# Information Quality and Digital Self-Efficacy on PLN Mobile Usage: Mediating Role of Behavioral Control

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***Abstract***
*This study investigates the determinants of actual engagement within the PLN Mobile application by examining information quality and digital self-efficacy as primary antecedents. It evaluates the mediating role of perceived behavioral control in linking system attributes to actual user behavior. An explanatory quantitative design with a causal-verificative approach was applied to data from 540 active users in South and Central Kalimantan. Using purposive sampling, structural relationships were analyzed through Partial Least Squares -Structural Equation Modeling (PLS-SEM) with SmartPLS 4. The findings reveal that information quality and digital self-efficacy significantly enhance both perceived behavioral control and actual usage. Perceived behavioral control acted as a significant partial mediator. The structural model explains 81.7% of the variance in behavioral control ($R^2$= 0.817) and 94.7% in actual application usage ($R^2$= 0.947), indicating strong explanatory power. These results confirm that psychological empowerment driven by information quality and digital confidence plays a key role in sustaining digital engagement. The sustainable utilization of digital public services in the energy sector depends largely on consumer psychological empowerment through reliable information systems and user-focused digital support. This study focuses on the Kalimantan Selatan Middle Region (Kalselteng) and uses cross-sectional data. It integrates the theory of planned behavior and the information systems success model to explain digital service adoption.*

***Keywords:*** *Actual Use, Digital Self-Efficacy, Information Quality, Perceived Behavioral Control, PLN Mobile.*

## 1. INTRODUCTION

The rapid evolution of digital technology has fundamentally transformed individuals' interactions with public services. Digitalization is increasingly regarded as a strategic tool for enhancing efficiency, transparency, and the quality of services, while also aiming to improve user satisfaction. Mobile applications, in particular, have become essential instruments for delivering fast, accessible, and convenient services, catering to modern demands. According to the We Are Social report, Indonesia has 185.9 million Internet users, or approximately 66.5% of the population, with a smartphone penetration rate of 74%. This data underscores the enormous potential for developing digital public services that are adaptive and responsive to the needs of today's society (Nurjannah, Hasymi, & Putera, 2025; Paningrum, Ramdan, Melinda, Karneli, & Irwanto, 2023).

The Indonesian government has prioritized digital transformation as part of its bureaucratic reform agenda to improve the quality of public services (Pramudita, 2025). Policies around digital transformation focus on integrating information technology into key sectors, such as education, healthcare, and energy. The adoption of mobile-based public service applications is seen as a key factor in expanding access, speeding up service processes, and enhancing accountability (Ahadzadeh, Wu, Ong, & Deng, 2021; Venkatesh, 2025). Therefore, digitalization is not only a global trend but also a strategic necessity for addressing the challenges of efficiency and accessibility in public services (Herawati, Siswanto, & Prawitasari, 2020; Pitafi & Ali, 2023; Ramayani et al., 2023). Digitalization is not only a global trend but also a strategic necessity. in addressing efficiency and accessibility in public services, particularly among younger demographics like Generation Z who are primary users of peer-to-peer services (Rosyada & Alie, 2025; Zulkifli & Jabbar, 2025).

The launch of the PLN Mobile application by PT PLN (Persero) represents a tangible manifestation of digital transformation within Indonesia's energy sector. The app integrates various functions, such as bill payments, self-meter readings, fault reporting, and electricity usage monitoring. PLN reports that the app has been downloaded over 58 million times across the Google Play Store and App Store, with an average rating of 4.9 stars. The growth in adoption, with 52,480,387 active users recorded by December 2024, indicates strong market acceptance of this

digital service channel for electricity in Indonesia (Almaiah et al., 2022; Almajali et al., 2023; Sukri, Susena, & Eska Prima, 2021). Previous empirical evidence also highlights that customer satisfaction with PLN Mobile is heavily influenced by the quality of the application and competitive service delivery (Rahayu, Mahrom, & Helmi, 2024). Furthermore, the acceptance of mobile-based services is significantly driven by the specific behavioral determinants of younger consumer cohorts, such as Generation Y, who prioritize convenience and technical efficiency (Ismail, Razak, Yusoff, & Mohd Nasir, 2020; Ismail, Razak, Zainol, & Sallehudin, 2019).

However, despite the significant number of downloads, the actual usage of the PLN Mobile app still lags behind expectations. An internal survey conducted by PLN found that only approximately 60% of users actively engage with the app for routine transactions. The barriers to increased engagement include suboptimal information quality and limited digital literacy, which affects users' self-efficacy in navigating the app (Damanik, Prasetyo, Alie, & Oktaria, 2025; Park et al., 2024; Pitafi & Ali, 2023). The gap between app downloads and actual usage is particularly pronounced in the Kalselteng region, which serves as a strategically important context for this study. The South and Central Kalimantan Provinces present unique infrastructural challenges, including uneven network connectivity across inland and coastal districts, as well as a rapidly growing middle-income demographic driving digital service demand in the energy sector.

