

Digital Health Management and Physician Behavior in Sustainable Telemedicine Use

Digital Health
Management and
Physician Behavior

Elika Setiawaty

Institut Pertanian Bogor; Bogor, Indonesia

E-Mail: elikasetiawaty@apps.ipb.ac.id

Hartoyo

Institut Pertanian Bogor; Bogor, Indonesia

E-Mail: hartoyo@apps.ipb.ac.id

Rita Nurmalina

Institut Pertanian Bogor; Bogor, Indonesia

E-Mail: ritanurmalina@apps.ipb.ac.id

Lilik Noor Yuliati

Institut Pertanian Bogor; Bogor, Indonesia

E-Mail: lilikny@apps.ipb.ac.id

4275

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ABSTRACT

Telemedicine has become a key component of digital health management in emerging healthcare systems. This study aims to investigate the behavioural drivers of sustainable telemedicine adoption among physicians. An integrative behavioural model was developed by combining the Unified Theory of Acceptance and Use of Technology, Technology Acceptance Model, Innovation Resistance Theory, and Social Cognitive Theory, along with constructs of economic value and social support. A cross-sectional survey of 244 licensed physicians was conducted using purposive sampling, and data were analysed with Partial Least Squares Structural Equation Modelling (PLS-SEM) and Multi-Group Analysis. The results indicate that economic value is the strongest predictor of behavioural intention, while social support is the primary determinant of actual use. Perceived digital risk had no significant impact, underscoring an intention–action gap where readiness does not always lead to sustained behaviour. MGA revealed that physicians with 5–10 years of experience were more sensitive to digital risks, which negatively influenced their intention to adopt. These findings emphasize the importance of economic framing and professional support in closing the intention–action gap and strengthening sustainable telemedicine adoption. The study offers evidence-based insights for managing long-term digital health transformation in developing healthcare contexts.

Keywords: Behavioral Drivers, Digital Health Management, Economic Value, Social Support, Sustainable Health Technology, Telemedicine Adoption.

ABSTRAK

Telemedisin telah menjadi komponen utama dalam manajemen kesehatan digital pada sistem layanan kesehatan negara berkembang. Penelitian ini bertujuan untuk mengeksplorasi faktor-faktor perilaku yang mendorong adopsi telemedisin yang berkelanjutan di kalangan dokter. Model perilaku integratif dikembangkan dengan menggabungkan Unified Theory of Acceptance and Use of Technology, Technology Acceptance Model, Innovation Resistance Theory, dan Social Cognitive Theory, serta menambahkan konstruk nilai ekonomi dan dukungan sosial. Survei cross-sectional dilakukan terhadap 244 dokter berlisensi menggunakan metode purposive sampling. Data dianalisis menggunakan Partial Least Squares Structural Equation Modeling dan Multi-Group Analysis. Hasilnya menunjukkan bahwa nilai ekonomi merupakan prediktor terkuat dari niat perilaku,

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sementara dukungan sosial menjadi penentu utama dalam penggunaan aktual. Risiko digital yang dirasakan tidak berpengaruh signifikan, yang menandakan adanya intention–action gap atau kesenjangan antara kesiapan dan perilaku nyata. Analisis MGA mengungkap bahwa dokter dengan pengalaman 5–10 tahun lebih sensitif terhadap risiko digital, yang berdampak negatif pada niat adopsi dokter.

Kata kunci: Penggerak Perilaku, Manajemen Kesehatan Digital, Nilai Ekonomi, Dukungan Sosial, Teknologi Kesehatan Berkelanjutan, Adopsi Telemedicine.

INTRODUCTION

The COVID-19 pandemic accelerated the digital transformation of healthcare, introducing a new phase of normalization for telemedicine technologies. Delivered primarily through digital platforms such as Halodoc and Alodokter, telemedicine became a critical substitute for in-person consultations, ensuring continuity of care during mobility restrictions (Peek et al., 2020; Witkowska & Nieradko, 2022; Katapally & Ibrahim, 2023; Hai et al., 2024; Naga & Sison, 2025). However, transitioning from emergency-driven implementation to sustainable adoption has remained challenging (Dionisio et al., 2023). Although the pandemic increased initial uptake, the long-term integration of telemedicine into routine clinical practice is still inconsistent, particularly among physicians (Ndwabe et al., 2024; Laheba et al., 2025).

In Indonesia, temporary government regulations facilitated the rapid deployment of teleconsultation services. Yet, physician participation declined significantly after these policies were relaxed, revealing an intention–action gap in which high acceptance does not translate into sustained usage (Sugandi et al., 2023; Laheba et al., 2025). This gap shows that adoption is not only shaped by perceived usefulness but also by structural readiness, workflow alignment, and psychological fit with professional norms (Stoumpos et al., 2023). Compared to countries such as Singapore and the Philippines, where telemedicine is backed by cohesive policy frameworks and structured incentives, Indonesia still faces fragmented digital infrastructure, uneven technology access, and limited policy integration (Sabrina & Defi, 2021; Katapally & Ibrahim, 2023; Hai et al., 2024; Naga & Sison, 2025). These constraints hinder the scalability and institutionalization of digital platforms in clinical workflows, reinforcing the need for system-wide coordination.

