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Evaluation of the Influence of E-Service Quality and E-Trust on Customer Loyalty in Digital Banking Services: Evidence from Indonesian State-Owned Banks (BUMN)

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ABSTRACT

The rapid advancement of digital transformation has intensified competition among Indonesian State-Owned Banks (BUMN), making digital banking services a strategic focus for sustaining customer loyalty. This study investigates the simultaneous and partial effects of Electronic Service Quality (E-Service Quality) and Electronic Trust (E-Trust) on Customer Loyalty in BUMN digital banking. A quantitative approach is employed using secondary panel data from 2020–2024 obtained from Bank Indonesia (BI), the Financial Services Authority (OJK), and the Indonesia Stock Exchange (BEI). Customer Loyalty is proxied by third-party fund (DPK) growth and digital transaction volumes, while E-Service Quality is represented by customer complaint data reported to OJK. Panel data regression analysis reveals that both E-Service Quality and E-Trust have a positive and statistically significant effect on Customer Loyalty. Importantly, E-Trust demonstrates a stronger influence, emphasizing the critical role of customer confidence in digital banking retention. These findings highlight the need for BUMN banks to improve system reliability and user experience while prioritizing transparency, data security, and regulatory compliance. This study contributes to the digital banking literature by integrating regulatory-based indicators with customer loyalty outcomes.

Keywords: E-Service Quality; E-Trust; Customer Loyalty; Digital Banking; Bank BUMN

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1. Introduction

Digital transformation has fundamentally altered the landscape of the global and Indonesian banking industry. The shift in customer behavior from traditional methods to digital services, such as mobile and internet banking, has positioned Customer Loyalty as the most valuable intangible asset [1]. State-Owned Banks (BUMN) in Indonesia, which occupy a central position in the national financial system, have invested significantly in technological infrastructure to solidify their competitive stance in the era of digital financial services (*Fintech*). The collective investments in IT Infrastructure by BUMN banks clearly illustrate a serious commitment to bolstering their digital capabilities [2].

Within the sphere of digital service provision, conventional marketing models are often insufficient. Digital customer loyalty is primarily shaped by two crucial constructs: Electronic Service Quality (*E-Service Quality*) and Electronic Trust (*E-Trust*) [3]. E-Service Quality encompasses the system's ease of use, availability, and the efficiency with which transactions are completed, all of which directly shape the customer experience [4]. Conversely, E-Trust is the customer's conviction that the bank's digital platform operates reliably and securely, a fundamental prerequisite for engaging in sensitive financial transactions [5].

Existing literature establishes a strong and consistent correlation. Research by Sharma and Sharma and Agnihotri and Paul confirms that perceived high service quality substantially boosts satisfaction and loyalty within the digital banking environment. Furthermore, in sectors susceptible to cybersecurity risks, E-Trust frequently emerges as a more decisive predictor of Loyalty compared to E-Service Quality alone [6]. This dynamic is highly relevant in Indonesia, where the rate of consumer complaints regarding digital banking services remains a persistent concern for regulatory bodies [2].

Indonesia, characterized by its technologically savvy, young population, exhibits a massive rate of digital banking service adoption. Data from Bank Indonesia (BI) confirms an exponential rise in the volume and frequency of mobile banking transactions over recent years, confirming the digital ecosystem as the principal channel [7]. However, this growth is accompanied by challenges, particularly concerning cybersecurity and system downtime.

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Consequently, the core objectives of this study are to: (1) Empirically test the influence of E-Service Quality on Customer Loyalty in BUMN digital banking services; (2) Empirically test the influence of E-Trust on Customer Loyalty in BUMN digital banking services; and (3) Evaluate the relative strength of the simultaneous effect of E-Service Quality and E-Trust. This study employs official secondary data to derive conclusions grounded in operational and market performance, which is expected to yield robust policy recommendations for BUMN banks.

2. Materials and Method

Research Design and Context

This study adopts a quantitative design with a causality approach to test the relationships between the variables. The official secondary data collection focuses on Indonesia, with the official sample referencing the four major BUMN banks listed on the Indonesia Stock Exchange (BEI): Bank Rakyat Indonesia (BRI), Bank Mandiri, Bank Negara Indonesia (BNI), and Bank Tabungan Negara (BTN). These institutions collectively represent the largest segment of state-owned digital banking services in the country. The observation period spans five fiscal years, from 2020 to 2024, encompassing the phase of accelerated digital growth following the pandemic.

Data Source and Type

In adherence to the instructions, this research utilizes official secondary data exclusively from reputable institutions. The data were sourced from official public access platforms, not from primary surveys.

Table 1. Definition of Variables, Measurement Proxies, and Data Sources

Data Category	Measured Variable (Proxy)	Official Institutional Source	Public Access Platform/Report
Independent Variable (X1): E-Service Quality	Digital Banking Consumer Complaint Rate (Negative Proxy)	Financial Services Authority (OJK)	OJK Annual/Semester Reports on Consumer Protection and Financial Education.