Unlike more urbanized Java-based regions, Kalselteng represents an emerging market in which digital literacy gaps remain significant, making it an ideal setting to examine how information quality and self-efficacy barriers manifest in real-world app adoption (Putro & Sugiat, 2025). Furthermore, with over 590,046 active PLN Mobile users in the region, Kalselteng provides a sufficiently large and diverse sample to yield statistically meaningful structural relationships. Here, the concept of perceived behavioral control plays a critical role, as it reflects the belief that users possess the resources and capabilities to complete tasks independently using the app (Ajzen, 2020; Esfandiar & Hadinejad, 2025; Ramayani et al., 2023).

This study aims to bridge this gap by investigating the roles of information quality, digital self-efficacy, and perceived behavioral control in influencing the actual usage of the PLN Mobile app. Previous studies have explored these factors in various contexts; however, research focusing on public utility apps such as PLN Mobile is limited (Alruwaie, El-Haddadeh, & Weerakkody, 2020; Pitafi & Ali, 2023). Understanding how these psychological and system-related factors drive actual app usage is crucial for improving user engagement. Therefore, this study will examine how enhancing the quality of information and strengthening digital self-efficacy can be mediated by perceived behavioral control to increase routine usage of the app (Pitafi & Ali, 2023; Su, Wang, & Li, 2025).

The urgency of this research lies in both its academic contribution and practical implications for public service delivery. While most studies have focused on sectors such as healthcare, education, and e-commerce Cahyani, Dewi, Widodo, Rubiyanti, and Silvianita (2024), Pitafi and Ali (2023), and Wang and Qi (2021), the public utility context, particularly in energy services like PLN Mobile, remains underexplored. By integrating information quality and digital self-efficacy into the theory of planned behavior framework and emphasizing the role of perceived behavioral control, this research will fill the existing research gap and provide valuable insights for improving digital service delivery in Indonesia (Ajzen, 2020; Al-Emran, 2021; Cavalcanti, Oliveira, & de Oliveira Santini, 2022).

## 2. LITERATURE REVIEW

### 2.1 Theoretical Integration: TPB and ISSM

This study's theoretical foundation synthesizes the Theory of Planned Behavior (TPB) Ajzen (2020) with the Information Systems Success Model (ISSM) (Almaiah et al., 2022). While TPB has long been the gold standard for predicting human behavior through attitudes, subjective norms, and perceived behavioral control, critics argue that it often treats the technological artifact as a 'black box,' ignoring specific system characteristics (Ramayani et al., 2023). Conversely, ISSM provides a robust framework for evaluating system attributes, such as information quality, however, it often lacks the psychological depth to explain why users with high-quality systems still fail to utilize them

(Putra, 2022). By integrating these frameworks, this research addresses a critical theoretical gap: the disconnection between system provision and user capability. We posit that information quality acts as an external resource, whereas digital self-efficacy represents the internal capability, both of which are channeled through perceived behavioral control to drive actual usage. This aligns with recent trends in economic and business research, which suggest that digital adoption is no longer a binary acceptance issue but a complex interplay of resource availability and psychological readiness (Pitafi & Ali, 2023; Venkatesh, 2025).

### 2.2 Information Quality as a Facilitating Condition

In the context of public utility applications, information quality extends beyond mere accuracy and encompasses relevance, timeliness, and completeness. Previous literature suggests that when users perceive information as high-quality, the cognitive load required to use an application decreases (Almaiah et al., 2022). However, a critical evaluation of recent studies reveals a contradiction: while some researchers argue that high-quality information directly drives usage, others contend that quality remains a latent asset without the user's ability to interpret this information (Novitasari & Widayani, 2025; Pratiwi & Juerges, 2022). This study argues that in the specific context of PLN Mobile, where users range from digital natives to older demographics, information quality functions as a 'facilitating condition.' It does not merely inform; it empowers. When users receive precise billing data or real-time outage notifications, their uncertainty diminishes, thereby enhancing their perceived control over the service (Nugroho et al., 2023; Verma, Yadav, Andrade, & Yadav, 2025; Wathanakom & Saranrom, 2025; Wen, Pookulangara, & Josiam, 2022).

### 2.3 Digital Self-Efficacy: The Internal Cognitive Capability

Digital self-efficacy represents the internal cognitive state, in contrast to the external environment represented by information quality. Ulfert-Blank and Schmidt (2022) defined this construct as an individual's confidence in their capability to successfully manage tasks and navigate complex interactions within digital environments. This modern definition emphasizes the technical proficiencies and cognitive agility required to effectively engage with sophisticated mobile platforms. Users with low digital self-efficacy view technical glitches not as system errors but as personal failures, leading to avoidance behavior. This internal capability is crucial because high digital self-efficacy allows users to better regulate their behavior and overcome technical barriers during app interactions, a relationship consistently found in studies on health and fitness-related mobile applications (Vinnikova, Lu, Wei, Fang, & Yan, 2020). Therefore, this study proposes that self-efficacy is not just a predictor of usage but a prerequisite for the formation of behavioral control (Al-Emran, 2021; Putriani, Putriana, Fuad, Widawati, & Aji, 2023).