Beyond structural barriers, behavioural factors play a decisive role in enabling sustainable digital health adoption. While technical feasibility and patient perspectives are widely documented, the behavioural dynamics of physicians, particularly in post-pandemic settings, remain underexplored. Traditional frameworks such as the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) emphasize perceived usefulness and ease of use, but often neglect contextual and individual-level factors (Venkatesh et al., 2003; Konopik & Blunck, 2023; Kim et al., 2024). In contrast, Social Cognitive Theory (SCT) highlights self-efficacy, while economic perspectives consider cost–benefit trade-offs (dos Santos et al., 2025; Wang et al., 2025). However, these frameworks are rarely integrated, resulting in theoretical fragmentation. Demographic factors such as professional experience further influence adoption behaviour (Elareed et al., 2024). Younger, digitally native physicians tend to adapt more quickly, while more experienced physicians may face workflow disruption or digital fatigue (de Blanes Sebastián et al., 2023; Vidal et al., 2023). Yet, studies on long-term behavioural determinants of telemedicine in low- and middle-income countries remain limited (Mahdavi et al., 2025; Ramdan et al., 2025).

This study aims to develop and empirically test an integrative behavioural model of physicians' use of digital platforms in Indonesia by combining TAM, UTAUT, Innovation Resistance Theory (IRT), SCT, and economic value into a unified framework. By addressing the intention–action gap and incorporating demographic moderators, this research contributes to advancing theoretical understanding and offers practical guidance

for policymakers, platform developers, and medical institutions seeking to scale sustainable digital health management.

LITERATURE REVIEW & HYPOTHESIS DEVELOPMENT

Performance and Effort Expectancy in Telemedicine Adoption

As the healthcare sector transitions from crisis-driven responses to long-term digital integration, it is essential to reassess the theoretical frameworks underpinning technology adoption. In Indonesia's post-pandemic context, physicians' behaviour is no longer shaped by emergency mandates, requiring classical models such as the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) to be critically refined to explain voluntary, context-dependent adoption (Shiferaw et al., 2021; Ramdan et al., 2025).

Both models propose that behavioural intention is driven by constructs such as performance expectancy and effort expectancy. However, behavioural intention alone does not ensure consistent actual use, highlighting the widely observed intention–action gap (Venkatesh et al., 2003; Stoumpos et al., 2023; Kim et al., 2024). In healthcare settings, physicians are more likely to adopt telemedicine platforms when they perceive tangible benefits such as improved clinical effectiveness, increased service efficiency, and enhanced patient communication (Diel et al., 2023; Alsahli et al., 2024; Austria et al., 2024). These expectations are especially important when digital tools must fit seamlessly into existing clinical workflows. System usability not only encourages positive attitudes but also facilitates habitual use by reducing cognitive effort (de Blanes Sebastián et al., 2023; Fabian et al., 2024; Wu et al., 2024). A study by Damayanti et al. (2025) found that digital health adoption among Gen Z in Indonesia is primarily driven by perceived ease of use, trust, and perceived benefits. While the study focuses on young consumers, its findings provide preliminary insights into how behavioral factors shape digital health technology adoption, insights that are relevant for contrasting with physician-specific contexts.

H1a: Performance expectancy positively influences physicians' behavioural intention to use telemedicine.

H1b: Performance expectancy positively influences physicians' actual use of telemedicine.

H2a: Effort expectancy positively influences physicians' behavioural intention to use telemedicine.

H2b: Effort expectancy positively influences physicians' actual use of telemedicine.

Behavioural and Contextual Determinants of Telemedicine Adoption

The availability of technical infrastructure and social encouragement often plays a crucial role in supporting digital adoption. Social support from peers, mentors, and supervisors can influence behavioural intention directly or even bypass intention by creating normative pressure that drives actual usage (de Blanes Sebastián et al., 2023; Wu et al., 2024). Similarly, facilitating conditions such as training, materials, and IT support strengthen users' confidence and reduce barriers to adoption (Alsahli et al., 2024; Kim et al., 2024).

Social Cognitive Theory (SCT) identifies self-efficacy as a central determinant of behavioural change, emphasizing that individuals' confidence in performing digital tasks strongly shapes technology adoption. Physicians with higher self-efficacy are more likely to perceive telemedicine as manageable and beneficial, which strengthens their behavioural intention to use and translates into sustained actual use in clinical practice (Elareed et al., 2024; Tan et al., 2024). Conversely, perceived digital risks such as data breaches, diagnostic errors, or medico-legal liabilities can undermine trust in telemedicine platforms. When institutional safeguards, regulatory clarity, or technical protections are inadequate, these risks become salient deterrents that weaken both physicians' willingness to engage and their continued actual use of telemedicine systems (Azam et al., 2023;

Owusu Kwateng et al., 2023). Together, self-efficacy and perceived digital risk reflect opposing psychological forces: one motivates engagement through confidence and competence, while the other constrains adoption through uncertainty and perceived vulnerability, making them critical in explaining post-pandemic telemedicine adoption.