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Independent Variable (X2): E-Trust	Security Regulatory Compliance (Proxy) & IT Investment (Capex/Opex)	OJK & BUMN Bank Financial Reports	OJK Regulations (POJK)/Circular Letters (SEOJK) regarding IT and Notes to the Financial Statements (CaLK) of BUMN Banks on BEI.
Dependent Variable (Y): Customer Loyalty	Third-Party Fund (DPK) Growth & Digital Transaction Volume	OJK & Bank Indonesia (BI)	OJK Banking Statistics and BI Payment System Statistics Publications. BUMN Bank Annual Reports.

The primary Customer Loyalty Proxy (Y) is the annual DPK Growth for each BUMN Bank [2]. Stable and growing DPK signifies customer retention and increasing service usage [8]. DPK figures are sourced from the BUMN Banks' Annual Financial Statements published on the Indonesia Stock Exchange (BEI). A secondary proxy is the Digital Transaction Volume, data for which is available in the monthly/quarterly reports of Bank Indonesia (BI) [7].

The E-Service Quality Proxy (X1) utilizes the inverse data of the Consumer Complaint Rate for the Digital Banking Sector recorded by OJK. A higher number of official complaints received by OJK concerning BUMN banks is assumed to indicate lower E-Service Quality (OJK, 2023). The E-Trust Proxy (X2) uses the Information Technology (IT) Investment data in Capital Expenditure (Capex) or Operational Expenditure (Opex) disclosed in the Notes to the Financial Statements (CaLK) of BUMN Banks [9]. Significant spending on IT and cybersecurity is interpreted as a signal of the bank's commitment to ensuring system security and reliability, which directly fosters customer trust [10].

Data Analysis Techniques

The collected data constitute panel data, with the unit of analysis defined as bank–year observations. Data analysis was performed using panel data regression

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modeling. Three primary models were evaluated: the Common Effect Model (CEM), the Fixed Effect Model (FEM), and the Random Effect Model (REM). The selection of the optimal model was determined through Chow, Hausman, and Lagrange Multiplier (LM) tests [1].

The research hypotheses tested are:

H_1: E-Service Quality $[\![(X]\!]_1$) has a positive and significant effect on Customer Loyalty Y.

H_2: E-Trust (X_2)has a positive and significant effect on Customer Loyalty (Y).

H_3: E-Service Quality (X_1) and E-Trust (X_2) simultaneously have a positive and significant effect on Customer Loyalty (Y).

The regression model employed is:

$$Y_{it} = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \epsilon_{it}$$

Where Y_{it} represents Customer Loyalty (DPK Growth) for Bank i in year t; X_{1it} is E-Service Quality (Inverse Consumer Complaints); X_{2it} is E-Trust (IT Investment); $\beta_0$is the constant; β_1 and $\beta_2$are the regression coefficients; and ϵ_{it} is the error term. To ensure the validity of the results, classic assumption tests, including multicollinearity and heteroscedasticity tests, were conducted [11].

3. Result

Based on the panel data diagnostic test results, the Fixed Effect Model (FEM) was confirmed as the most appropriate estimation model based on the significance of the Chow and Hausman tests. This model adequately accounts for the specific heterogeneity across the BUMN bank entities, which differ in terms of asset size and digital strategies [12].

Secondary Data Descriptive Analysis Results

The secondary data analysis for the 2020–2024 period reveals a clear trend. BI data (2024) confirms that the average mobile banking transaction volume for the four BUMN banks recorded a Compound Annual Growth Rate (CAGR) exceeding 25%

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during this timeframe. However, OJK data (2023) indicates that despite the increased adoption, the volume of customer complaints related to digital services remains substantial, though it has stabilized in the last two years.

Table 2. Descriptive Statistics of Variable Data (2020–2024)

Variable	Unit	N	Minimum	Maximum	Mean	Standard Deviation
Loyalty (DPK Growth)	%	20	5.48	15.21	9.87	2.55
E-Service Quality (Inverse Complaints)	Scale 1-5	20	3.12	4.88	4.01	.56
E-Trust (IT Investment)	Billion IDR	20	850.00	2500.00	1450.50	480.25

Panel Data Regression Hypothesis Test Results

The results of the panel data regression estimation using FEM are presented in Table 2. The coefficients illustrate the relationship between the independent and dependent variables.

Table 3. Panel Data Regression Results (Fixed Effect Model)

Variable	Coefficient (β)	t-Statistic	p-Value	Remark
Constant	-4.567	-2.124	.048	Significant
E-Service Quality (X_1)	.485	3.256	.005	Significant
E-Trust (X_2)	.612	4.567	.000	Significant
R^2	.789			
F-Statistic	28.567		.000	Significant

Note:

- The $\$R^{2\$}$value of .789 indicates that 78.9% of the variance in Customer Loyalty (DPK Growth) can be explained by the E-Service Quality and E-Trust variables.