### 2.4 Perceived Behavioral Control as a Strategic Mediator

The central thesis of this research relies on the mediating role of perceived behavioral control (PBC). Ajzen (2020) posits that PBC reflects the perceived ease or difficulty of performing the behavior. However, this study expands on this definition. In the context of the PLN mobile app, PBC is conceptualized as the user's assessment of whether they possess both the technical skills (derived from self-efficacy) and the systemic support (derived from information quality) to utilize the app. Scholars have noted that direct relationships between antecedents (such as quality) and outcomes (such as usage) are often weak or inconsistent because they bypass the user's cognitive processing (Cavalcanti et al., 2022; Rahmania, 2023). By positioning PBC as a mediator, we resolve these inconsistencies. We argue that improved information quality and higher self-efficacy do not magically create usage. Rather, they elevate the user's sense of control, which is the proximate driver of actual behavior. This perspective shifts the focus from 'what the app offers' to 'what the user feels capable of doing with it' (Tzeng, Lin, & Lee, 2022).

### 2.5 Conceptual Framework and Hypotheses

This study follows a serial mediation model in which system and psychological factors interact to influence the actual usage of the PLN mobile application in the Kalselteng region. The framework

is based on the theory of planned behavior, technology acceptance model, and information systems success model, which together explain how information quality and digital self-efficacy influence actual usage through the mediating role of perceived behavioral control.

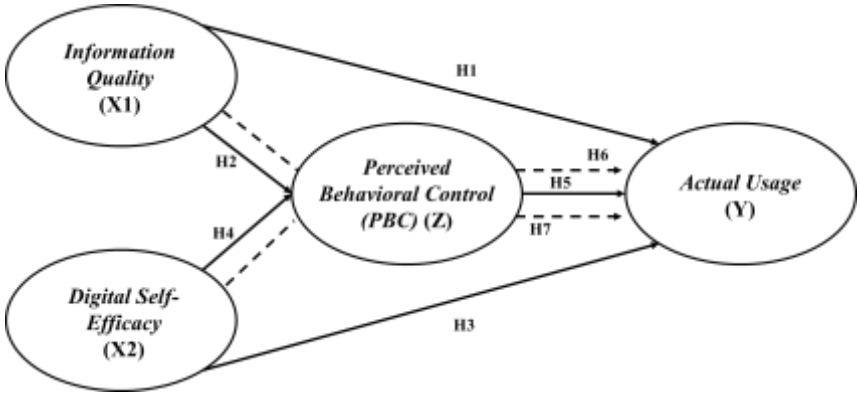


Figure 1. Research Conceptual Framework

Based on the structural relationships depicted in the conceptual framework on Figure 1, the following hypotheses were formulated for empirical testing:

*H1*: Information quality positively and significantly impacts the actual usage of the PLN Mobile application in Kalselteng
*H2*: Information quality positively influences users perceived behavioral control over the use of PLNs via mobile
*H3*: Digital self-efficacy positively influences the actual usage of the PLN mobile application in Kalselteng
*H4*: Digital self-efficacy positively influences perceived behavioral control in using the PLM
*H5*: Perceived behavioral control mediates the relationship between information quality and actual usage of the PLN mobile
*H6*: Perceived behavioral control mediates the relationship between digital self-efficacy and actual usage of PLNs
*H7*: Perceived behavioral control serial mediates the relationships between information quality, digital self-efficacy, and actual usage of the PLM

## 3. METHODOLOGY

This study uses an explanatory quantitative design with a causal-verificative approach to explore the relationships between information quality, digital self-efficacy, and perceived behavioral control on the actual usage of the PLN Mobile in Kalselteng. Data were collected from 540 active PLN Mobile users across various districts in the South and Central Kalimantan regions through purposive sampling, applying specific eligibility criteria: (1) registered PLN Mobile users, (2) active usage within the past three months, and (3) residing within the UID Kalselteng service area. The original population frame comprised 590,046 active users as recorded in the PT PLN (Persero) internal database (December 2024), and the sample size of 540 was determined based on the PLS-SEM minimum ratio recommendation of at least 10 observations per indicator (Sarstedt, Ringle, & Hair, 2021). Data collection was conducted during January to March 2025 using a structured online questionnaire distributed through PLN's official customer engagement channels.

In this study, constructs were measured using a 1-5 Likert scale for perceptions and attitudes and a frequency scale for actual usage to ensure a precise understanding of users' perceptions of information quality, confidence in using the app, and perceived control over its usage. The research framework integrates the Theory of Planned Behavior Ajzen (2020), technology acceptance model (Su et al. (2025), information systems success model (Almaiah et al. (2022), and unified theory of acceptance and use of technology (Venkatesh, 2025).