H3a: Social support positively influences physicians' behavioural intention to use telemedicine.

H3b: Social support positively influences physicians' actual use of telemedicine.

H4a: Facilitating conditions positively influence physicians' behavioural intention to use telemedicine.

H4b: Facilitating conditions positively influence physicians' actual use of telemedicine.

H5a: Self-efficacy positively influences physicians' behavioural intention to use telemedicine.

H5b: Self-efficacy positively influences physicians' actual use of telemedicine.

H6a: Perceived digital risk negatively influences physicians' behavioural intention to use telemedicine.

H6b: Perceived digital risk negatively influences physicians' actual use of telemedicine.

Economic Value and Intention–Action Dynamics in Telemedicine Adoption

In post-regulatory contexts where digital health is no longer mandatory, economic value becomes a dominant factor in influencing adoption. Physicians assess telemedicine based on whether it adds efficiency, patient volume, or financial benefit (Raza et al., 2025; Wang et al., 2024). However, this cognitive evaluation may be internalized through attitude, serving as an affective mediator that links beliefs to behaviours (Naamani et al., 2022; Shaarani et al., 2023).

While behavioral intention is widely recognized as a strong predictor of actual use in technology adoption models, it does not guarantee consistent execution. Especially in complex clinical settings, external disruptions such as system incompatibility, fragmented workflows, or administrative burdens may prevent users from translating intention into action (El Naamani et al., 2022; Raza et al., 2025). In the Indonesian healthcare context, physicians often encounter friction in daily operations, including high administrative workload, poor platform interoperability, and the frequent need to alternate between digital and in-person consultations (Laheba et al., 2025). These operational constraints can undermine the behavioral consistency typically expected from high intention, signaling a need to reassess the robustness of this relationship under real-world conditions (Karambut et al., 2019). Therefore, the following hypothesis can be obtained:

H7a: Perceived economic value influences physicians' intention to use telemedicine.

H7b: Perceived economic value influences physicians' actual use of telemedicine.

H8: Behavioural intention influences physicians' actual use of telemedicine.

Experience as a Moderator

In addition to these contextual barriers, individual demographic characteristics, particularly professional experience, may influence how physicians evaluate, respond to, and engage with digital technologies (Kosowicz et al., 2023; Hawrysz et al., 2024; Li et al., 2024; Michalaki et al., 2024). Drawing on digital divide theory and the literature on technology readiness, there is growing recognition that generational cohorts differ in both confidence and cognitive processing of digital systems (Parasuraman, 2000). Experienced physicians may either be more confident in navigating digital tools or, conversely, more resistant to change due to entrenched habits. These dynamics suggest that experience may moderate the strength of influence between psychological predictors such as self-efficacy, perceived risk, and economic value to intention and actual usage behavior (Li et al., 2024; Tan et al., 2024; Wang et al., 2024; Yao et al., 2025). Hence, the following hypotheses are formulated to test the direct relationship between behavioral intention and actual use,

as well as the moderating effects of experience on key psychological and economic determinants of telemedicine intention and actual use.

H9a: Experience moderates the effect of self-efficacy on intention to use.

H9b: Experience moderates the effect of self-efficacy on actual use.

H10a: Experience moderates the effect of perceived digital risk on intention to use.

H10b: Experience moderates the effect of perceived digital risk on actual use.

H11a: Experience moderates the effect of economic value on intention to use.

H11b: Experience moderates the effect of economic value on actual use.

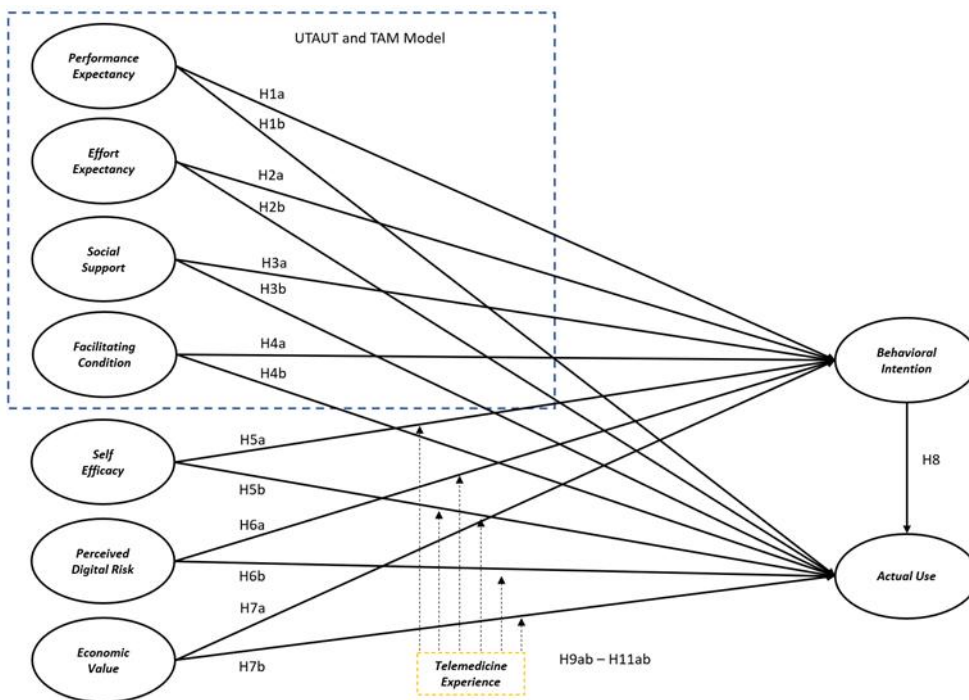


Figure 1. Research Model (An Integrated Model of the TAM, UTAUT, IRT, and SCT Theory for Telemedicine)

