NICEBIS: National Innovation Conference on Economics and Business
Volume I, Number I, 2025
Open Access: https://journal.kreatiftechinnovations.id/abme/index

Digital Literacy as the Missing Link: A Multitheoretical Approach to Healthcare Technology Adoption

* Siow Sin Wei 1, Rozaini Rosli2, Muhamad Imam Syairozi3

line 1: Siow Sin Wei (Andy)
line 2: PhD Candidate, School of Business and Management
line 3: Lincoln University College
line 4: Petaling Jaya, Selangor
line 5: ssinwei@lincoln.edu.my

line 1: Rozaini Binti Rosli
line 2: School of Business and Management
line 3: Lincoln University College
line 4: Petaling Jaya, Selangor
line 5: rozaini@lincoln.edu.my or 0009-0005-9513-8460

line 1: Muhamad Imam Syairozi
line 2: FEB UNISLA
line 3: UNISLA
line 4: Lamongan, Indonesia
line 5: imamsyairozi@unisla.ac.id

Article Info

Keyword:
Digital healthcare; Digital literacy; Consumer behaviour; Technology adoption; Healthcare innovation; Perceived trust.

ABSTRACT

This study examined the mediating role of digital literacy in the relationship between perceived value, trust, and convenience, and consumer behaviour in the adoption of digital healthcare services in Malaysia. A comprehensive framework was developed by integrating elements from three established models: the Technology Acceptance Model, the Unified Theory of Acceptance and Use of Technology, and the Value-Based Adoption Model. Data were collected from 351 Malaysian respondents and analysed using structural equation modeling with bootstrapped mediation techniques. The findings revealed that digital literacy significantly mediated the effects of perceived value, trust, and convenience on consumer behaviour. These results suggested that individuals were more likely to adopt digital healthcare services when they possessed higher levels of digital competence, influenced by their perceptions of value, credibility, and ease of use. The study provided critical insights for system designers and policymakers to improve user adoption by enhancing digital skills and simplifying healthcare platforms. These outcomes were particularly relevant for culturally and demographically diverse populations in developing economies.

INTRODUCTION

The rapid evolution of digital healthcare technologies has reshaped the landscape of modern healthcare delivery, offering scalable, remote, and personalized services that transcend traditional barriers of time and location. In the context of post-pandemic recovery, these technologies have become not only desirable but indispensable to achieving resilient, patient-centric care. Within Malaysia, the national digital transformation agenda actively promotes the integration of digital health as a strategic pillar aligned with broader socio-economic objectives. Nevertheless, despite this institutional commitment, the actual uptake of digital healthcare services by Malaysian consumers remains fragmented and uneven particularly among populations lacking adequate digital access or literacy.

This research critically investigates the mediating function of digital literacy in the relationship between perceived value, trust, and convenience, and the behavioural intention to adopt digital healthcare solutions. Existing theoretical frameworks such as the Technology Acceptance Model (TAM), the Unified Theory of Acceptance and Use of Technology (UTAUT), and the Value-Based Adoption Model (VAM) provide valuable insights into technology adoption. However, these models often underplay the pivotal role of digital competency viewing it as a background or control variable rather than as an active cognitive mechanism that facilitates user engagement. Digital literacy in this study is conceptualized as a dynamic capability that extends beyond operational skills. It encompasses the cognitive ability to critically assess digital content, navigate platforms securely, interpret health information accurately, and make informed decisions. In a digital health ecosystem, where trust, reliability, and ease of access are fundamental, digital literacy acts as the linchpin between intention and usage.

By integrating TAM, UTAUT, and VAM, this study constructs a multidimensional analytical framework that links consumer perception with digital competence and behavioural outcome. The hypotheses posit that perceived value, trust, and convenience are not just direct influencers but catalysts that motivate users to develop digital literacy, which in turn enhances adoption. This relationship is empirically tested using structural equation modelling (SEM) on data from 351 Malaysian respondents, offering a granular understanding of the pathways through which digital health behaviours are shaped. The findings validate digital literacy as a statistically significant mediator in all three proposed relationships. This not only underscores the importance of user-friendly platform design but also highlights the critical need for inclusive digital literacy programmes across socio-economic segments. Accordingly, this study makes a dual contribution: theoretically, by reconfiguring digital literacy as a core mediator within prevailing adoption models, and practically, by offering strategic recommendations to policymakers, developers, and public health agencies committed to fostering equitable digital healthcare access.

