Medical Sains : Jurnal Ilmiah Kefarmasian
Vol. 10 No. 4, October – December 2025
https:/ojs.ummada.ac.id/index.php/iojs

THE INFLUENCE OF PERCEIVED EASE OF USE AND USEFULNESS ON INTENTION AND SATISFACTION OF PHARMACY MANAGEMENT INFORMATION SYSTEMS: A CASE STUDY IN CIREBON REGENCY

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Submitted: September 11, 2025 Revised: December 23, 2025 Accepted: December 30, 2025

ABSTRACT

This study aimed to examine the influence of Perceived Ease of Use (PEOU) and Perceived Usefulness (PU) on Behavioral Intention (BI) and User Satisfaction (US) of Pharmacy Management Information Systems (PMIS) in Cirebon Regency. A quantitative approach with a cross-sectional design was employed in 29 pharmacies that had been using PMIS for at least one year. The research instrument consisted of 20 items grouped into four variables: PEOU, PU, BI, and US. The data were analyzed using descriptive statistics, reliability testing, and multiple linear regression. The results indicate that PEOU significantly influences PU ($\beta = 0.727$, $p < 0.001$; $R^2 = 0.561$). PU significantly influenced BI ($\beta = 0.800$, $p < 0.001$), whereas PEOU did not show a significant direct effect ($p = 0.229$). BI had a strong positive effect on US ($\beta = 0.967$, $p < 0.001$; $R^2 = 0.893$). All variables demonstrated high internal consistency (Cronbach's Alpha > 0.7). These findings confirm the applicability of the Technology Acceptance Model (TAM) and DeLone & McLean IS Success Model in the pharmacy context. PMIS developers should enhance perceived usefulness through relevant features, provide continuous training to improve ease of use, and maintain user engagement to optimize satisfaction.

Keywords: Perceived Ease of Use, Perceived Usefulness, Behavioral Intention, User Satisfaction, Pharmacy Management Information Systems

INTRODUCTION

The rapid digital transformation of the healthcare sector in Indonesia over the last decade has significantly changed the delivery of pharmaceutical services (RI, 2017; WHO, 2021). This transformation has been driven by the growing integration of information and communication technologies into healthcare operations, ranging from large-scale hospital information systems to specialized digital applications such as Pharmacy Management Information Systems (PMIS) (Andini & Paramita, 2023; Ummah *et al*., 2017). PMIS plays a critical role in supporting pharmacists' daily tasks, including inventory management, stock monitoring, error reduction in medication dispensing, and efficient preparation of regulatory reports (F. Rahimi *et al*., 2022; Wibowo & Raharjo, 2021). By automating these processes, PMIS streamlines operations and improves compliance with national healthcare standards, potentially enhancing service quality and patient safety (Zhang *et al*., 2021).

However, successful PMIS implementation depends not only on the technical robustness of the system but also on how well it is accepted and used by pharmacists and other end users (Gefen D.W., 1997; Parasuraman, 2000). In practice, many health information systems face challenges such as underutilization, user resistance, and dissatisfaction despite their advanced capabilities (Legris J. and Collerette, P., 2003; Venkatesh, 2012). These issues often stem from a misalignment between system features and user expectations or insufficient attention to user experience during system development and deployment (DeLone & McLean, 2003). Therefore, understanding the determinants of user acceptance and satisfaction is

essential to ensure that PMIS delivers its intended benefits in real-world settings (Holden B.-T., 2010).

Davis (1989) introduced the TAM, which has since become one of the most frequently applied frameworks in studies of technology adoption. According to the TAM, individuals' willingness to accept a system is largely determined by how easy they believe it is to use (PEOU) and how beneficial it is for their performance (PU), and the degree to which a person believes using the system would enhance job performance (Venkatesh F. D., 2000). Both PEOU and PU influence the user's Behavioral Intention (BI) to use the system, which in turn affects actual system usage and, ultimately, User Satisfaction (US) (Davis, 1989; Legris J. and Collerette, P., 2003). In the DeLone and McLean IS Success framework (2003), system utilization and user satisfaction are described as mutually reinforcing dimensions of information system success, suggesting that continued use reinforces satisfaction, whereas higher satisfaction levels encourage sustained use (Hellstén & Markova, 2003).