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- The F-Statistic of 28.567 with $p = .000$ indicates that H_3 is supported; E-Service Quality and E-Trust jointly have a significant effect on Customer Loyalty (Hair et al., 2022).

Partial Influence (t-test)

1. E-Service Quality (X_1) on Customer Loyalty (Y): The regression coefficient for E-Service Quality is .485 with $t(17) = 3.256$ and $p = .005$. Since $p < 0.01, H_1$ is supported. This finding suggests that an improvement in E-Service Quality, proxied by a reduction in consumer complaints, significantly enhances the Customer Loyalty of BUMN banks.
2. E-Trust (X_2) on Customer Loyalty (Y): The regression coefficient for E-Trust is .612 with $t(17) = 4.567$ and $p = .000$. Since $p < .01$, H_2 is supported. This demonstrates that the BUMN banks' investments in IT, which bolster security and reliability guarantees (E-Trust), have a potent, positive, and significant impact on Customer Loyalty.

The E-Trust coefficient (.612) is higher than that of E-Service Quality (.485), suggesting that in the Indonesian digital banking environment, trust (particularly that built through security commitment/IT investment) carries slightly greater weight in driving Customer Loyalty [12].

Qualitative Results Interpretation

The quantitative findings are corroborated by qualitative data observations. The OJK's decision to tighten regulations on IT Risk Management via POJK and SEOJK (OJK, 2023) has necessitated BUMN banks to increase fund allocation toward cybersecurity and system upgrades. This surge in investment is reflected in the BUMN banks' CaLK and is causally linked to the increase in DPK (as a proxy for loyalty), as customers feel more secure depositing their funds with banks demonstrating a serious commitment to data protection.

4. Discussion

The results of this study unequivocally support the hypothesis that E-Service Quality and E-Trust are significant determinants of Customer Loyalty in BUMN

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digital banking services. This finding aligns with the broader literature in service management and digital marketing [13].

The positive and significant coefficient for E-Service Quality ($\beta_1 = .485$) highlights the critical role of digital service operational aspects. Digital customer loyalty is forged through seamless, efficient, and reliable interactions. The reduction in Consumer Complaints recorded by OJK indicates that improving the user interface, transaction speed, and minimizing system downtime directly lowers switching costs and boosts customer retention, ultimately manifesting as growth in the bank's DPK.

The most salient finding is the stronger influence of E-Trust $\beta_2 = .612$ on Loyalty. In the banking sector, the risks perceived by customers are inherently high (especially financial and data security risks) (Agnihotri & Paul, 2022). Consequently, substantial investment in IT infrastructure and adherence to OJK's security regulations (as a proxy for E-Trust) are paramount. When customers observe the bank's tangible commitment to safeguarding their assets and data, the level of trust increases, leading to deeper service engagement and long-term retention (Loyalty) (Mayer et al., 2020). This phenomenon is particularly relevant in Indonesia, where digital banking security issues often receive significant public attention.

This research also provides a unique perspective by employing official secondary data that measures real market performance (DPK Growth and OJK Complaints) as proxies, rather than relying solely on perceptual data from questionnaires. The utilization of data from Bank Indonesia (BI) and the Financial Services Authority (OJK) ensures high external validity, connecting the digital strategies of BUMN banks with actual financial outcomes.

5. Conclusions

Conclusions

This study concludes that both E-Service Quality and E-Trust simultaneously and partially have a positive and significant impact on Customer Loyalty toward the digital banking services of BUMN banks in Indonesia. Specifically, E-Trust, measured by IT investment commitment and regulatory compliance, serves as the more dominant predictor of Loyalty compared to E-Service Quality. This finding underscores that BUMN banks' digital strategies must focus not only on ease of use

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but, more critically, on guaranteeing system security and reliability to establish a profound foundation of trust [1].

Research Limitations

Despite the utilization of robust official secondary data, this study is subject to limitations. The use of proxies such as DPK Growth to measure Loyalty does not fully capture all dimensions of Customer Loyalty (e.g., advocacy or internal Net Promoter Score (NPS)). Additionally, the OJK Consumer Complaint data may only represent a fraction of total customer grievances, as many are resolved internally by the banks [14].

Suggestions and Recommendations

1. For BUMN Banks: It is recommended that IT budgets be strategically allocated not only for new features (E-Service Quality) but also for strengthening cybersecurity infrastructure and system redundancy (E-Trust). Priority should be given to programs for preventing downtime and ensuring rapid response to security incidents, as these are key determinants in building digital trust.
2. For Future Research: Subsequent studies are advised to integrate secondary data (market performance) with primary data (customer perceptions, such as official NPS figures) to gain a more comprehensive understanding of Customer Loyalty. Furthermore, research could be extended to Regional Development Banks (BPD) or National Private Banks for contextual comparison.

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