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*RESEARCH ARTICLE*

# Assessing The Factors That Influence The Acceptance And Adoption Of The Use Of New Performance Technology Systems In Indonesia Drugstores By Pharmacists Using The Utaut-2 Model

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**A B S T R A C T**

The rapid acceleration of digital transformation, especially during the COVID-19 pandemic, has drastically reshaped consumer behavior and necessitated adaptation within the healthcare sector, including pharmacy retail. Independent drugstores in Indonesia face mounting pressure to digitalize their operations to meet evolving customer demands, particularly through the adoption of integrated pharmacy operational systems (e-iPOS). This research examines the factors influencing pharmacists' acceptance and use of such digital systems using the Unified Theory of Acceptance and Use of Technology 2 (UTAUT-2) model. A structured questionnaire was distributed to pharmacists across Indonesia, with 202 valid responses analyzed through structural equation modeling using SmartPLS. The study reveals that social influence, price value, and habit significantly affect pharmacists' behavioral intention to adopt e-iPOS, with habit also directly influencing actual usage behavior. Surprisingly, traditional constructs like performance expectancy and effort expectancy were not significant predictors. These findings underscore the importance of peer influence, perceived value, and behavioral habituation in driving technology adoption in the pharmaceutical sector. The results provide actionable insights for developers of digital pharmacy platforms and health policymakers aiming to support digital transformation in independent pharmacies, particularly through tailored training, pricing strategies, and advocacy campaigns involving key opinion leaders in the pharmacy community.

**K E Y W O R D S**

*pharmacy digitalization; e-iPOS adoption; UTAUT-2; Behavioral intention; Technology acceptance; Indonesian pharmacists; Health informatics; Structural equation modeling*

*H I G H L I G H T S*

- ❖ Social influence, price value, and habit significantly affect pharmacists' behavioral intention to adopt e-iPOS systems.
- ❖ Habit is the only variable that directly influences both intention and actual usage behavior of digital pharmacy systems.
- ❖ Performance expectancy and effort expectancy do not significantly predict pharmacists' intention to adopt new technology.
- ❖ The UTAUT-2 model explains 63.2% of the variance in behavioral intention to use e-iPOS and 17.4% of the variance in actual use behavior.

## INTRODUCTION

The global COVID-19 pandemic has significantly altered human behavior, especially in the way people access and utilize services through digital platforms. Restrictions on mobility and social interaction have accelerated the use of online applications for daily activities, including working, studying, shopping, and healthcare services (Kotler et al., 2021; Statista, 2022). The pharmaceutical sector, particularly community pharmacies, has not been immune to these changes. Independent pharmacies in Indonesia experienced a decline in customer visits during the pandemic, prompting a need for transformation in how pharmaceutical services are delivered and managed.

Prior to the pandemic, many drugstores operated with minimal technological integration, relying heavily on manual systems such as Microsoft Excel or basic freeware applications. These systems were often disconnected from e-commerce platforms and lacked features for managing end-to-end pharmaceutical operations. Although some software solutions such as Qasir and Bukukas were available, their adoption was limited and primarily focused on basic point-of-sale (POS) functions. The pandemic exposed the limitations of these tools and emphasized the need for more comprehensive, integrated digital systems like electronic-integrated Pharmacy Operational Systems (e-iPOS) to meet evolving consumer expectations.

The growing popularity of over-the-counter (OTC) products, vitamins, and supplements—especially through online channels—has created both challenges and opportunities for pharmacies. To maintain competitiveness, pharmacies must not only digitize their sales processes but also optimize internal operations such as inventory planning, procurement, storage, and reporting (Health Government, 2016). Leading pharmacy chains such as Kimia Farma and Century have already adopted advanced digital platforms, including mobile applications that offer online consultations, medicine delivery, and real-time inventory checks (Kimia Farma, 2021). However, the majority of pharmacies in Indonesia—comprising roughly 80% of the total—are independently owned and lack the financial and technical capacity to develop or implement similar systems (GoApotek, 2021).

In response to these challenges, numerous digital health technology providers have emerged with solutions tailored for smaller pharmacies, such as Vmedis and Apotek Digital (Apotek Digital, n.d; Vmedis, 2022). These platforms offer features ranging from stock management to financial reporting, yet adoption remains uneven. Most notably, integration between procurement systems and wholesaler networks (PBFs) is still limited, preventing seamless upstream-to-downstream pharmacy operations.

In this context, pharmacists are key agents of change. As licensed professionals responsible for ensuring the quality and legality of pharmaceutical services, they must adapt their behavior and skillsets to utilize technology effectively. Pharmacists not only manage supply chains and documentation but also serve as direct communicators with patients, offering counseling and recommendations for drug use and self-medication (Indonesia Health Government, 2016).