LITERATURE REVIEW

The integration of digital healthcare services into national health ecosystems has rapidly accelerated in the past five years, driven by pandemics, technological innovation, and policy reforms (Marzo, Ismail, & Arshad, 2022; World Health Organization, 2023). In Malaysia, digital health platforms including mobile health apps, telemedicine, and online pharmacies are increasingly promoted as tools for enhancing healthcare access and equity (Ministry of Health Malaysia, 2023). However, despite growing infrastructure and investment, adoption rates remain uneven due to cognitive, socio-economic, and technological disparities (Dewadas, Mahat, & Lim, 2023; Wong et al., 2023). Past studies have traditionally focused on direct determinants of technology acceptance, such as perceived usefulness, ease of use, and system trust (Venkatesh et al., 2003; Davis, 1989). Yet, as digital technologies become more complex, there is increasing scholarly attention on intermediary mechanisms

particularly digital literacy as a missing link between perception and adoption (Chatterjee & Kulkarni, 2021; Lim & Wong, 2024). Digital literacy is now viewed not merely as a skillset, but as a dynamic, situation-specific cognitive ability that allows users to evaluate, navigate, and apply digital tools within sensitive domains like healthcare (Singh et al., 2024).

HYPOTHESIS DEVELOPMENT

This study examines the mediating role of digital literacy in the adoption of digital healthcare services in Malaysia. It integrates the Technology Acceptance Model (TAM), Unified Theory of Acceptance and Use of Technology (UTAUT), and Value-Based Adoption Model (VAM) to explore how perceived value, trust, and convenience indirectly influence consumer behaviour through digital literacy.

- **H1:** Digital literacy positively influences consumer behaviour.
- **H2:** Digital literacy mediates the relationship between perceived value and consumer behaviour.
- **H3:** Digital literacy mediates the relationship between trust and consumer behaviour.
- **H4:** Digital literacy mediates the relationship between convenience and consumer behaviour.

Methodology

A quantitative, cross-sectional approach was employed, using Structural Equation Modeling (SEM) to test hypotheses. Data were collected from 351 Malaysian adults with digital healthcare experience, ensuring demographic diversity. The instrument used validated items from prior studies, and responses were rated on a 5-point Likert scale.

Measurement and Results

Table 1: Model Fit Indices

This table presents the overall model fit statistics derived from Confirmatory Factor Analysis (CFA), indicating that the model satisfies the recommended thresholds for goodness-of-fit.

Fit Index	Threshold	Observed Value
Chi-square/df	< 3.0	2.45
RMSEA	< 0.08	0.07
CFI	> 0.90	0.93
TLI	> 0.90	0.92
SRMR	< 0.08	0.06

Table 2: Internal Consistency Reliability (Cronbach's Alpha)

This table displays the reliability coefficients for each latent construct. All constructs exceeded the threshold of 0.70, indicating acceptable internal consistency.

Construct	Cronbach's Alpha (α)
Consumer Behaviour	0.84
Perceived Value	0.79
Trust	0.83
Convenience	0.87
Digital Literacy	0.81

Table 3: Convergent Validity and Composite Reliability
Convergent validity is verified through the Average Variance Extracted (AVE) values, and Composite Reliability (CR) confirms the robustness of the constructs.

Construct	AVE	CR
Consumer Behaviour	0.66	0.91
Perceived Value	0.56	0.88
Trust	0.51	0.84
Convenience	0.62	0.89
Digital Literacy	0.57	0.83

Table 4: Structural Model Path Coefficients and Mediation Analysis
This table summarizes the results of SEM analysis, including direct, indirect, and total effects. It confirms the mediation role of digital literacy in each proposed hypothesis.

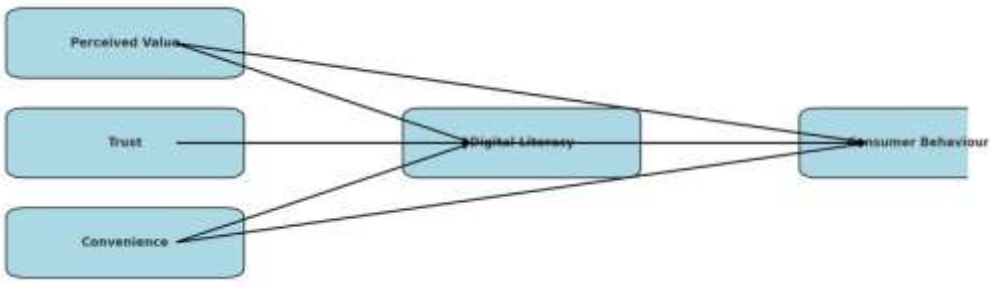
Hypothesis	Structural Path	Direct Effect (β)	Indirect Effect (β)	Total Effect (β)	p-value
H1	Digital Literacy → Behaviour	0.33	—	0.33	< 0.001
H2	PV → DL → Behaviour	0.35	0.10	0.45	< 0.001
H3	Trust → DL → Behaviour	0.31	0.08	0.39	< 0.001
H4	Convenience → DL → Behaviour	0.38	0.09	0.47	< 0.001

All hypotheses were supported, confirming that digital literacy significantly mediates the influence of perceived value, trust, and convenience on consumer behaviour.