Empirical evidence from previous studies reinforces the applicability of these models in healthcare. Venkatesh and Davis (2000), through their extended TAM (TAM2), demonstrated that PU often exerts a stronger influence on BI than PEOU, especially in professional environments where job performance outcomes are prioritized (Venkatesh F. D., 2000). Rahimi *et al*. (2022), studying pharmacy information systems in Iran, found that PU was the primary determinant of continued system use, as users placed high value on features that directly improved efficiency, accuracy, and safety (Rahimi *et al*., 2022). Similarly, studies in Indonesia (Andini & Paramita, 2023; Wibowo , 2021) have indicated that while ease of use is a necessary condition for adoption, it is the tangible benefits of the system, such as time savings and error reduction, that sustain user engagement over time.

Despite the growing body of literature on technology acceptance in healthcare, there remains a gap in understanding PMIS adoption in Indonesian pharmacies, particularly in areas outside metropolitan areas (Husada *et al*., 2021). Much of the existing research has focused on hospital information systems or telemedicine platforms (Andini & Paramita, 2023), with limited attention given to smaller-scale systems in community and retail pharmacy settings. Furthermore, regional disparities in infrastructure, training availability, and resource allocation create unique adoption challenges that may influence the balance between PEOU and PU in shaping user behavior (C. Liu *et al*., 2021).

Cirebon Regency provides a particularly relevant setting for this research. As a region that encompasses both urbanized and rural areas, it offers a diverse environment in which pharmacies operate under varying resource constraints and customer demand. Understanding how pharmacists in this region perceive PMIS can provide insights into which factors—ease of use or perceived usefulness—play a more critical role in driving behavioral intention and satisfaction with the system. Such insights can guide targeted interventions, whether in system design, training programs, or policy support (Sigagiling, 2020).

This study positions itself within the existing literature by integrating TAM and elements of the DeLone and McLean IS Success Model to explore the relationships between PEOU, PU, BI, and US among PMIS users in Cirebon Regency. By focusing on a context that has received limited scholarly attention, this study extends the applicability of these models to a new and underexplored segment of the healthcare sector. The novelty of this research lies in its dual contribution: first, providing empirical evidence on TAM's relevance to PMIS adoption in Indonesian community pharmacies, and second, highlighting the mediating and reinforcing relationships between ease of use, perceived benefits, behavioral intention, and satisfaction within a mixed urban–rural environment.

The theoretical foundation of this study builds directly on the proposition that PEOU influences PU, which then shapes BI and, ultimately, US (Davis, 1989; Venkatesh F.D., 2000). Within TAM, PEOU is not merely an independent driver of BI but also operates indirectly through the PU. In parallel, the DeLone and McLean framework suggests that BI—as a proxy for actual use—plays a pivotal role in sustaining US (DeLone E.R., 2003). Together, these models offer a comprehensive lens through which to examine the acceptance and success of PMIS in real-world pharmacy settings in the future.

Therefore, the objective of this research is twofold: (1) to assess the influence of PEOU on PU in the context of PMIS use, and (2) to examine the effects of PEOU and PU on BI, and the subsequent impact of BI on US. Through these objectives, this study aims to generate findings that are both theoretically meaningful and practically applicable. For system developers, the results can inform design and feature prioritization; for policymakers, they can support the creation of targeted training, incentive programs, and regulatory frameworks that promote effective digital transformation in the pharmacy sector (Holden B.-T., 2010; Parasuraman, 2000).

By addressing the interplay between ease of use, perceived benefits, intention to use, and satisfaction, this study seeks to contribute to a more nuanced understanding of technology acceptance in Indonesia's healthcare landscape. In doing so, it not only validates the applicability of established theoretical models to the PMIS context but also provides a foundation for future work exploring other factors—such as organizational support, infrastructure readiness, and user training—that may further enhance the success of digital health initiatives (Liu S, *et al* 2021).

RESEARCH METHODS

This study used a quantitative cross-sectional survey to examine the relationships between PEOU, PU, BI, and US in the adoption of PMIS. The research framework was based on the TAM and DeLone and McLean 'sIS Success Model.

A structured questionnaire was designed and pre-tested to ensure clarity and reliability. Data were collected from pharmacies that had used PMIS for at least one year, ensuring that the respondents had sufficient experience to provide accurate assessments. Statistical analysis was conducted to measure the strength and significance of the relationships among variables in line with the study objectives.

Equipment and Materials

The primary data collection instrument for this study was a structured questionnaire consisting of 20 items, each designed to measure key constructs derived from the TAM and the DeLone and McLean IS Success Model. The items were grouped into four variables: PEOU (5 items), PU (5 items), BI (5 items), and US (5 items). Each item was formulated based on validated scales from prior studies (Davis, 1989; Venkatesh F.D., 2000) and adapted to the PMIS context in Indonesia.

