaining 24.3% is attributable to factors not included in the study. These are in accordance with widely recognized standards. R^2 values demonstrate significant explanatory capacity of the suggested structural model.

Table 5. F^2 (Effect Size)

	f-square	Description
Brand Image -> Customer E-Loyalty	0.029	Small Effect
Brand Image -> Customer E-Satisfaction	0.335	Moderate
Customer E-Satisfaction -> Customer E-Loyalty	0.192	Moderate
E-Service Quality -> Customer E-Loyalty	0.111	Small Effect
E-Service Quality -> Customer E-Satisfaction	0.12	Small Effect

The effect sizes (f^2) are presented in Table 5 and indicate the degree to which each exogenous variable affects the endogenous constructs. The findings suggest that Customer E-Loyalty is substantially influenced by Customer E-Satisfaction, surpassing the direct effects of Brand Image and E-Service Quality.

Table 6. Predictive Relevance (Q^2)

Variable	SSO	SSE	Q^2
Brand Image	1311	1311	0.000
Customer E-Loyalty	1748	587.231	0.664
Customer E-Satisfaction	2622	983.65	0.625
E-Service Quality	2622	2622	0.000

The blindfolding procedure is the source of the predictive relevance (Q^2) results. The structural model's robust predictive validity for both endogenous categories is indicated by the Q^2 values for Customer E-Loyalty (0.664) and Customer E-Satisfaction (0.625), which exceed zero. Concurrently, Brand Image and E-Service Quality exhibit Q^2 values of 0.000 because they function as exogenous variables within the model. The results indicate that the model has a substantial predictive capacity.

Table 7. Path Coefficient

	Path Coefficients
Brand Image -> Customer E-Loyalty	0.182
Brand Image -> Customer E-Satisfaction	0.563
Customer E-Satisfaction -> Customer E-Loyalty	0.420
E-Service Quality -> Customer E-Loyalty	0.328
E-Service Quality -> Customer E-Satisfaction	0.337

The structural path coefficients of the proposed model are illustrated in Table 7. The results indicate that Brand Image has a positive impact on Customer E-Loyalty ($\beta = 0.182$) and a more substantial positive impact on Customer E-Satisfaction ($\beta = 0.563$). Customer E-Loyalty is substantially influenced by Customer E-Satisfaction ($\beta = 0.420$), underscoring its critical mediating role. Additionally, both Customer E-Loyalty ($\beta = 0.328$) and Customer E-Satisfaction are positively influenced by E-Service Quality ($\beta = 0.337$). All structural interactions exhibit positive correlations among the constructs.

Table 8. Total Effect

List	Total Effect
Brand Image -> Customer E-Loyalty	0.418
Brand Image -> Customer E-Satisfaction	0.563
Customer E-Satisfaction -> Customer E-Loyalty	0.420
E-Service Quality -> Customer E-Loyalty	0.469
E-Service Quality -> Customer E-Satisfaction	0.337

E-Satisfaction.

Table 8 illustrates the aggregate direct and indirect impacts among constructs in the structural model, which are represented by the total effects. The results suggest that E-Service Quality has the most substantial overall impact on Customer E-Loyalty (β = 0.469), followed by Brand Image (β = 0.418). The total effect of Brand Image on Customer E-Satisfaction is considerable (β = 0.563), and Customer E-Satisfaction has a significant impact on Customer E-Loyalty (β = 0.420). The data indicate that Customer E-Loyalty is substantially improved by both E-Service Quality and Brand Image, with a portion of their impact being mediated by Customer E-Satisfaction.

Table 9. Total Indirect Effect

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
Brand Image -> Customer E-Loyalty	0.208	0.209	0.054	3.860	0.000
E-Service Quality -> Customer E-Loyalty	0.158	0.157	0.036	4.345	0.000

Table 9 illustrates the exhaustive indirect effects, which assess the mediating role of Customer E-Satisfaction within the structural model. The results indicate that Brand Image has a substantial indirect impact on Customer E-Loyalty (β = 0.208; t = 3.860; p < 0.001), while E-Service Quality also has a significant indirect affect on Customer E-Loyalty (β = 0.158; t = 4.345; p < 0.001). The indirect effects are statistically significant, as evidenced by the fact that all p-values are less than 0.05.

Table 10. Bootstrapping Results for Path Coefficients

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values	Description
BI -> CEL	0.185	0.182	0.079	2.330	0.020	Accepted
BI -> CES	0.504	0.503	0.064	7.858	0.000	Accepted
CES -> CEL	0.413	0.413	0.080	5.190	0.000	Accepted
ESQ -> CEL	0.320	0.322	0.084	3.803	0.000	Accepted
ESQ -> CES	0.382	0.382	0.060	6.359	0.000	Accepted

The bootstrapping results for the structural path coefficients are presented in Table 10. Statistical significance is demonstrated by T-statistics exceeding 1.96 and p-values below 0.05 for all proposed correlations. Customer E-Loyalty (β = 0.185; p = 0.020) and Customer E-Satisfaction (β = 0.504; p < 0.001) are significantly influenced by brand image. Customer E-Loyalty is

significantly positively impacted by Customer E-Satisfaction ($\beta = 0.413$; $p < 0.001$). Customer E-Loyalty ($\beta = 0.320$; $p < 0.001$) and Customer E-Satisfaction ($\beta = 0.382$; $p < 0.001$) are significantly influenced by E-Service Quality. The acceptance of all theories that have been presented is substantiated by these findings.