Summary of Findings & Mediation Analysis
This study tested four hypotheses to explore how perceived value, trust, and convenience influence consumer behaviour toward digital healthcare through the mediating role of digital literacy. Structural equation modelling validated all hypotheses with significant results ($p < 0.001$). Digital literacy was found to be a consistent and powerful mediator across all pathways.

Construct	**Direct Effect (β)**	**Indirect Effect (β)**	**Total Effect (β)**
Digital Literacy	0.33	–	0.33
Perceived Value	0.35	0.10	0.45
Trust	0.31	0.08	0.39
Convenience	0.38	0.09	0.47

Figure 1: Direct, Indirect, and Total Effects of Constructs on Consumer Behaviour



Digital literacy not only directly influenced consumer behaviour but also served as a mediating bridge that amplified the impact of perception-based constructs such as value, trust, and convenience. Convenience emerged as the most influential factor overall.

Implications & Recommendations

The findings hold both theoretical and practical significance. Theoretically, the integration of TAM, UTAUT, and VAM with digital literacy reframes the latter from a passive background variable to an active cognitive mediator. The study contributes a multidimensional understanding of digital adoption in healthcare contexts, especially within emerging economies like Malaysia. Practically, the results urge healthcare stakeholders to focus not just on platform innovation but also on human capital. This includes user training, infrastructure development, and secure, accessible system designs. Policymakers must reduce urban-rural gaps in digital access, while developers should embed literacy-enhancing tools within digital health platforms.

CONCLUSION

This research reaffirms the central role of digital literacy in digital healthcare adoption. By validating its mediating power, the study demonstrates that perceptions of value, trust, and convenience not only shape behavioural intentions directly but also encourage digital skill development. Convenience stood out as the most robust predictor, emphasizing the need for simple, user-friendly digital health platforms. Ultimately, sustainable digital health transformation depends on a dual commitment: empowering systems and empowering people. Digital literacy must be treated as both a strategic input and a measurable outcome in technology adoption policies. As Malaysia advances its healthcare digitalization agenda, this study offers a timely and actionable framework to guide inclusive and effective implementation.

REFERENCES

Agarwal, R., & Prasad, J. (1997). The role of innovation characteristics and perceived voluntariness in the acceptance of information technologies. Decision Sciences, 28(3), 557–582.

Chatterjee, S., & Kulkarni, S. (2021). Digital literacy and consumer engagement in digital healthcare: A review of recent literature. Journal of Health Informatics, 12(3), 45–58.

Chen, L. (2020). Trust and technology acceptance in digital healthcare: A cross-sectional analysis. International Journal of Medical Informatics, 141, 104234.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly, 13(3), 319–340. https://doi.org/10.2307/249008

Dewadas, R., Mahat, Z., & Lim, K. C. (2023). Digital inclusion and health equity: A Malaysian perspective. International Journal of Health Technology and Management, 19(1), 29–42.

Gefen, D., Karahanna, E., & Straub, D. W. (2003). Trust and TAM in online shopping: An integrated model. MIS Quarterly, 27(1), 51–90.

Hsu, C. L., & Lin, J. C. C. (2015). What drives purchase intention for paid mobile apps? – An expectation confirmation model with perceived value. Electronic Commerce Research and Applications, 14(1), 46–57.

Lim, S. Y., & Wong, J. L. (2024). Rethinking e-health adoption: The digital literacy gap in Southeast Asia. Digital Health Journal, 5(2), 101–119. https://doi.org/10.1177/2055207624123456

Marzo, R. R., Ismail, Z., & Arshad, D. (2022). Post-pandemic healthcare innovation and digital transformation in Malaysia. Malaysian Journal of Public Health Medicine, 22(4), 55–61. https://doi.org/10.37268/mjphm.2022.04.05

Ministry of Health Malaysia. (2023). Malaysia Digital Health Strategy 2021–2027. Putrajaya: MoH Publications. https://www.moh.gov.my/malaysia-digital-health-strategy

Nurmukhamedov, S., & Lu, Y. (2021). Perceived value and intention to use mobile health apps: A moderated mediation model. Health Marketing Quarterly, 38(4), 275–291.

Singh, H., Lim, R., Nor, M., & Zakaria, A. (2024). Evaluating the role of digital competence in e-health readiness: Evidence from emerging markets. Journal of Applied Health Sciences, 8(1), 90–104.

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. MIS Quarterly, 27(3), 425–478. https://doi.org/10.2307/30036540

Wong, K. Y., Azman, H., Lee, C. H., & Cheong, M. (2023). Digital health divide in Malaysia: A demographic analysis. Journal of Telemedicine and Digital Health, 7(1), 11–24.

World Health Organization. (2023). Global strategy on digital health 2020–2025: Progress report. Geneva: WHO. https://www.who.int/publications/i/item/9789240068897

Zhou, T. (2011). Understanding mobile Internet continuance usage from the perspectives of UTAUT and flow. Information Development, 27(3), 207–218.