Responses were captured using a 4-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = agree, 4 = strongly agree), avoiding a neutral midpoint to encourage respondents to take a clear position on the statements. Before distribution, the questionnaire was reviewed by two academic experts in health informatics and pharmacy management to ensure its face validity and contextual relevance. A small pilot test with five PMIS users was conducted to assess clarity and comprehension, resulting in minor adjustments to wording.

Research Procedure

This study employed a census-based convenience sampling approach to recruit participants. All community pharmacies in Cirebon Regency that had been using PMIS for at least one year and were willing to participate were included. From this population, 29 pharmacies met the inclusion criteria and completed the questionnaires. Although the sample size was relatively small, it was considered acceptable for regression analysis in exploratory technology acceptance studies, particularly when effect sizes were strong and model complexity was limited (Hair, 2019).

The survey was conducted between June and July of 2025. Questionnaires were distributed in both printed and electronic formats (via Google Forms) to maximize participation and accommodate respondents' preferences and convenience. Respondents were informed about the purpose of the study, assured of the confidentiality of their responses, and required to provide informed consent before participating in the study. No incentives were provided to

avoid potential response bias. The research protocol was reviewed for ethical compliance according to university research guidelines, although formal ethics board approval was not mandated because of the non-interventional nature of the study. Ethical clearance was obtained from the Institutional Review Board of Universitas Muhammadiyah Purwokerto, approval number KEPK/UMP/69/VIII/2025.

Data Analysis

Data were coded and analyzed using the Jeffrey's Amazing Statistics Program (JASP) Version 0.19.1. Descriptive statistics (mean, standard deviation, minimum, and maximum) were calculated for each variable to provide an overview of the central tendency and variability in responses.

The reliability of each construct was assessed using Cronbach's Alpha, with a threshold of ≥ 0.70 considered acceptable for internal consistency (Bernstein, 2018). All four variables met or exceeded this threshold, indicating their strong reliability.

To test the research hypotheses derived from the TAM framework, multiple linear regression analyses were performed in three stages: Model 1 (testing the effect of PEOU on PU), Model 2 (testing the effects of PEOU and PU on BI), and Model 3 (testing the effect of BI on US).

For each model, the coefficient of determination (R^2) was used to assess explanatory power, and the significance of the regression coefficients (β) was evaluated using p-values, with a significance level set at $\alpha = 0.05$. Standard diagnostic tests were conducted to ensure that the regression assumptions were met, including the normality of residuals, homoscedasticity, and absence of multicollinearity. Variance Inflation Factor (VIF) values below 5 were considered acceptable, indicating no serious multicollinearity issues.

The choice of a regression-based analytical approach is consistent with previous TAM studies (Legris J. and Collerette, P., 2003; Venkatesh F.D., 2000), enabling the assessment of both direct and indirect effects between constructs. All analyses were performed using a reproducible workflow, and the scripts were archived to facilitate transparency and potential replication by other researchers.

RESULTS AND DISCUSSION

This section presents the study's findings and discusses them in the context of TAM and DeLone and McLean's IS Success Model. The results are organized into three main parts: (1) respondent characteristics, (2) descriptive statistics and reliability analysis of the research variables, and (3) regression analysis testing the proposed hypotheses. The discussion integrates the statistical findings with the relevant literature to provide theoretical and practical interpretations. The primary aim of this study was to determine how PEOU and PU influence BI and US among PMIS users in pharmacies across Cirebon Regency. Statistical outputs were complemented by interpretations grounded in previous empirical studies, allowing the results to be linked to broader patterns observed in information systems research within healthcare contexts.

Respondent Characteristics

A total of 29 pharmacies in Cirebon Regency that used PMIS participated in this study. The respondents comprised Apoteker Pengelola Apotek (APA) or pharmacists in charge who had been using PMIS for at least one year. This inclusion criterion ensured that the respondents had sufficient experience to provide valid assessments of PMIS performance. The pharmacies were located across the northern, southern, eastern, and western parts of the regency, allowing the findings to represent a relatively diverse set of operational conditions in the area.

Reliability and Descriptive Statistics of Research Variables

The research instrument consisted of 20 items grouped into four main variables: PEOU – 5 items, PU – 5 items, BI – 5 items, and US – 5 items.

Table I. Descriptive Statistics and Reliability of The Instrument

Variable	Mean	SD	Min	Max	Cronbach's Alpha
PEOU	3.47	0.65	1	4	0.776
PU	3.69	0.46	3	4	0.924
BI	3.61	0.49	3	4	0.949
US	3.62	0.49	3	4	0.931

Cronbach's alpha values above 0.70 for all variables indicated high internal consistency (Purwanto, 2016). Descriptively, all variables had mean scores greater than 3.4 on a 1–4 Likert scale, indicating relatively high acceptance and satisfaction with the PMIS. The PEOU variable showed the greatest variation in responses (SD = 0.65; min = 1), suggesting that while most respondents perceived PMIS as easy to use, a small group experienced operational difficulties in using it.