To understand what drives pharmacists to adopt new digital systems, the Unified Theory of Acceptance and Use of Technology 2 (UTAUT-2) offers a comprehensive framework. Originally developed by Venkatesh et al. (2003) and later expanded, the model incorporates constructs such as performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price value, habit, behavioral intention, and use behavior. Prior research has applied this model to analyze technology adoption in healthcare settings, demonstrating its relevance and adaptability (Ammenwerth, 2019; Alazzam et al., 2018; Semiz & Semiz, 2021).

This study employs the UTAUT-2 model to investigate the determinants of e-iPOS adoption among pharmacists in Indonesian drugstores. It seeks to fill a gap in current literature by focusing on a population segment that is both crucial to public health and underserved by existing technological research. The insights generated aim to inform technology developers, policymakers, and healthcare administrators in promoting effective digital transformation in pharmacy practice across Indonesia.

## MATERIAL AND METHODS

**Table 1.** Inclusion and exclusion criteria for considering studies

| Inclusion Criteria | Exclusion Criteria |
|---|---|
| **Population**<br>• Licensed pharmacists practicing in Indonesia<br>• Respondents working in drugstores, hospitals, clinics, and pharmacy distributors | • Non-pharmacist respondents<br>• Incomplete or invalid questionnaire responses |
| **Intervention**<br>• Assessment of behavioral intention and usage of e-iPOS systems based on UTAUT-2 constructs | • Studies unrelated to digital pharmacy systems<br>• Use of outdated or unsupported technology models |
| **Control (Comparison)**<br>• Responses compared based on demographic groups: age, experience, workplace type | • No comparative demographic data<br>• Lack of baseline (non-user) reference |
| **Outcome**<br>• Behavioral intention to use e-iPOS<br>• Actual usage behavior<br>• Impact of UTAUT-2 constructs: performance expectancy, effort expectancy, social influence, facilitating condition, hedonic motivation, price value, habit | • Non-quantitative outcomes<br>• Irrelevant technology outcomes (e.g., non-health or administrative tech use) |
| **Publication**<br>• Responses collected via online questionnaire (Google Form)<br>• Full data accessible and statistically analyzable using SmartPLS and SPSS | • Incomplete datasets<br>• Responses excluded due to inconsistency, duplication, or missing values |

## MATERIALS

### Software

The research utilizes SmartPLS. SmartPLS is a specialized software application designed for Partial Least Squares Structural Equation Modeling (PLS-SEM), enabling researchers to analyze complex models with multiple variables and their interrelationships. In the study, SmartPLS was utilized to assess the measurement model and test research hypotheses related to pharmacists' acceptance of the e-iPOS system

within the UTAUT-2 framework. The software facilitated the evaluation of the measurement instruments' validity and reliability, ensuring that questionnaire items accurately represented their intended constructs through metrics like Composite Reliability, Cronbach's Alpha, and Average Variance Extracted (AVE). Additionally, SmartPLS was employed to analyze the structural model, examining the influence of factors such as social influence, price value, and habit on pharmacists' behavioral intention and use behavior. This involved calculating path coefficients, t-statistics, and significance levels to determine the strength and significance of hypothesized relationships, as well as assessing model fit and predictive relevance. In summary, SmartPLS served as a critical tool for conducting PLS-SEM analysis, validating the measurement model, and testing the hypothesized relationships in the study.

## METHOD

### Quantitative Research Method

The study adopts a quantitative research approach, focusing on the collection and analysis of numerical data to investigate pharmacists' acceptance of the e-iPOS system. Data is gathered directly from respondents, primarily pharmacists, through structured questionnaires designed to capture their perceptions and behaviors. This method enables the quantification of variables such as perceived usefulness, social influence, and behavioral intention, facilitating statistical analysis to explore relationships among these constructs. By leveraging numerical data, the quantitative approach provides a robust framework for testing hypotheses and deriving statistically significant insights into the factors influencing e-iPOS adoption.

### Survey Questionnaires

To measure the variables influencing e-iPOS adoption, the study employs structured questionnaires featuring Likert scale statements ranging from 1 to 5. These questionnaires are carefully designed to quantify respondents' perceptions across multiple constructs, including performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price value, habit, behavioral intention, and use behavior. By standardizing responses, the Likert scale format ensures consistency and enables precise measurement of pharmacists' attitudes and intentions toward adopting the e-iPOS system, providing a reliable dataset for subsequent analysis.

### Instrument Validity and Reliability Testing

The assessment of the measurement model is a critical step in ensuring the quality of the research instruments. The study evaluates the validity and reliability of the questionnaires using metrics such as factor loadings, Composite Reliability (CR), and Cronbach's Alpha. Items with low factor loadings are removed to enhance the accuracy of the measurement, ensuring that the instruments validly capture the intended constructs. This rigorous testing process confirms that the questionnaires are both reliable and valid, laying a solid foundation for accurate data analysis and interpretation.