The variables include information quality ($X_1$), referring to accuracy, timeliness, relevance, understandability, and reliability Almaiah et al. (2022), Pitafi and Ali (2023), Firdaus, Susita, & Handaru (2022), and Herawati et al. (2020); digital self-efficacy ($X_2$), measuring users' confidence in using digital technology, including data literacy, communication, content creation, security, and problem-solving Putriani et al. (2023) and Gou, Zhang, He, He, and Xu (2024), perceived behaviorallcontroll ($Z$), assessing beliefs about users' ability to use the app successfully Al-Emran (2021), Tzeng et al. (2022), and Ajzen (2020);and actuall usage ($Y$), evaluating how frequently and for how long users engage with the app (Monyei, Igwe, Onyeanu, Kelvin-Iloafu, & Ukpere, 2022; Putra, 2022; Su et al., 2025). Data analysis will be conducted using partial least squares structural equation modeling (PLS-SEM) with SmartPLS 4 software. This method is ideal for analyzing complex mediation models that involve both reflective and formative indicators (Sarstedt et al., 2021).

## 4. RESULT AND DISCUSSION

### 4.1 Results

#### 4.1.1 General Overview of PLN Mobile Users in Kalselteng

This study examines the usage of the PLN Mobile application in the South and Central Kalimantan regions under PT PLN (Persero) UID Kalselteng. PLN Mobile serves as the main digital service platform, providing essential services such as bill payments, token purchases, complaint reporting, and self-meter readings. With over 85 million downloads and 34.86 million active users nationwide as of June 2025, and over 2.47 million customers and 590,046 active users in the Kalselteng region, the application plays a crucial role in electricity service delivery. This study explores the factors, such as information quality and digital self-efficacy, that influence the actual usage of PLN Mobile, particularly through the lens of perceived behavioral control (PBC). This study provides insights into the factors driving the adoption and sustained use of PLN Mobile among customers in Kalselteng.

#### 4.1.2 Respondent Characteristics in the Context of PLN Mobile Users in Kalselteng

This study involved users of the PLN Mobile application in the Kalselteng region, with a focus on active users from South Kalimantan and Central Kalimantan. The respondent distribution reflects the demographic and geographical characteristics of the region, with 48.1% and 51.9% of respondents from South Kalimantan and Central Kalimantan, respectively. The majority of respondents are between the ages of 20-39 years, representing 80.6% of the sample. The gender distribution was balanced, with 50% male and 50% female respondents. Most respondents held at least a bachelor's degree (50%), indicating a relatively high level of digital literacy. The frequency of PLN Mobile app usage showed that 34.4% used it several times a month, and 30% used it several times a week, highlighting diverse engagement levels across the region. This distribution allows for an in-depth understanding of how information quality, digital self-efficacy, and perceived behavioral control impact the actual use of the PLN Mobile app in various demographic groups across Kalselteng (Anh, 2022).

#### 4.1.3 Results of Respondents' Answers by Research Variable

A descriptive analysis of respondents' answers reveals that the key variables information quality ($X_1$), digital self-efficacy ($X_2$), Perceived Behavioral Control (PBC) ($Z$), and actual usage ($Y$) of the PLN mobile application were evaluated positively by the users in Kalselteng. Each variable was assessed using a 5-point Likert scale, with average scores indicating a generally high perception of the app's quality and usability. Information quality ($X_1$) scored an average of 4.19, showing that users found the information provided by the app accurate and relevant. Digital self-efficacy ($X_2$) scored 4.07, indicating that respondents felt confident in using the app's features independently. Perceived Behavioral Control (PBC) ($Z$) achieved a mean of 4.22, reflecting that user felt in control of their app usage. Finally, actual usage ($Y$) scored 4.21, demonstrating that the respondents actively used the PLN mobile application for regular tasks, such as bill payments and service requests. These

results highlight both the strengths and areas for improvement in PLN Mobile's service delivery and user engagement (Anh, 2022).

4.1.4 PLS-SEM Analysis Results

This study applies Partial Least Squares–Structural Equation Modeling (PLS-SEM) using SmartPLS 4 to examine the causal relationships among information quality ($X_1$), digital self-efficacy ($X_2$), perceived behavioral control ($Z$), and actual usage ($Y$) of the PLN mobile application. Following standard PLS-SEM procedures, the evaluation was conducted in two sequential stages: (1) Assessment of the measurement model (outer model) to confirm the adequacy of the instruments and (2) Assessment of the structural model (inner model) to evaluate the strength and significance of the hypothesized paths.

a. Assessment of the Measurement Model (Outer Model)

The measurement model confirms that all constructs are measured reliably and validly (Hair et al., 2021). Convergent validity is supported by strong indicator loadings and Average Variance Extracted (AVE) values above 0.50 for all constructs. Although Z.8 loads at 0.696, it is retained because it falls within the acceptable 0.60–0.70 range and does not compromise AVE or reliability. Internal consistency is also adequate, with Cronbach's alpha and composite reliability (ρc) exceeding 0.70 across constructs.

