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Research Paper

Performance and Effort Expectancy toward Employee Loyalty in Mobile Banking: The Moderating Role of Educational Level

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ABSTRACT: *This study aims to analyze user loyalty toward mobile banking using variables based on the Unified Theory of Acceptance and Use of Technology (UTAUT), focusing solely on* performance expectancy *and* effort expectancy *as key variables. Additionally, the study examines the moderating role of educational level in the relationship between these variables and user loyalty among employees in Batam City, Indonesia. In today's digital banking landscape, understanding what drives continued use and loyalty is essential, especially among employed users who depend on mobile banking for daily financial transactions. A quantitative approach was employed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The sample consisted of 274 employees who actively use mobile banking, selected through purposive sampling. Data were collected using structured online questionnaires. The findings reveal that both* performance expectancy *and* effort expectancy *significantly influence mobile banking user loyalty. Furthermore, educational level was found to moderate these relationships, either strengthening or weakening their effects depending on user characteristics. This study contributes to the theoretical development of the UTAUT model by highlighting the selective influence of its core constructs on loyalty. Practically, the findings offer valuable insights for banking institutions in designing targeted strategies to enhance user retention based on the educational profiles of their users, especially for users who are employees.*

KEYWORDS: Mobile Banking, User Loyalty, UTAUT, Performance Expectancy, Effort Expectancy, Education Level, Employee

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I. INTRODUCTION

The rapid advancement of financial technology has fundamentally transformed the way users interact with banking services. Mobile banking, as one of the leading innovations in digital finance, allows users to perform transactions anytime and anywhere through their smartphones (Grimmelmann, 2014). This shift not only enhances convenience but also aligns with the broader agenda of digital transformation in financial services. In Indonesia, digital banking usage has shown steady growth. According to Bank Indonesia (2023), the value of digital banking transactions reached IDR 15,148.71 trillion in Q3 2023, reflecting a 12.83% year-on-year increase. Meanwhile, the use of ATM services declined, highlighting a shift in user preference toward mobile-based solutions. Particularly in Batam City, known as a fast-growing industrial hub with over 580,000 active employees (Dinas Lingkungan Hidup Batam, 2024), mobile banking has become integral to daily financial management due to the city's modern workforce and high digital adoption rate (Goodstats, 2024).

Despite high adoption, retaining user loyalty in mobile banking remains a challenge. Users often switch between multiple mobile banking apps or substitute them with fintech services such as e-wallets, driven by differences in interface, transaction costs, and value-added features (Alalwan et al., 2017). Therefore, understanding the determinants of loyalty is critical for financial institutions aiming to improve user retention. This study adopts the Unified Theory of Acceptance and Use of Technology (UTAUT) model developed by Venkatesh et al. (2003), focusing on two main constructs: *performance expectancy* and *effort expectancy*. *Performance expectancy* refers to the degree to which individuals believe that using mobile banking will help

them accomplish tasks more effectively. Prior studies (Alalwan et al., 2017; Rahi & Ghani, 2019) have confirmed its strong influence on user satisfaction and loyalty. *Effort expectancy*, which reflects the perceived ease of use, also plays a significant role in influencing users' willingness to continue using the service (Davis, 1989; Venkatesh et al., 2003).

In addition, this research introduces educational level as a moderating variable. Users with higher education levels may possess greater confidence and technical competence to engage with mobile banking systems, leading to stronger loyalty (Gefen et al., 2003; Alalwan et al., 2018). Educational attainment enhances not only technology acceptance but also rational decision-making, enabling users to appreciate the practical benefits of mobile banking (Holbrook, 1985; Bandura, 1997). Focusing on employees in Batam City, this study aims to examine how *performance expectancy* and *effort expectancy* influence mobile banking user loyalty, and how educational level moderates these relationships. The findings are expected to contribute to theoretical refinement of UTAUT in the context of user loyalty and provide actionable insights for banking institutions in designing targeted retention strategies for digitally engaged workers.