This study makes several significant contributions to address the identified voids.

1. Application of Digital Loyalty Theory to Public Utility Platforms. This study expands upon the current theories of digital marketing and service quality by investigating the development of e-loyalty on a public utility digital platform (PLN Mobile), a context that has received restricted scholarly attention.
2. Empirical Evidence from a State-Owned Digital Service Environment. The research offers empirical evidence from a government-owned electricity service application that is distinct from private-sector platforms in terms of its structural customer dependency and the essential service nature.
3. The integration of customer satisfaction, brand image, and service quality in public digital services. The research presents and assesses a cohesive structural model that connects E-Service Quality, Brand Image, Customer E-Satisfaction, and Customer E-Loyalty, thereby facilitating a more thorough comprehension of the evolution of digital loyalty.
4. Determination of the Mediating Function of Customer E-Satisfaction. This investigation elucidates the mediating role of consumer e-satisfaction in the transformation of service quality and brand perception into enduring digital loyalty behavior within the public utility sector.
5. Empirical Examination of the Adoption-Engagement Paradox. This investigation contributes to understanding the discrepancy between the adoption of digital platforms and their active use, particularly in government service applications. Cutting-edge research has demonstrated that consumer satisfaction and loyalty on digital platforms are influenced by the content of e-services and the company's image.

Research Gap: These relationships are underinvestigated in public utility digital services and emerging market contexts, with a particular emphasis on the gap between adoption and active utilization. Novelty: This investigation empirically evaluates and develops an integrated model of e-service quality, brand image, e-satisfaction, and e-loyalty in a public utility digital platform (PLN Mobile).

CONCLUSION

The results of the PLS-SEM analysis suggest that Customer E-Loyalty among PLN Mobile users is substantially influenced by E-Service Quality and Brand Image, both directly and indirectly through Customer E-Satisfaction. Customer E-Loyalty is positively influenced by E-Service Quality, which in turn, enhances Customer E-Satisfaction, thereby strengthening loyalty. In the same way, Brand Image directly influences Customer E-Loyalty and indirectly influences Customer E-Satisfaction through its favorable effects. Additionally, the mediating function of Customer E-Satisfaction in the structural model is confirmed by its substantial contribution to the development of Customer E-Loyalty. In general, the findings underscore the importance of digital service quality, brand image, and customer satisfaction in fostering enduring digital loyalty.

Moreover, there are numerous critical components that can be the focus of recommendations to improve PLN Mobile services for businesses. PLN Mobile can advance security and transaction trust (assurance), develop more personalized services (personalization), and prioritize simplicity of use. Additional research is advised to retest this model on various objects or regions to determine the consistency of the influence of E-Service Quality on Customer E-Loyalty in the context of other digital services. Additionally, the model should be enhanced by incorporating variables such as Operational Performance and Customer Experience (CX), which can affect Customer E-Satisfaction and Customer E-Loyalty through application stability and performance. A variety of analytical methods can be employed to evaluate the stability of the results in further research.

Implication

Customer E-Loyalty is most significantly influenced by E-Service Quality, with a value of 0.469, according to the Total Effect analysis. Customer E-Satisfaction followed with a value of 0.420, and Brand Image had the lowest value of 0.418. These findings suggest that the E-Service Quality of the PLN Mobile application is a critical factor in developing customer loyalty, both directly and indirectly through Customer E-Satisfaction. This discovery implies that E-Service Quality remains a critical factor in application-based public utility services, such as PLN Mobile and Customer E-Loyalty, even though customers have a structural attachment to the service provider.

Furthermore, based on the contribution of each indicator to the E-Service Quality construct, recommendations for developing PLN Mobile services should be developed in stages according to the outer loading value. The dimension with the highest contribution is ease of use, so the company needs to prioritize optimizing the application's ease of use through simplifying the service flow, improving the interface design, and increasing feature clarity. Furthermore, the

personalization dimension is the second priority, which can be achieved by developing services that are more adaptive to customers' needs and characteristics. Next, strengthening the assurance aspect needs to be continuously improved through enhancing the digital transaction security system to maintain and strengthen user trust.

Furthermore, the accessibility and credibility dimensions need to be maintained through efforts to maintain system stability, minimize service disruptions, and ensure the transparency and accuracy of information conveyed to customers. Meanwhile, despite its relatively lower contribution value compared to other indicators, the responsiveness aspect still requires attention, with improvements to system response speed and service process efficiency to maintain consistent service quality.

The results of this study support the theoretical model of the relationship between E-Service Quality, Customer E-Satisfaction, and Customer E-Loyalty, which was proposed by Venkatakrishnan et al. (2023), Kotler et al. (2022), and Schiffman & Wisenblit (2019). This model posits that service quality is a primary determinant of customer satisfaction and loyalty. These results are also consistent with the cognitive-affective-conative consumer behavior concept, as elucidated by Solomon & Russell (2024). In this concept, customer perceptions of service quality and brand image (cognitive stage) influence emotional satisfaction (affective stage), which in turn inspires loyal behavior (conative stage). In the context of PLN Mobile, E-Service Quality and Brand Image function as cognitive stimuli, while Customer E-Satisfaction serves as an affective response that facilitates the development of Customer E-Loyalty.

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