Table 1. Summary of convergent validity and reliability metrics

| Constructs | AVE | Cronbach's Alpha | Composite Reliability (ρc) |
|---|---|---|---|
| Information Quality | 0.719 | 0.902 | 0.927 |
| Digital Self-Efficacy | 0.679 | 0.882 | 0.913 |
| Perceived Behavioral Control | 0.792 | 0.911 | 0.938 |
| Actual Usage | 0.675 | 0.879 | 0.912 |

Discriminant validity was assessed using cross-loadings, which indicated that each indicator loaded most strongly on its associated construct compared to other constructs. This confirmed that the latent variables were empirically distinct and reduced concerns about construct overlap. Overall, the measurement model met the recommended criteria for validity and reliability, supporting the use of the constructs for subsequent structural model testing.

b. Assessment of the Structural Model (Inner Model)

After confirming the quality of the measurement model, we evaluated the structural model to assess its explanatory power ($R^2$), effect size ($f^2$), and predictive relevance ($Q^2$). As summarized in Table 2, the model showed significant explanatory power.

Table 2. Structural model fit and predictive power

| Endogenous Constructs | $R^2$ | Result | $f^2$ Effect Size Contributors | Predictive Relevance ($Q^2$) |
|---|---|---|---|---|
| Perceived Behavioral Control | 0.817 | Substantial | Info. Quality (1.149); Digital Self-Efficacy (0.050) | 0.990 (Global Model) |
| Actual Usage | 0.947 | Substantial | PBC (1.401); Info. Quality (0.284); Digital Self-Efficacy (0.032) | - |

Overall, the model demonstrates substantial explanatory power for both perceived behavioral control ($R^2$= 0.817) and actual usage ($R^2$= 0.947). The dominant drivers in the model are perceived behavioral control ($f^2$= 1.401) as the strongest determinant of actual usage and information quality ($f^2$= 1.149) as the strongest determinant of perceived behavioral control, indicating that behavioral control and information quality are the central mechanisms underlying PLN mobile usage. The model

also exhibits excellent predictive relevance (global $Q^2$= 0.990) and a large overall fit (GoF = 0.795), supporting the robustness of the proposed structural relationships.

c. Results of Hypothesis Testing

Hypothesis testing was performed using bootstrapping procedure with 5,000 subsamples. The results for the direct, indirect, and total effects are summarized in Table 3.

Table 3. Summary of structural model path coefficients

| Hyp | Path Relationship | β | T-Stats | P-Values | Result |
|---|---|---|---|---|---|
| **Direct Effects** | | | | | |
| $H_1$ | Information Quality → Actual Usage | 0.301 | 2.206 | 0.014 | Supported |
| $H_2$ | Information Quality → PBC | 0.769 | 9.554 | 0.000 | Supported |
| $H_3$ | Digital Self-Efficacy → Actual Usage | 0.070 | 1.744 | 0.041 | Supported |
| $H_4$ | Digital Self-Efficacy → PBC | 0.161 | 2.039 | 0.021 | Supported |
| $H_5$ | PBC → Actual Usage | 0.636 | 5.339 | 0.000 | Supported |
| **Indirect Effects** | | | | | |
| $H_6$ | $X_1$ → PBC → Actual Usage | 0.489 | 7.024 | 0.000 | Supported |
| $H_7$ | $X_2$ → PBC → Actual Usage | 0.103 | 1.731 | 0.040 | Supported |

Overall, the structural results confirm a coherent explanatory mechanism in which information quality and digital self-efficacy strengthen Perceived Behavioral Control (PBC), which in turn becomes the most influential proximate driver of actual usage. The strongest pathway in the model is information quality → PBC (β = 0.769), followed by PBC → actual usage (β = 0.636), indicating that users' behavioral control is largely shaped by the quality of information delivered by the app and subsequently translates into actual use. Both indirect effects are statistically supported ($X_1$ → PBC → $Y$: β = 0.489; $X_2$ → PBC → $Y$: β = 0.103), demonstrating that PBC functions as a significant mediator for both antecedents. In practical terms, the model suggests that improving information quality is likely to yield the largest overall gains in usage, primarily by enhancing users' perceived control during app interactions.

## 4.2 DISCUSSION

### 4.2.1 Influence of Information Quality on Actual Use of PLN Mobile Application in Kalselteng

The findings of this study reveal that information quality significantly influences the actual usage of the PLN mobile application among users in the Kalselteng region. High-quality information encourages users to engage with the app more consistently by reducing cognitive uncertainty during routine transactions, such as bill payments, token purchases, and outage reporting. This finding is consistent with the Information Systems Success Model of Almaiah et al. (2022), which positions information quality as a primary determinant of system usage, asserting that users are more inclined to utilize a platform when its informational output meets their cognitive and transactional needs. When users are provided with accurate, relevant, and timely information, their perceived effort to complete tasks independently is significantly reduced, thereby increasing their frequency of actual engagement with the application (Pitafi & Ali, 2023; Wathanakom & Saranrom, 2025). In this context, information quality not only serves as an antecedent to user engagement but also functions as a direct behavioral trigger that motivates users to return to the application on a routine basis, which is essential for sustaining digital public service utilization (Wen et al., 2022).