II. LITERATURE REVIEW

a. The Relationship Between Performance Expectancy and User Loyalty

Performance expectancy (PE) is defined as the degree to which an individual believes that using a specific system will help them attain gains in job performance (Venkatesh et al., 2003). In the context of mobile banking, performance expectancy refers to how well users perceive the application to enhance the efficiency and effectiveness of their financial tasks. Prior research has consistently shown a significant positive relationship between performance expectancy and technology adoption, as well as continued use behavior (Alalwan et al., 2017; Rahi & Ghani, 2019).

Users who believe that mobile banking services can improve their productivity, save time, and provide reliable performance are more likely to continue using the application, thereby fostering loyalty. According to Alalwan et al. (2017), performance expectancy significantly contributes to user satisfaction, which in turn strengthens long-term commitment to the service. Furthermore, Gupta and Aurora (2017) found that individuals with higher expectations of performance benefits are more likely to exhibit brand loyalty in mobile banking.

H1: Performance Expectancy has a positive and significant effect on employee loyalty to mobile banking in Batam City.

b. The Relationship Between Effort Expectancy and User Loyalty

Effort expectancy (EE) is defined as the degree of ease associated with the use of a particular technology (Venkatesh et al., 2003). When users perceive a mobile banking application as user-friendly and intuitive, they are more likely to continue using it. According to Davis (1989), perceived ease of use is a fundamental determinant of technology acceptance, and it plays a critical role in shaping user behavior.

Research by Putri and Herlina (2020) revealed that effort expectancy has a significant positive effect on mobile banking user loyalty. Users tend to remain loyal to an application that they find simple to navigate and understand, especially when it requires minimal cognitive effort. This is particularly relevant in fast-paced work environments, where ease of access and simplicity can be decisive factors in continued technology usage.

H2: Effort Expectancy has a positive and significant effect on employee loyalty to mobile banking in Batam City.

c. The Relationship Between Educational Level and User Loyalty

Education level is widely acknowledged as a significant factor influencing individual behavior in adopting and continuously using technology-based services such as mobile banking. Individuals with higher levels of education are generally more capable of understanding and evaluating these factors, which enhances their confidence and comfort in using mobile banking applications. Consequently, as they find the technology both easy to use and beneficial, they are more likely to exhibit stronger loyalty to the service. Further, Engel, Blackwell, and Miniard (1995), in their theory of consumer behavior, emphasized that higher education is often associated with better financial and technological literacy. This enables consumers to fully comprehend and utilize digital financial services, leading to greater satisfaction and, ultimately, loyalty to mobile banking

platforms. Educated users tend to recognize the convenience, cost-effectiveness, and accessibility of such services, which aligns with their lifestyle and expectations.

When users believe in their ability to effectively navigate mobile banking systems and perceive real value from their usage, they are more inclined to become loyal users. Similarly, Holbrook (1985) argued that individuals with advanced education possess enhanced evaluative and analytical skills, allowing them to assess the user experience and the added value provided by digital services. In the context of mobile banking, these users often prioritize functionality, innovation, speed, and convenience. Their ability to critically evaluate these aspects leads to a deeper appreciation of the service, fostering sustained loyalty. Higher education not only facilitates better comprehension and perceived usefulness of the service but also nurtures a more confident, satisfied, and loyal user base.

H3: Educational Level has a positive and significant effect on employee loyalty to mobile banking in Batam City.

d. Educational Level as a Moderator

Educational level can play a moderating role in the relationship between performance expectancy, effort expectancy, and user loyalty. Higher educational attainment often correlates with stronger analytical skills, greater technological literacy, and a higher capacity to evaluate the benefits of a service (Holbrook, 1985; Bandura, 1997). As a result, users with higher education levels may perceive mobile banking applications as more useful (higher PE) and easier to use (higher EE), thus reinforcing their loyalty.