Figure 1 illustrates the conceptual framework of research on telemedicine adoption by physicians. The model integrates the core constructs of TAM and UTAUT performance expectancy and effort expectancy, as well as social factors, enabling conditions, self-efficacy, perceived digital risk, and economic value. All of these factors are assumed to influence both behavioral intention and actual use, with intention acting as the primary mediator. Furthermore, telemedicine experience is tested as a moderating variable influencing the relationship between self-efficacy, perceived risk, and economic value on intention and actual use. This model emphasizes the interaction of psychological, social, and economic factors in explaining the intention-action gap.

RESEARCH METHODS

This research adopts a mixed methods design to investigate how physicians in Indonesia adopt telemedicine, combining quantitative and qualitative approaches to ensure empirical robustness and contextual relevance. The quantitative phase employed a cross-sectional survey analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM), which is well-suited for modelling complex latent constructs and effectively addresses non-normal data distributions, particularly in demographic-based Multi-Group Analysis (MGA) (Hair et al., 2022).

A pilot study involving 30 physicians was first conducted to evaluate the clarity, contextual relevance, and comprehensibility of the research instrument. Based on the feedback, the questionnaire was refined and then distributed online to 300 physicians using

a purposive sampling approach. From this distribution, 244 complete and valid responses were obtained from licensed physicians, producing a strong response rate of 81.3%. The sample comprised both general practitioners and medical specialists, all of whom had prior experience with telemedicine. Recruitment was facilitated through professional networks, including national medical associations, hospital systems, and a central telemedicine platform.

The measurement model in this study was carefully designed to ensure validity and reliability by adapting multi-item constructs from well-established theoretical frameworks, namely the Unified Theory of Acceptance and Use of Technology (UTAUT), the Technology Acceptance Model (TAM), Social Cognitive Theory (SCT), and Innovation Resistance Theory. These frameworks provided a solid foundation for capturing the diverse factors influencing physicians' adoption of telemedicine. Key constructs such as performance expectancy, effort expectancy, facilitating conditions, perceived digital risk, and economic value were operationalized using five-point Likert scales, allowing participants to indicate their level of agreement or disagreement in a nuanced way. Meanwhile, actual use of telemedicine was measured through frequency-based items to capture real patterns of utilization rather than perceptions alone. To further enrich the analysis, physicians' experience with telemedicine was categorized into three distinct groups: less than five years, between five and ten years, and more than ten years, providing a meaningful basis for multi-group comparisons.

RESULTS

The respondent profile reflects a predominantly young and early-career medical workforce. Of the 244 participating physicians, a substantial proportion had relatively limited clinical experience, with 37.3% ($n = 91$) having practiced for less than five years and 32.0% ($n = 78$) for five to ten years. Meanwhile, 30.73% ($n = 75$) reported having more than 10 years of clinical experience. This composition suggests that the sample is largely representative of younger physicians, who are generally more adaptable to technological innovations in healthcare. Detailed information on respondents' clinical experience is presented in Table 1.

Table 1. Respondent's Profile Based on Experience

Years of Clinical Experience	Number of Respondents	Percentage (%)
Less than 5 years	91	37.3%
5–10 years	78	32.0%
More than 10 years	75	30.73%
Total	244	100%

The measurement model demonstrated strong reliability and convergent validity across the constructs, as presented in Table 2. For Performance Expectancy, the highest loading was found for the item "Enables effective patient monitoring" ($\lambda = 0.867$), reflecting physicians' perceptions of the operational benefits of telemedicine. Effort expectancy was best represented by "System features are easy to learn" ($\lambda = 0.91$), indicating ease of use. For the social support variable, the highest indicator was "Senior/mentor recommends telemedicine" ($\lambda = 0.921$). For facilitating conditions, the strongest indicator was "Provides supporting materials" ($\lambda = 0.959$), highlighting organizational readiness. For Self-Efficacy, "Confidence in their ability to integrate telemedicine into routine clinical practice" had the highest loading ($\lambda = 0.92$), indicating physicians' confidence in routine activities. The most strongly perceived digital risk was reflected in the statement "Worry that technical disruptions could negatively impact the quality of care" ($\lambda = 0.87$), which emphasizes the patient's lived experience. The economic value construct was best represented by the statement "Enabling more patients to be served" ($\lambda = 0.94$). All constructs achieved Cronbach's Alpha and Composite Reliability values above 0.7, confirming internal consistency, and all AVE values were above 0.5, supporting convergent validity (Hair et al., 2022).