From a theoretical perspective, this study contributes to the body of knowledge by demonstrating that information quality operates as both a direct determinant of actual usage and an indirect enabler through perceived behavioral control, offering an integrative account of how system-level attributes translate into sustained behavioral engagement. The findings reinforce the synthesis of the information systems success model and the theory of planned behavior by Ajzen (2020), wherein information quality functions as an external facilitating condition that equips users with the

systemic resources necessary to act with confidence and autonomy. This confirms the empowering role of informational precision in public utility contexts, as previously observed in studies on PLN mobile customer satisfaction in other Indonesian regions (Rahayu et al., 2024; Verma et al., 2025). In practical terms, this suggests that PT PLN (Persero) should continuously prioritize the accuracy, timeliness, and comprehensibility of information presented within the application, as these attributes directly drive routine usage while simultaneously reinforcing users' sense of control over their electricity service management. Theoretical implications suggest that future research should explore how specific dimensions of information quality, such as real-time billing transparency and personalized consumption data, interact with users' behavioral intentions to foster deeper and more sustained engagement with digital public utility platforms.

4.2.2 Influence of Information Quality on Perceived Behavioral Control

The findings also reveal that information quality significantly influences users Perceived Behavioral Control (PBC) when using the PLN Mobile app. High-quality information empowers users by strengthening their confidence in their ability to navigate the app and perform tasks independently. This finding is consistent with Ajzen's Theory of planned behavior, which posits that PBC is a critical mediator in translating intentions into actual behavior. When users are provided with accurate, relevant, and timely information, it enhances their belief that they have the resources and abilities required to use the app effectively. By improving the quality of information within the app, PLN Mobile increases users' self-efficacy and sense of control over their actions. This aligns with the Information Systems Success Model proposed by Almaiah et al. (2022), which asserts that information quality is a key determinant of user satisfaction and system usage. In this context, information quality not only serves as an antecedent to user engagement but also fosters the psychological perception of control, which is essential for motivating users to take action.

From a theoretical perspective, this study contributes to the body of knowledge by highlighting the mediating role of perceived behavioral control (PBC) in the relationship between information quality and actual usage. The findings reinforce Ajzen's (2020) assertion that perceived control is central to the theory of planned behavior, which suggests that the more users feel in control of their technology interactions, the more likely they are to engage in consistent use. This confirms the role of high-quality systems in public utilities, as previously observed in the impact of PLN Mobile on customer satisfaction in other Indonesian regions (Rahayu et al., 2024). These results emphasize the importance of providing clear and usable information to strengthen users' sense of control over the application. In practical terms, this suggests that PLN Mobile should prioritize the clarity, accuracy, and relevance of the information presented to users, as this will directly contribute to improving their perceived control, which in turn encourages more consistent use of the application. Theoretical implications suggest that future research should focus on exploring how various aspects of information quality can interact with psychological factors, such as self-efficacy and perceived control, to foster greater user engagement.

4.2.3 Influence of Digital Self-Efficacy on Actual Use of PLN Mobile Application

Digital self-efficacy plays a positive, although relatively smaller, role in influencing the actual use of the PLN mobile app. Users with higher levels of confidence in their digital abilities are more likely to engage with the app, although its direct impact on actual usage is less pronounced than other factors, such as information quality and perceived behavioral control. This finding is in line with Pitafi and Ali 's(2023) research, which suggests that digital self-efficacy contributes to the adoption of digital services but may not be the primary driver of usage. Contemporary research findings by Ulfert-Blank and Schmidt (2022) reinforce this perspective, demonstrating that technical confidence is essential for determining user engagement and their specific belief in task execution within digital environments. Users of the PLN mobile app who possess robust digital self-efficacy demonstrate greater proficiency when interacting with sophisticated application features or managing technical troubleshooting. Scientific evidence suggests that this internal capability functions as a fundamental support mechanism, although its direct influence on usage frequency is secondary compared to the impact of perceived behavioral control.

The theoretical implications of this study suggest that while digital self-efficacy plays an important supporting role, it should be viewed as a facilitating factor rather than a primary determinant of actual use. Ajzen's Theory of planned behavior and research findings by Ulfert-Blank and Schmidt (2022) suggest that perceived behavioral control serves as the primary determinant for actual usage, whereas digital self-efficacy operates as an auxiliary factor that optimizes an individual's ability to interact with specific technological artifacts. Technical empowerment derived from high self-efficacy levels facilitates the transition from initial digital awareness to consistent and meaningful engagement with mobile platforms. Such a framework posits that while control perceptions directly dictate behavior, internal belief in one's digital proficiency acts as the necessary catalyst for successful technology navigation. From a practical standpoint, PLN Mobile should continue to promote digital literacy among its users by providing tools and guidance that increase users' confidence in their digital capabilities. Although digital self-efficacy alone may not drive usage, fostering it can empower users to overcome minor challenges they face while interacting with the app. Future theoretical research should examine how digital self-efficacy, in combination with other factors, influences long-term adoption and sustained usage of digital services.