Empirical studies have supported this view. For instance, Alalwan et al. (2018) found that educational level significantly moderated the relationship between PE and behavioral intention. Similarly, Musa et al. (2021) demonstrated that in Nigeria, effort expectancy had a stronger impact on mobile banking adoption among users with higher education levels. In other words, education not only facilitates understanding of complex features but also enhances confidence in using digital services, which ultimately leads to stronger loyalty.

H4: Education level moderates the effect of Performance Expectancy dan Effort Expectancy on employee loyalty to mobile banking in Batam City.

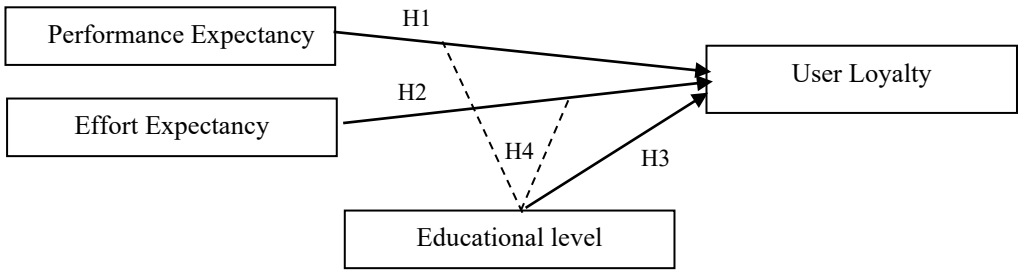

Fig. Conceptual Framework

METHOD

This study employed a quantitative research method, aiming to examine the causal relationship between independent variables and user loyalty. Specifically, it investigates the influence of performance expectancy and effort expectancy on mobile banking user loyalty, with education level serving as a moderating variable. The research was conducted in Batam City, Indonesia, with a data collection period from May to July 2025. The population consists of employees in Batam who use mobile banking services. A purposive sampling technique was used, resulting in a final sample size of 273 respondents based on Cochran's formula. Primary data were collected through an online questionnaire using a 5-point Likert scale to measure each construct. The questionnaire was distributed via Google Forms and assessed variables including performance expectancy, effort expectancy, user loyalty, and education level.

Inferential statistical analysis was conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM) via SmartPLS software 4.1.1.2. The analysis consisted of:

1) Outer model evaluation: to assess construct validity (convergent and discriminant validity) and reliability using factor loadings, Composite Reliability (CR), and Average Variance Extracted (AVE).
2) Inner Model evaluation: Coefficient of determination (R^2) and effect size (f^2) were used to evaluate the explanatory power of the model.
3) Hypotesis testing: to test the significance of hypothesis using bootstrapping (with 5,000 subsamples), assessing path coefficients (t-statistics and p-values) for direct and moderating effects.

III. RESULT AND DISCUSSION

1) Outer Model Evaluation

Variable	Indicators	Outer Loading	(AVE)	CR	Cronbach's Alpha
Perfomance Expectancy	PE1	0,876	0,693	0,940	0,925
	PE2	0,893			
	PE4	0,854			
	PE5	0,855			
	PE6	0,851			
	PE7	0,781			
	PE8	0,699			
Effort Expectancy	EE1	0,855	0,739	0,952	0,941
	EE2	0,887			
	EE3	0,887			
	EE4	0,827			
	EE5	0,842			
	EE6	0,898			
	EE7	0,818			
Educational Level	TP1	0,841	0,697	0,932	0,913
	TP2	0,803			
	TP3	0,807			
	TP4	0,807			
	TP5	0,886			
	TP6	0,859			
Loyalty	L1	0,821	0,732	0,956	0,948
	L2	0,868			
	L3	0,867			
	L4	0,831			
	L5	0,816			
	L6	0,896			
	L7	0,868			
	L8	0,876			

Based on the table above, Convergent Validity was confirmed as all indicator loadings exceeded the threshold of 0.70, and the Average Variance Extracted (AVE) for all constructs was above 0.50. Construct Reliability was satisfactory with Composite Reliability (CR) and Cronbach's Alpha values greater than 0.70 for all variables, indicating internal consistency.