Table 2. Validity and Reliability Results

Construct	Code	Items	Factor Loading	AVE	Alpha	CR (ρ_c)	Notes
Perceived Expectancy	PE 1	Faster medical advice	0.844	0.727	0.875	0.914	Statistically supported
	PE 2	Improves clinical time efficiency	0.861				
	PE 3	Supports accurate diagnosis	0.838				
	PE 4	Enables effective patient monitoring	0.867				
Effort Expectancy	EE 1	Facilitates patient interaction	0.862	0.781	0.906	0.935	Statistically supported
	EE 2	Assists with routine administrative tasks	0.844				
	EE 3	Easy to use	0.910				
	EE 4	The system features are readily learnable	0.918				
Social Support	SS 1	The family encourages telemedicine use	0.841	0.786	0.909	0.936	Statistically supported
	SS 2	Senior/mentor recommendations	0.921				
	SS 3	Colleagues' recommendations	0.904				
	SS 4	The supervisor supports telemedicine use	0.879				
Facilitating Condition	FC 1	The organization provides telemedicine training	0.928	0.888	0.958	0.969	Statistically supported
	FC 2	Provides supporting materials	0.959				
	FC 3	Technical support is available	0.954				
	FC 4	Platform is user-friendly	0.927				
Self-Efficacy	SE 1	Able to operate systems effectively	0.903	0.830	0.932	0.951	Statistically supported
	SE 2	Capable of resolving technical issues	0.917				
	SE 3	Confident in making accurate clinical decisions during virtual consultations	0.904				
	SE 4	Trusting their own ability in routine activities.	0.920				
Perceived Digital Risk	PR 1	Legal protection concerns	0.881	0.793	0.917	0.939	Statistically supported
	PR 2	Data leakage concerns	0.876				
	PR 3	Diagnostic error risk	0.878				
	PR 4	Technical disruption impact	0.926				
Economic Value	EV 1	Reduce operational costs	0.855	0.83	0.931	0.951	Statistically supported
	EV 2	Enables serving more patients	0.940				
	EV 3	Saves time on administrative tasks	0.932				
	EV 4	Adds economic value	0.914				

Construct	Code	Items	Factor Loading	AVE	Alpha	CR (ρ_c)	Notes
Behavioral Intention	BI 1	Intend to use it consistently	0.942	0.913	0.968	0.977	Statistically supported
	BI 2	Intend to integrate it into practice	0.969				
	BI 3	Continue using it for patient convenience	0.959				
	BI 4	Optimizing telemedicine use	0.952				
Actual Use	AU 1	Routinely uses telemedicine weekly	0.829	0.735	0.88	0.917	Statistically supported
	AU 2	Significant practice time on telemedicine	0.885				
	AU 3	Uses telemedicine for chronic patient monitoring	0.882				
	AU 4	Consultation duration comparable to in-person	0.831				

After establishing convergent validity and reliability, discriminant validity was assessed using the Heterotrait-Monotrait Ratio of Correlations (HTMT), as presented in Table 3. The results indicate that all HTMT values were below the conservative threshold of 0.85, confirming acceptable discriminant validity among the constructs (Henseler et al., 2015). For example, the HTMT between Behavioral Intention (BI) and Economic Value (EV) was 0.815, between Effort Expectancy (EE) and Self-Efficacy (SE) was 0.831, and between Perceived Expectancy (PE) and Social Support (SS) was 0.780, none exceeding the critical value. Notably, Perceived Digital Risk (PR) showed consistently low correlations with other constructs, such as with BI (0.130) and SE (0.100), further supporting construct distinctiveness. These findings demonstrate that the model possesses adequate discriminant validity, allowing for the interpretation of relationships among latent variables without significant multicollinearity concerns. The following Table 3 explains the HTMT results (Hair et al., 2022; Schubert et al., 2023).

Table 3. Heterotrait-Monotrait Ratio of Correlations (HTMT)

Variable	AU	BI	EE	EV	FC	PE	PR	SE	SS
Actual Use									
Behavioral Intention	0.594								
Effort Expectancy	0.519	0.792							
Economic Value	0.621	0.815	0.836						
Facilitating Conditions	0.554	0.748	0.768	0.705					
Perceived Expectancy	0.557	0.675	0.779	0.740	0.698				
Perceived Digital Risk	0.141	0.130	0.190	0.175	0.076	0.157			
Self-Efficacy	0.591	0.785	0.831	0.806	0.799	0.769	0.100		
Social Support	0.622	0.531	0.658	0.639	0.661	0.780	0.074	0.710	

This study evaluated model fit and explanatory power using PLS-SEM. The R-squared (R^2) results demonstrate strong predictive ability, with behavioral intention achieving 0.710, meaning 71% of the variance in physicians' intention to adopt telemedicine is explained by the model. Actual use recorded an R^2 of 0.446, showing that 44.6% of the variance in telemedicine usage is accounted for by the predictors. Since R^2 values above 0.25 indicate moderate to substantial explanatory power, these findings confirm the model's adequacy, see Figure 2.