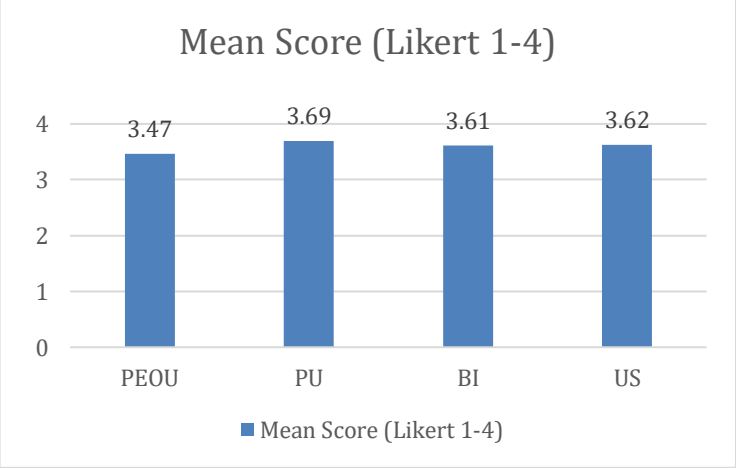

Figure 1. Average Scores and Standard Deviations per Variable

Regression Analysis

Three linear regression models were tested using the simplified TAM framework (Davis, 1989).

Model 1 – Effect of PEOU on PU

The results of the regression analysis demonstrate that Perceived Ease of Use (PEOU) has a significant and positive effect on Perceived Usefulness (PU) ($\beta = 0.727$, $p < 0.001$), explaining 56.1% of the variance in PU. This indicates that more than half of pharmacists' perceptions of the usefulness of PMIS can be attributed to how easy the system is to operate.

Table II. Effect of PEOU on PU

Dependent Variable	Independent Variable(s)	β Coefficient	p-value	R^2
PU	PEOU	0.727	< 0.001	0.561

This finding strongly supports the core proposition of the Technology Acceptance Model, which posits that systems perceived as easier to use are more likely to be perceived as useful (Davis, 1989). In the context of community pharmacies, ease of use reduces the cognitive and operational burden associated with routine tasks, such as prescription entry, inventory updates, and report generation. When pharmacists are not required to expend excessive mental effort to understand or operate the system, they can focus on leveraging PMIS functionalities to improve workflow efficiency and accuracy of the service.

From a cognitive load perspective, systems with intuitive interfaces, clear navigation, and minimal technical complexity lower extraneous cognitive load, allowing users to allocate more cognitive resources to task execution and decision-making. As a result, pharmacists perceive PMIS as being more beneficial to their job performance, reinforcing its perceived usefulness. This explanation aligns with the findings of Venkatesh and Davis (2000), who emphasized that PEOU indirectly contributes to performance improvement by facilitating system engagement.

The relatively high explanatory power of this model ($R^2 = 0.561$) also suggests that usability remains a critical foundation for PMIS adoption, particularly in heterogeneous user populations. Community pharmacies in Cirebon Regency vary in terms of staff technological proficiency, infrastructure, and workloads. Consequently, differences in ease-of-use perceptions may significantly shape how pharmacists evaluate the practical value of PMIS, as reflected in the variability in PEOU scores.

Model 2 – Effects of PEOU and PU on BI

The second regression model revealed that Perceived Usefulness (PU) had a strong and significant positive effect on Behavioral Intention (BI) ($\beta = 0.800$, $p < 0.001$), whereas Perceived Ease of Use (PEOU) did not have a significant direct effect on BI ($p = 0.229$). Together, PEOU and PU explain 75.7% of the variance in behavioral intention, indicating the model's high explanatory power.

Table III. Effect of PEOU and PU on BI

Dependent Variable	Independent Variable(s)	β Coefficient	p-value	R^2
BI	PU	0.800	< 0.001	0.757
	PEOU	0.192	0.229 (not significant)	

These results suggest that pharmacists' intention to continue using PMIS is primarily driven by the system's perceived contribution to job performance rather than its ease of operation alone. In professional environments, such as pharmacies, technology use is often mandatory or closely tied to operational outcomes. Consequently, users tend to evaluate systems based on tangible benefits, such as improved productivity, reduced dispensing errors, faster service delivery, and regulatory compliance, rather than usability attributes.