2) Inner Model Evaluation

After the estimated model meets the criteria for discriminant validity, the next step is to conduct the structural model (inner model) assessment. The structural model evaluation is carried out by examining the R-square (R^2) values, which serve as an indicator of the model's goodness-of-fit. The results of the R-square test show a value of 0.754. This indicates that performance expectancy, effort expectancy, and education level contribute to user loyalty by 75.4%.

3) Hypotesis Testing

Variable	*Original Sample*	*Sample Mean (M)*	*Standar Deviation* (STDEV)	*T Statistics* (|O/STDEV|)	*P Values*
Perfomance Expectancy > Loyalty	0,350	0,351	0,060	5,831	0,000
Effort Expectancy > Loyalty	0,252	0,247	0,063	4,019	0,000
Educational Level > Loyalitas	0,315	0,317	0,053	5,892	0,000
Perfomance Expectancy x Educational Level > Loyalty	-0,159	-0,165	0,043	3,719	0,000
Effort Expectancy x Educational Level > Loyalty	0,114	0,117	0,044	2,585	0,005

a) H1 accepted

Based on the path coefficient test results, Performance Expectancy has a positive and significant effect on Loyalty, with a parameter coefficient of 0.350 and a p-value of 0.000. The T-statistic value of 5.831 exceeds the critical value of 1.96, indicating statistical significance. This finding suggests that mobile banking enhances the daily work and financial efficiency of employees in Batam. It offers speed, convenience, and effective financial management, supporting their productivity. Features such as high security, lower transaction costs, and user-friendly services contribute to their satisfaction and long-term loyalty.

This result aligns with Susanto et al. (2020), who found that performance expectancy positively influences continued mobile banking use due to its functional benefits. Sitorus & Handayani (2018) also confirmed that performance expectancy significantly affects user loyalty, especially for employees with limited time who value fast and accessible banking services.

b) H2 accepted

The results show that Effort Expectancy has a positive and significant effect on Loyalty, with a path coefficient of 0.252 and a p-value of 0.000. The T-statistic value of 4.019 exceeds the critical value of 1.96, confirming its statistical significance. Employees in Batam find mobile banking easy to learn and use without needing much effort or external help. Despite some initial complexity, they can follow instructions and navigate the app effectively. This ease of use reduces technological barriers, especially for less tech-savvy users, fostering consistent usage and long-term loyalty. Many employees even recommend mobile banking to others due to its simplicity and reliability.

These findings are consistent with Lestari and Santoso (2021), who found that ease of use significantly impacts loyalty in mobile banking users. Widodo and Falahuddin (2022) also support that employees are more loyal to mobile banking apps that are user-friendly, simple, and mentally non-demanding, which helps retain users and reduces the likelihood of switching to competitors.

c) H3 accepted

Based on the path coefficient test results, Educational level has a positive and significant effect on Loyalty, with a parameter coefficient of 0.315 and a p-value of 0.000. The T-statistic value of 5.892 exceeds the critical value of 1.96, indicating statistical significance. Higher education levels positively and significantly

influence mobile banking loyalty among employees in Batam. Educated users tend to have better digital literacy, allowing them to understand and operate mobile banking applications more efficiently. They are also more aware of digital risks and security measures, which increases their confidence and trust in using the service.