Model fit indices in Table 4 further support these results. The SRMR value was 0.069 for both saturated and estimated models, below the accepted threshold of 0.08, suggesting good model-data fit (Henseler et al., 2015). Additionally, d_{ULS} (3.159) and d_G (1.431) values showed minimal residual discrepancy between observed and model-implied

correlations. The similarity between saturated and estimated models highlights consistency and strengthens confidence in the structural model.

Table 4. Model Fit Result

Model Fit Indices	Saturated model	Estimated model	Results
SRMR	0.069	0.069	Good Fit
d_ULS	3.159	3.159	Good Fit
d_G	1.431	1.431	Good Fit
NFI	0.8	0.8	Good Fit

The Normed Fit Index (NFI) was 0.80 for both models, indicating that the proposed model explains 80% of the covariance observed in the null model. Although slightly below the more conservative benchmark of 0.90, this value is considered acceptable in exploratory behavioral research, especially when modeling complex constructs in emerging contexts such as telemedicine. Collectively, these indicators support the adequacy of the model and justify further interpretation of the structural relationships. Further, after the validity and reliability tests, the structural model analysis to test the hypotheses is conducted (See Table 5 and Figure 2).

Table 5. Hypothesis Result

Hypotheses	Path Coefficient	p-value	R ²	f ²	Results
H1a: Perceived Expectancy → Behavioral Intention	0.056	0.173	0.710	0.004	Supported
H1b: Perceived Expectancy → Actual Use	-0.014	0.437	0.710	0.000	Not Supported
H2a: Effort Expectancy → Behavioral Intention	0.172	0.019	0.710	0.030	Supported
H2b: Effort Expectancy → Actual Use	-0.203	0.024	0.710	0.021	Supported
H3a: Social Support → Behavioral Intention	-0.152	0.007	0.710	0.034	Supported
H3b: Social Support → Actual Use	0.338*	0	0.710	0.086	Supported
H4a: Facilitating Conditions → Behavioral Intention	0.256*	0.001	0.710	0.082	Supported
H4b: Facilitating Conditions → Actual Use	0.080	0.246	0.710	0.004	Not Supported
H5a: Self-Efficacy → Behavioral Intention	0.203	0.01	0.710	0.039	Supported
H5b: Self-Efficacy → Actual Use	0.046	0.364	0.710	0.001	Not Supported
H6a: Perceived Digital Risk → Behavioral Intention	-0.006	0.443	0.710	0.000	Not Supported
H6b: Perceived Digital Risk → Actual Use	-0.085	0.075	0.710	0.012	Not Supported
H7a: Economic Value → Behavioral Intention	0.371*	0	0.710	0.156	Supported
H7b: Economic Value → Actual Use	0.219*	0.018	0.710	0.025	Supported
H8: Behavioral Intention → Actual Use	0.277*	0.018	0.446	0.040	Supported

Based on Table 5, these results show that performance expectancy did not significantly predict either behavioral intention ($\beta = 0.056$, $p = 0.173$) or actual use ($\beta = -0.014$, $p = 0.437$), indicating that perceived expectancy alone is insufficient to drive adoption. In contrast, effort expectancy significantly influenced behavioral intention ($\beta = 0.172$, $p = 0.019$), highlighting the importance of ease of use in physicians' intention to adopt telemedicine. Interestingly, effort expectancy also showed a significant negative effect on actual use ($\beta = -0.203$, $p = 0.024$), which may reflect reliance on perceived simplicity rather than actual engagement (Walczak et al., 2022; Hawrysz et al., 2024; Yao et al., 2025). This paradox suggests that usability may enhance intention but not always translate into behavior without additional triggers (Karambut et al., 2019; Azam et al., 2023).

The analysis revealed mixed effects of social support, which negatively influenced behavioral intention ($\beta = -0.152, p = 0.007$) but positively and strongly affected actual use ($\beta = 0.338, p < 0.001$). This indicates that peer or institutional pressures may directly drive telemedicine adoption, bypassing intention. Facilitating conditions significantly predicted behavioral intention ($\beta = 0.256, p = 0.001$), underscoring the importance of technical and organizational support, although their direct impact on actual use was insignificant ($\beta = 0.080, p = 0.246$). Self-efficacy also strongly shaped behavioral intention ($\beta = 0.203, p = 0.010$), yet did not significantly affect actual use ($\beta = 0.046, p = 0.364$), highlighting the intention-behavior gap (Adler et al., 2025). Perceived digital risk showed no significant influence on either intention ($\beta = -0.006, p = 0.443$) or actual use ($\beta = -0.085, p = 0.075$). By contrast, economic value was the strongest determinant, influencing both intention ($\beta = 0.371, p < 0.001$) and actual use ($\beta = 0.219, p = 0.018$). Finally, behavioral intention significantly predicted actual use ($\beta = 0.277, p = 0.018$).

Subsequently, to explore how the years of telemedicine-related work experience (specifically in clinical experience) may influence adoption behavior, this research employed a Multi-Group Analysis (MGA) to test the moderating role of clinical experience in telemedicine practice (See Table 6). The moderation analysis revealed a significant interaction between years of clinical practice and the relationship between perceived digital risk and behavioral intention (Cimino et al., 2024; Tuyen & Nguyen, 2025).