The non-significant direct effect of PEOU on BI is consistent with the TAM2 framework proposed by Venkatesh and Davis (2000), which argues that ease of use primarily influences behavioral intention indirectly through perceived usefulness. Once users achieve a basic level of proficiency, ease of use becomes a hygiene factor rather than a motivational driver. In this study, pharmacists who had at least one year of experience using PMIS may have reached a stage where usability no longer determined their intention to use the system.

From the perspectives of cognitive load and job performance expectancy, PU dominates BI because pharmacists operate in high-responsibility environments where accuracy, efficiency, and compliance are critical. Technologies that demonstrably improve

these outcomes are more likely to be adopted and sustained. This finding is consistent with prior studies in healthcare and pharmacy informatics, which reported that perceived usefulness is the strongest predictor of continued system use in professional settings (F. Rahimi *et al*., 2022; Zhang *et al*., 2021).

Overall, Model 2 reinforces the mediating role of PU between PEOU and BI, highlighting that system usability must translate into meaningful performance gains to influence pharmacists' behavioral intentions.

Model 3 – Effect of BI on US

The third regression model shows that Behavioral Intention (BI) has a very strong and significant positive effect on User Satisfaction (US) ($\beta = 0.967$, $p < 0.001$), explaining 89.3% of the variance in satisfaction. This exceptionally high explanatory power indicates that pharmacists' satisfaction with the PMIS is closely tied to their intention to continue using the system.

Table IV. Effect of BI on US

Dependent Variable	Independent Variable(s)	β Coefficient	p-value	R^2
US	BI	0.967	< 0.001	0.893

This result aligns with the DeLone and McLean Information Systems Success Model, which conceptualizes system use (or the intention to use) and user satisfaction as mutually reinforcing dimensions of information system success (DeLone E.R., 2003). In the PMIS context, pharmacists who intend to continue using the system are more likely to invest time in learning its features, adapting their workflows, and integrating the system into their daily practice. These experiences foster higher satisfaction as users increasingly recognize the benefits of the system.

The strong relationship between BI and US may also reflect a post-adoption learning effect. As pharmacists become more familiar with the PMIS over time, they experience fewer technical difficulties and gain greater confidence in the system's reliability and accuracy. This cumulative positive experience strengthens both satisfaction and continued intention, creating a virtuous cycle of successful systems.

Empirical studies on health information systems have reported similar findings, indicating that continuance intention is a critical determinant of user satisfaction, particularly in mandatory or semi-mandatory system environments (Zhang *et al*., 2021). In community pharmacies, where PMIS supports essential operational and regulatory functions, the sustained intention to use the system is a key pathway through which satisfaction is achieved.

This study has some contributions.

Theoretical contribution: This study empirically confirms the applicability of the integrated TAM and DeLone and McLean IS Success Model in small-scale community pharmacies, a context that has received limited scholarly attention.

Practical contribution: The findings highlight the importance of enhancing perceived usefulness through continuous system updates and targeted user training to sustain behavioral intention and satisfaction of use.

Policy implications: Professional pharmacy associations and government agencies may play a strategic role in supporting digital pharmacy adoption through standardized training programmes and digital capacity-building initiatives.

CONCLUSION

This study examined the relationships among PEOU, PU, BI, and US in the adoption of PMIS in Cirebon Regency. The findings confirm the applicability of TAM and DeLone and McLean's IS Success Model in the pharmacy context.

PEOU significantly and positively affected PU, supporting the notion that system usability enhances perceived benefits. PU emerged as the strongest predictor of BI, indicating that perceived functional value is more influential than ease of use in driving PMIS usage intention. Furthermore, BI strongly influenced US, suggesting that a sustained usage intention leads to higher satisfaction through accumulated positive experiences.

From a theoretical perspective, the results reinforce PU's mediating role between PEOU and BI and highlight the importance of behavioral intention in enhancing the user's satisfaction. Practically, the findings suggest that PMIS developers and stakeholders should prioritize system features that deliver tangible benefits, provide continuous user training, and ensure responsive technical support to sustain adoption and satisfaction of the system.

While the results provide valuable insights, the study's limitations, such as its small sample size and focus on a single geographic area, should be addressed in future research. Further studies should include larger, more diverse samples and additional external variables to gain a more comprehensive understanding of PMIS adoption factors.

ACKNOWLEDGMENT

The authors would like to express their sincere gratitude to all the participating pharmacists in Cirebon Regency for their time and cooperation in completing the survey. Special thanks are extended to the local health authorities for their support in facilitating data collection. Constructive feedback from academic colleagues and technical assistance provided during the statistical analysis were invaluable for the completion of this study.

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