### Data Collection Method

The data collection method employed in this study involved distributing questionnaires via social media platforms such as Instagram, TikTok, WhatsApp, LinkedIn, and Twitter to reach the targeted respondents in the Greater Jakarta Area. The questionnaires were hosted on Google Forms, allowing for easy and efficient data collection from online participants.

### Structural Equation Modeling (SEM) using PLS-SEM via SmartPLS

The primary method of data analysis in the study is Partial Least Squares Structural Equation Modeling (PLS-SEM), conducted using the SmartPLS software. This approach is used to test hypotheses about the relationships between latent variables, assess the overall model fit, and evaluate predictive relevance. The analysis process involves two key stages: first, validating the measurement model by confirming the validity and reliability of the instruments; and second, testing the structural model to examine the hypothesized relationships between constructs such as social influence, price value, and behavioral intention. By leveraging PLS-SEM through SmartPLS, the study ensures a comprehensive analysis of the factors driving pharmacists' acceptance of the e-iPOS system.

## RESULTS

**Table 2.** Demographic distribution of respondents

| Variable | n | Percentage (%) |
|---|---|---|
| Gender - Female | 157 | 77.7% |
| Gender - Male | 45 | 22.3% |
| Work Experience < 1 year | 40 | 19.8% |
| 2–5 years | 121 | 59.9% |
| 6–10 years | 26 | 12.9% |
| >10 years | 15 | 7.4% |
| Workplace - National Private Pharmacy | 120 | 59.4% |
| Region - Jabodetabek | 105 | 52.0% |

**Table 3.** Path coefficient results for UTAUT-2 constructs

| Hypothesis | Path | n | β (SE) | 95% CI | Result |
|---|---|---|---|---|---|
| H3 | Social Influence → BI | 202 | .197 (.075) | [.05, .34] | Significant |
| H7 | Price Value → BI | 202 | .199 (.055) | [.09, .30] | Significant |
| H8 | Habit → BI | 202 | .467 (.086) | [.30, .61] | Significant |
| H9 | Habit → UB | 202 | .322 (.123) | [.08, .52] | Significant |
| H1, H2, H4–H6, H10 | Others | 202 | ns | ns | Not Significant |

**Demographic Profile of Respondents**

The majority of respondents were female (77.7%), aged between 27–31 years, and had 2–5 years of work experience, indicating that early-career pharmacists are actively involved in pharmacy operations and may be more open to adopting new technologies. With 59.4% of participants working at national private

pharmacies and over half located in the Jabodetabek area, the sample reflects a population with relatively better exposure to digital infrastructure and innovation readiness compared to more rural regions.

**Significance of Social Influence**

Social influence demonstrated a significant positive effect on behavioral intention ($\beta = .197$, $p < .01$). This highlights the role of peer encouragement, professional community, and industry leadership in motivating pharmacists to engage with new technologies. Endorsements or usage by trusted figures such as colleagues or educators appear to enhance pharmacists' willingness to adopt e-iPOS, consistent with findings by Ljubicic et al. (2018) and Kijsanayotin et al. (2009).

**Impact of Price Value on Adoption**

Price value was found to significantly influence behavioral intention ($\beta = .199$, $p < .001$), indicating that pharmacists are highly sensitive to the cost-benefit ratio of implementing digital systems. Given that many independent pharmacies operate under tight financial constraints, the perceived return on investment from e-iPOS adoption is a critical motivator. Affordable pricing and tiered service options may thus improve adoption rates.

**Habit as the Strongest Predictor**

Habit emerged as the most influential factor in shaping both behavioral intention ($\beta = .467$, $p < .001$) and actual use behavior ($\beta = .322$, $p < .01$). This suggests that consistent exposure and repeated usage of digital tools contribute significantly to the internalization and continued application of e-iPOS in daily pharmacy operations. As supported by Kwateng et al. (2022), this reflects the power of behavioral reinforcement over time.

**Non-Significant Predictors and Implications**

Contrary to expectations, key constructs such as performance expectancy, effort expectancy, and behavioral intention to use behavior were not statistically significant. This may indicate a lack of clarity among pharmacists regarding the practical utility or ease of use of e-iPOS, or possibly due to limited direct experience with the system. These findings emphasize the need for more comprehensive training, demonstrations, and user onboarding to bridge the intention-action gap.

## DISCUSSION

The primary aim of this study was to investigate the factors that influence the adoption of electronic-integrated Pharmacy Operational Systems (e-iPOS) by pharmacists in Indonesia using the UTAUT-2 framework. The findings revealed that among the ten hypotheses tested, only four were statistically significant: social influence, price value, and habit influencing behavioral intention, and habit also directly affecting actual system usage. These outcomes suggest that interpersonal dynamics and routine-forming behavior play a more critical role in technology adoption than perceived ease or performance efficiency, highlighting the contextual uniqueness of pharmacist behavior in Indonesia's pharmacy retail landscape.