Table 6. Hypothesis Results on Moderation Effects

Hypothesis	Years' Experience	Difference	p-value	Result
H9a: Self-efficacy → behavioral intention	<5 vs 5–10	-0.102	0.721	Not Supported
	<5 vs >10	0.114	0.259	Not Supported
	5–10 vs >10	0.216	0.094	Not Supported
H9b: Self-efficacy → actual use	<5 vs 5–10	0.189	0.278	Not Supported
	<5 vs >10	-0.072	0.634	Not Supported
	5–10 vs >10	-0.261	0.819	Not Supported
H10a: Perceived digital risk → behavioral intention	<5 vs 5–10	0.240	0.039	Supported
	<5 vs >10	0.051	0.299	Not Supported
	5–10 vs >10	-0.189	0.913	Not Supported
H10b: Perceived digital risk → actual use	<5 vs 5–10	-0.281	0.929	Not Supported
	<5 vs >10	-0.146	0.840	Not Supported
	5–10 vs >10	0.135	0.261	Not Supported
H11a: Economic value → behavioral intention	<5 vs 5–10	0.139	0.226	Not Supported
	<5 vs >10	-0.129	0.781	Not Supported
	5–10 vs >10	-0.268	0.948	Not Supported
H11b: Economic value → actual use	<5 vs 5–10	-0.061	0.584	Not Supported
	<5 vs >10	-0.285	0.892	Not Supported
	5–10 vs >10	-0.224	0.794	Not Supported

Table 6 shows that among all tested moderation pathways, only one relationship demonstrated a statistically significant difference: the effect of perceived digital risk on behavioral intention was significantly different between physicians with less than five years of experience and those with 5–10 years ($p = 0.039$). Specifically, for the 5–10-year group, perceived digital risk had a moderate negative effect on behavioral intention ($\beta = -0.222$), whereas for physicians with under five years of experience, the relationship was nearly neutral ($\beta = 0.018$). This finding suggests that early-mid career physicians are more sensitive to perceived digital risk, which in turn weakens their intention to adopt telemedicine technologies (Alpert, 2024). It can be inferred that as physicians gain more autonomy and responsibility, typically around the 5–10 years mark, they become more cautious about potential risks such as legal ambiguity, data breaches, and diagnostic reliability in virtual care.

The results show that no significant moderation effects were found across pathways, including those involving economic value and self-efficacy, meaning only H10a was supported. Group comparisons (<5 years vs. >10 years and 5–10 years vs. >10 years) also

revealed no significant differences, except in the perceived risk–intention pathway. This suggests that sensitivity to digital risk peaks at a transitional stage rather than increasing linearly with experience (Dalwai et al., 2023). Physicians with 5–10 years’ experience appear more risk-averse, reflecting growing clinical independence but limited confidence in legal and technological complexities (Dubey & Sahu, 2022).

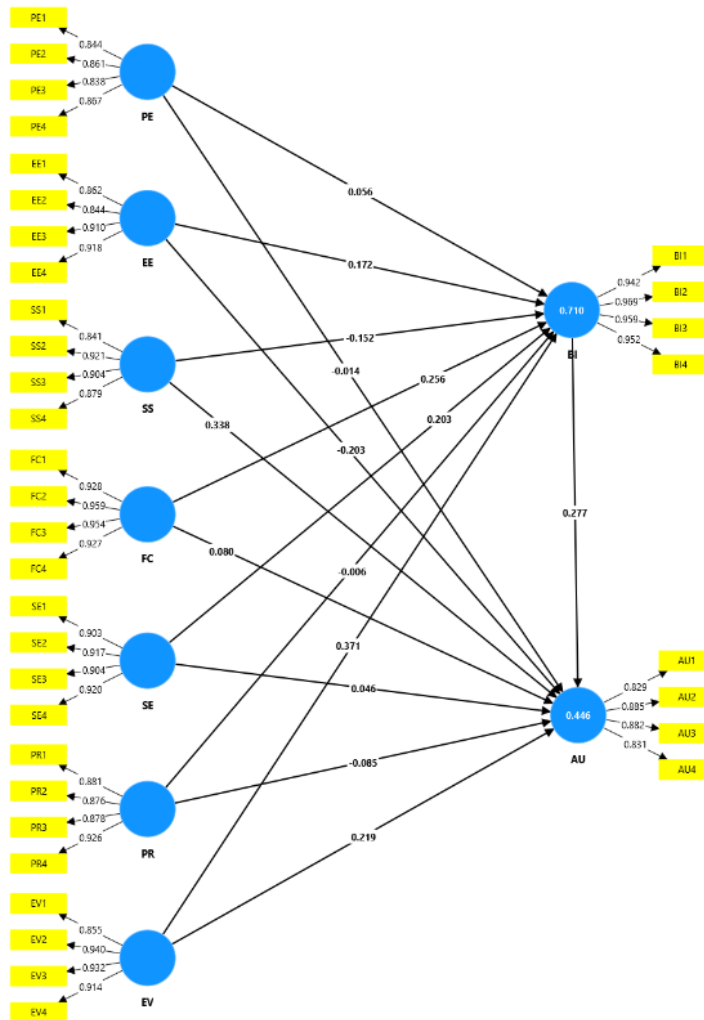


Figure 2. Structural Model

Based on Figure 2, these results suggest that telemedicine adoption is more strongly shaped by contextual and psychological concerns at certain stages of professional development rather than by experience alone (Tuyen & Nguyen, 2025). The absence of significant differences in most pathways implies that the foundational drivers of telemedicine use are broadly accepted among physicians regardless of tenure. However, addressing stage-specific barriers, especially for mid-career professionals, may be key to ensuring more equitable and widespread integration of digital health technologies across Indonesia’s medical workforce (Alpert, 2024).