4.2.4 Influence of Digital Self-Efficacy on Perceived Behavioral Control

The study also finds that digital self-efficacy significantly influences users Perceived Behavioral Control (PBC) when using the PLN Mobile app. This suggests that users who feel confident in their digital abilities are more likely to believe that they can control and manage their interactions with the app. Contemporary perspectives offered by Ulfert-Blank and Schmidt (2022) substantiate the vital function of digital self-efficacy in determining perceived behavioral control and dictating actual behavior. Technological confidence acts as a primary internal resource that shapes how individuals evaluate their mastery over specialized application interfaces. High levels of digital competency perceptions empower users to view their interactions as structured and controllable activities. Empirical research confirms that these internal psychological states are fundamental for translating latent motivation into consistent and meaningful technology adoption. In the context of PLN Mobile, users with higher digital self-efficacy are more likely to feel capable of using the app effectively, which enhances their sense of control. Ajzen's Theory of planned behavior also asserts that self-efficacy influences perceived control, which mediates the relationship between attitudes and actual behavior. Thus, fostering higher levels of digital self-efficacy helps users develop a stronger belief in their capability to use the app, resulting in more frequent and consistent usage.

The theoretical analysis of these empirical results confirms the specialized framework established by Ulfert-Blank and Schmidt (2022), illustrating that digital self-efficacy serves as a fundamental catalyst for an individual's perception of control. These findings provide a modern validation of the Theory of Planned Behavior by Ajzen (2020) by demonstrating that internal technological confidence significantly shapes perceived behavioral control. In the case of PLN Mobile, enhancing digital self-efficacy is instrumental in strengthening users perceived behavioral control. Theoretical implications suggest that PLN Mobile should invest in providing resources, tutorials, and support that boost users' digital confidence, especially for those who may not be digitally savvy. By increasing users' sense of self-efficacy, the app can enhance users' belief in their ability to manage their interactions with technology independently. This, in turn, may improve engagement and sustain app usage. Future research should explore how digital self-efficacy, along with other factors, such as information quality, works synergistically to enhance users' perceptions of control and overall technology adoption.

4.2.5 Influence of Perceived Behavioral Control on Actual Use of PLN Mobile Application

Perceived Behavioral Control (PBC) plays a crucial role in determining the actual use of digital applications, such as the PLN Mobile application. According to Ajzen's theory of planned behavior, PBC is a key mediator that connects an individual's intentions with their actual behavior. Users who perceive that they have sufficient control over the functionality of an application are more likely to use it consistently. In the context of the PLN Mobile application, this theory suggests that users who believe that they possess the necessary skills, resources, and control over the application's features

will engage with it on a more regular basis. This notion aligns with the fundamental principles of the theory of planned behavior, in which perceived control directly influences users' behavioral intentions and actual usage. From a practical perspective, this finding implies that PLN Mobile should prioritize developing user-friendly features that enhance users' perceptions of control, such as intuitive interfaces and clear navigation tools, to foster consistent and independent usage.

Previous studies have consistently emphasized the importance of perceived control in driving user engagement with digital platforms. For instance, Pitafi and Ali (2023) argued that a sense of control is essential for fostering user engagement and satisfaction with mobile applications. The results of this study support these claims, reinforcing the idea that the more control users feel they have, the more likely they are to engage regularly with the app. The implications for practice are clear: to improve user engagement, PLN Mobile must ensure that users not only perceive control over the app's functionalities but also feel confident in using it independently. By offering features that enhance users' perceived control, PLN Mobile can create an environment that fosters greater engagement, thereby enhancing user satisfaction and promoting more frequent usage of the app. Future research should explore how specific design elements or feature enhancements can influence users perceived control and, consequently, their sustained use of the app.

#### 4.2.6 Mediating Role of Perceived Behavioral Control in the Influence of Information Quality on Actual Use

This study highlights the mediating role of Perceived Behavioral Control (PBC) in the relationship between information quality and the actual use of the PLN mobile application (Almaiah et al., 2022). While the information systems success model identifies information quality as a critical factor for platform usage, this research extends that model by demonstrating that high-quality information primarily operates by enhancing users' perceived control over the application. Recent findings on mandatory information systems suggest that the direct influence of information quality on outcomes can be insignificant, as its effect is often fully mediated by users' internal perceptions of ease and usefulness (Saputra et al., 2023). In the context of digital services, PBC represents the user's assessment of how easy or difficult it is to perform a behavior and has been identified as a significant determinant that positively correlates with actual usage behavior (Ighomereho & Sajuyigbe, 2022). Furthermore, PBC significantly predicts intentions and actual behavior towards the adoption of digital instruments, reinforcing the idea that high-quality information must empower users with the perception that they possess the necessary resources and abilities to utilize the platform effectively (Shittu & Salisu, 2023).