Additionally, individuals with higher education adapt more quickly to technological updates and are more likely to explore and utilize the full range of features offered by mobile banking, leading to greater satisfaction. Mobile banking also aligns well with the professional and time-efficiency needs of educated employees, making it a preferred choice for managing financial activities. These findings are supported by studies such as Cahyono et al. (2020) and Rahi et al. (2018), which highlight that users with higher education are more likely to remain loyal due to a stronger understanding of the benefits and functionality of digital banking services.

d) H4 accepted

The study found that education level moderates the relationship between performance expectancy and loyalty, with a significant p-value of 0.000 and a negative coefficient of -0.159. The T-statistic value of 3.719 confirms that the effect is statistically significant. This means that as education level increases, the positive impact of performance expectancy on loyalty decreases. Highly educated employees tend to be more critical and analytical. They are not easily satisfied with basic functional benefits like efficiency or usability, which are seen as standard features. Instead, they expect more advanced features such as enhanced security, service integration, and a modern user experience. As a result, basic performance benefits do not significantly influence their loyalty. In contrast, employees with lower education levels are more appreciative of core functional benefits and are more likely to develop loyalty when those basic expectations are met. These findings align with Apaua and Lallie (2022), who found that higher education can weaken the influence of performance expectancy due to more complex user expectations and trust standards.

Beside that, this study also found that education level moderates the relationship between effort expectancy and loyalty, with a significant p-value of 0.005 and a positive coefficient of 0.114. The T-statistic value of 2.585 confirms that the effect is statistically significant. This positive moderating effect suggests that individuals with higher levels of education are more likely to translate their perceptions of effort expectancy into increased loyalty. In other words, the easier a system is to use, the more educated users are inclined to remain loyal to it. Educated users may be more sensitive to usability features and better equipped to evaluate system functionality, which enhances their satisfaction and long-term commitment when their expectations regarding ease of use are met. Furthermore, higher education is often associated with greater cognitive flexibility and self-efficacy (Bandura, 1997), allowing individuals to more effectively utilize systems that require learning or adaptation. As a result, when these users perceive a system to be easy to use (high effort expectancy), they are more likely to develop trust and emotional attachment to the platform, thereby strengthening their loyalty.

In the context of employees in Batam City, this moderating effect of education level becomes particularly relevant. Batam is known as an industrial and economic hub, where employees are often required to adapt to digital systems in both personal and professional settings. Employees with higher educational backgrounds in Batam are more likely to have prior exposure to information and communication technologies, making them more responsive to the perceived ease of using mobile banking services. These employees may not only value convenience and efficiency but also integrate such tools into their daily routines more seamlessly. When mobile banking applications are perceived as easy to use (high effort expectancy), well-educated employees in Batam are more likely to adopt and continue using them, perceiving them as valuable tools that align with their productivity-oriented mindset.

Additionally, the competitive work environment in Batam may drive educated employees to prefer services that save time and minimize complexity. This reinforces their loyalty when effort expectancy is met. Therefore, the positive moderating role of education highlights that the easier mobile banking is perceived to be, the stronger the loyalty among higher-educated employees in Batam, as they tend to reward systems that support their efficiency and digital fluency.

IV. CONCLUSION

This study investigated the impact of performance expectancy and effort expectancy on employee loyalty in using mobile banking, with educational level as a moderating variable, based on the UTAUT model. The findings reveal that both performance expectancy and effort expectancy significantly influence user loyalty among employees in Batam City. Employees who perceive mobile banking as useful and easy to use are more inclined to remain loyal to the platform, underscoring the importance of functionality and user-friendliness in sustaining long-term engagement.

Moreover, the study confirms that educational level significantly moderates these relationships. Interestingly, while higher education strengthens the relationship between effort expectancy and loyalty, it weakens the influence of performance expectancy on loyalty. This suggests that highly educated users are more sensitive to ease-of-use aspects and demand more sophisticated features beyond basic performance. Conversely, users with lower education levels are more influenced by practical performance benefits.

These results highlight the need for financial institutions to tailor their digital banking strategies based on user education profiles. For users with higher educational attainment, banks should focus on advanced features, seamless integration, and interface innovation. For less-educated users, emphasis on simplicity, clarity, and core functionality remains key. Overall, the study contributes to refining the UTAUT model by incorporating educational level as a relevant contextual factor, while offering practical implications for enhancing mobile banking loyalty in digitally active workforce segments like those in Batam

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