DISCUSSION

The findings of this study provide important insights into the behavioral dynamics of physicians adopting telemedicine. Economic value emerged as the strongest driver, significantly influencing both behavioral intentions and actual use. These results reinforce the notion that physicians primarily adopt digital platforms when they perceive increased efficiency and clear financial benefits. This aligns with research by Wang et al. (2024) and Raza et al. (2025), which showed that cost-effectiveness and service efficiency are

determinants in the adoption of digital healthcare services. Conversely, self-efficacy positively shaped behavioral intentions but did not significantly influence actual use. This suggests that confidence in using digital systems does not always result in consistent practice. This confirms the persistent gap between intentions and actions noted in studies by Stoumpos et al. (2023) and Adler et al. (2025).

Social support exhibited a paradoxical pattern: it negatively influenced intentions but strongly encouraged actual use. This suggests that normative or institutional pressures can override intentions and directly drive behavior, a dynamic also highlighted by Wu et al. (2024) in the context of peer-driven digital engagement. Similarly, facilitating conditions significantly increased intention but not actual use, consistent with Alsahli et al. (2024), who emphasized that training and technical support build willingness but require stronger structural integration to sustain use. Perceived and perceived digital risks did not show significant effects on intention or actual use, suggesting that physicians may underestimate concerns about data security or medicolegal risks, unlike findings in previous studies where such risks acted as barriers (Owusu Kwateng et al., 2023; Azam et al., 2023).

Regarding moderation, only H10a was supported, indicating that experience influences the relationship between perceived risk and intention, particularly among physicians with 5–10 years of practice. This group demonstrated higher risk sensitivity compared to both junior and senior colleagues, echoing Dubey and Sahu's (2022) observation that mid-career professionals often face transitional uncertainty. However, no other moderating effects were found, in contrast to studies that consistently found that experience moderates digital adoption (Li et al., 2024; Michalaki et al., 2024).

This research provides an integrative model to explain telemedicine adoption among physicians in Indonesia by combining UTAUT, TAM, IRT, and Social Cognitive Theory. The findings indicate that behavioural intention is significantly influenced by effort expectancy, social support, facilitating conditions, self-efficacy, and, most notably, economic value. These results underscore the importance of both technological and institutional enablers in encouraging physicians to engage with digital health platforms.

Actual use is driven by behavioural intention, social support, economic value, and effort expectancy, highlighting the crucial role of intention–behaviour translation mechanisms. Interestingly, perceived digital risk, performance expectancy, and facilitating conditions did not significantly predict actual usage, suggesting a gap between perceived readiness and behavioural execution. Moreover, multi-group analysis shows that physicians with 5–10 years of experience exhibit a heightened sensitivity to digital risk, which negatively moderates their intention to use telemedicine.

Theoretically, this study extends technology acceptance frameworks by incorporating economic value as a key driver and perceived digital risk as a psychological barrier in emerging healthcare systems. It also highlights how clinical experience moderates' adoption, moving beyond age or digital literacy as the main segmentation variables. Practically, the findings emphasize the need for endorsement from senior physicians, structured peer mentoring, and clear communication of economic benefits to promote sustainable telemedicine adoption.

CONCLUSION

This study highlights that telemedicine adoption among physicians in Indonesia is influenced by a combination of behavioral and contextual factors. Economic value was found to be the strongest determinant of behavioral intention, underscoring the role of efficiency and cost-effectiveness in shaping physicians' willingness to adopt. In contrast, social support directly drove actual use, revealing that peer influence and institutional pressures can bypass intention and encourage real-world practice. Together, these findings confirm the presence of the intention-behavior gap in digital health adoption. From a practical perspective, the results suggest that policymakers and healthcare institutions should design strategies that emphasize both economic incentives and peer-

based mentoring to strengthen adoption. For developers, improving usability and ensuring seamless workflow integration can enhance sustained use.

This study contributes by demonstrating the differentiated roles of economic value and social support in predicting intention versus actual behavior, offering refinements to classical models such as the technology acceptance model and the unified theory of acceptance and use of technology. Despite these contributions, the study has limitations. Data were collected cross-sectionally, which limits causal interpretation, and the focus on Indonesian physicians limits broader generalizability. Future research should employ longitudinal or experimental designs to capture behavioral dynamics over time and conduct comparative studies across medical specialties and healthcare systems. Incorporating emerging technologies into adoption models would further enrich the understanding of sustainable digital health implementation.

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