From a practical standpoint, this research underscores the necessity to improve both information quality and users' sense of control. PLN Mobile should prioritize delivering accurate, understandable, and actionable information through real-time updates and clear instructions to foster a more confident user base. Evidence suggests that perceived service quality acts as a reinforcing mediator between behavioral characteristics and actual usage, highlighting the importance of system reliability in building user trust (Ighomereho & Sajuyigbe, 2022). Additionally, awareness plays a critical role in mediating the relationship between PBC and digital adoption, suggesting that strategic efforts to raise awareness regarding app functionalities are essential to drive consistent engagement (Shittu & Salisu, 2023). Providing assistance, such as mentoring or specific guidance, can further help maintain a positive perception of the system and improve individual user performance (Saputra et al., 2023). Future research could investigate how personalized versus generic information impacts these dynamics across diverse demographic groups to better understand the universal applicability of these findings

## 5. CONCLUSIONS

### 5.1 Conclusion

This study demonstrates that the actual usage of the PLN Mobile application in the Kalselteng region is predominantly determined by a robust sense of perceived behavioral control among users. Empirical evidence indicates that perceived behavioral control serves as a pivotal mediator, linking system-related quality and internal user capabilities to actual behavior. High-quality information and

digital self-efficacy act as fundamental antecedents that empower customers to navigate the application independently. The integration of the Theory of Planned Behavior (TPB) and the Information Systems Success Model (ISSM) provides a systematic framework for understanding the psychological mechanisms behind digital public service adoption. Successful digital transformation in the energy sector depends significantly on the system's ability to foster user autonomy rather than merely providing advanced technological features.

### 5.2 Research Limitations

This study had several limitations. The online data collection process encountered duplicate entries requiring intensive cleaning, whereas broad geographical coverage across 27 districts in Kalselteng created operational inconsistencies owing to varying Internet infrastructure quality. The findings are geographically confined to South and Central Kalimantan, limiting their generalizability to other provinces with different digital and sociodemographic profiles. The cross-sectional design restricts the ability to track behavioral evolution over time. Finally, reliance on self-reported measures of actual usage introduces a potential self-reporting bias, as respondents may inaccurately recall their engagement frequency because of social desirability effects or memory limitations. Future research should incorporate objective data from application logs, such as login frequency and session duration, to validate self-reported usage patterns.

### 5.3 Suggestions and Directions for Future Research

Management at PT PLN (Persero) is advised to implement three targeted interventions derived directly from the structural findings of this study. First, a real-time billing intelligence dashboard should be integrated to disaggregate electricity consumption by appliance category and time-of-use tariff, as information quality is the dominant driver of perceived behavioral control ($\beta$= 0.769, $f^2$= 1.149), directly enhancing users' sense of control over their energy expenditure. Second, in-app contextual microlearning modules in the form of short-form (60–90 s) tutorial videos should be embedded and activated at the point of first feature use, particularly for meter self-reading, outage reporting, and token purchase workflows, to address the digital self-efficacy gap among older demographic segments. Third, proactive notification personalization should be implemented by replacing generic system alerts with segmented, action-oriented prompts calibrated to users' interaction history, given that indicator Z.8 (notification comprehension, loading= 0.696) emerged as the lowest-performing perceived behavioral control item.

PT PLN (Persero) UID Kalselteng is further advised to prioritize broader application improvements grounded in the lowest-scoring perception items across all constructs. These include simplifying menu navigation through intuitive labeling and effective search functionality, optimizing the application for low-bandwidth conditions via automatic retry mechanisms and reduced interface rendering load, and promoting the self-meter reading feature through scheduled reminders and simplified task flow. Establishing a continuous user experience governance framework encompassing user-experience-based performance indicators, recurring complaint monitoring, and consistent public communication regarding feature updates is essential for sustaining positive user perceptions over time.

Future research should expand the structural model by incorporating variables not addressed in this study, such as trust in digital services, user satisfaction, habit formation, and facilitating conditions, to construct a more comprehensive understanding of PLN mobile adoption dynamics. Methodologically, transitioning from cross-sectional to longitudinal designs would enable the tracking of behavioral evolution over time, whereas qualitative approaches, including in-depth interviews and focus group discussions, combined with objective data extracted from application usage logs, would yield more precise measurements of actual usage, mitigate self-reporting bias, and strengthen the external validity of the findings.

## AUTHOR CONTRIBUTIONS

SM conceptualization, data collection, methodology development, formal analysis, software operation in SmartPLS, investigation, writing original draft preparation, and visualization. AB

research supervision, validation, conceptual refinement, writing review and editing, and final approval of the manuscript. All authors have read and approved the final version of the manuscript and agree to be accountable for all aspects of the work.

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