Contrary to expectations, traditional UTAUT variables such as performance expectancy and effort expectancy did not significantly affect behavioral intention. This deviates from previous research that found these factors to be major predictors in health technology adoption (Phichitchaisopa & Naenna, 2013; Kim et al., 2016). A potential explanation is the limited exposure of pharmacists to such integrated systems, particularly in independent pharmacies where digital infrastructure is minimal. As such, pharmacists may not yet perceive concrete benefits or ease in using unfamiliar technologies, resulting in diminished relevance of these constructs.

The significant influence of social factors reinforces the notion that pharmacist communities are deeply embedded in relational trust and professional networks. When respected colleagues, professional bodies, or academic mentors endorse or use a system, pharmacists are more likely to follow suit. Similar conclusions were drawn by Kijsanayotin et al. (2009) and Ljubicic et al. (2018), who found that peer pressure and normative belief systems strongly predicted health professionals' technology usage. For implementation strategies, this underscores the importance of engaging opinion leaders and integrating e-iPOS systems into professional development and continuing education forums.

Equally important is the role of perceived price value, which significantly influenced pharmacists' behavioral intention. Given that many independent pharmacies operate with limited budgets, any digital solution must demonstrate a favorable cost-benefit ratio. Slade et al. (2013) emphasized that affordability, when balanced with utility, plays a critical role in determining acceptance. This finding is especially relevant in developing country settings where financial limitations and lack of subsidies can hinder technology adoption. Tailored pricing models and government-supported incentives could help overcome this barrier.

Habit was the strongest predictor of both intention and actual usage, suggesting that once pharmacists internalize technology use, it becomes a sustained behavior. This aligns with findings from Alazzam et al. (2018) and Kwateng et al. (2022), who identified habit as a dominant force in telemedicine and mobile health system adoption. In practice, this indicates that user training, pilot programs, and long-term exposure are critical in driving sustained usage. Creating intuitive and familiar interfaces may also facilitate the transition from trial to routine use.

Despite the valuable insights, the study is not without limitations. First, the research was limited to pharmacists' self-reported intentions and behaviors, which may be influenced by social desirability or recall bias. Second, the e-iPOS system examined in the study is not yet widely adopted or known, which might have limited respondents' understanding and thus affected the validity of their responses. Furthermore, the sample was dominated by pharmacists in urban and semi-urban areas, potentially underrepresenting those in remote or underserved regions with distinct barriers.

Nevertheless, this study contributes to the limited body of knowledge regarding technology adoption by pharmacists, particularly in low- and middle-income countries. Previous research in Indonesia has focused predominantly on broader health technology usage among physicians or patients, leaving a gap in pharmacist-specific studies. By applying the UTAUT-2 model, this study provides a nuanced understanding of the psychological and contextual factors that shape pharmacists' acceptance of digital systems in the retail setting.

Future research should explore qualitative dimensions of pharmacist behavior, including interviews or focus group discussions, to uncover deeper insights into resistance or motivations. Additionally, longitudinal studies may track actual system usage over time, providing more robust data on how intention translates into sustained behavior. Given the critical role pharmacists play in delivering frontline healthcare, understanding and enabling their digital transformation should remain a priority for policymakers, healthcare administrators, and technology developers alike.

## CONCLUSION

This study explored the determinants of pharmacists' acceptance and usage of electronic-integrated Pharmacy Operational Systems (e-iPOS) in Indonesia by employing the UTAUT-2 framework. Among the ten hypothesized constructs, social influence, price value, and habit were found to significantly affect pharmacists' behavioral intention, while habit also demonstrated a direct influence on actual use behavior. These findings highlight that adoption of digital systems in pharmacy settings is driven more by behavioral patterns and external encouragement rather than purely by perceived performance or ease of use.

The results offer practical implications for stakeholders in pharmacy digitalization. Technology developers and policymakers should prioritize awareness-building campaigns that leverage influential figures within the pharmacist community. Furthermore, pricing models should be tailored to the financial realities of independent pharmacy businesses. Promoting habitual use through pilot programs, user training, and simplified interfaces can also strengthen long-term adoption. Given the current gaps in digital transformation within Indonesia's pharmacy sector, targeted efforts are needed to ensure that digital health infrastructure becomes inclusive and sustainable.

While this research provides new insights, it also acknowledges its limitations, particularly in terms of system familiarity and sample scope. Future research should broaden demographic coverage, incorporate qualitative perspectives, and assess long-term behavioral shifts. Overall, empowering pharmacists through accessible, affordable, and professionally endorsed digital tools will be vital to improving pharmaceutical care and aligning with broader healthcare digitization efforts across Indonesia.

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