

Digital Competence, Organizational Support, and Proxy Compliance in Electronic Medical Record Use: An Explanatory Sequential Mixed-Methods Study

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Abstract:

Electronic Medical Record (EMR) implementation depends not only on organizational readiness but also on healthcare workers' digital competence and their everyday experience of using the system. This study examined digital competence, perceived organizational support, and lived experiences of EMR implementation among healthcare workers at an Indonesian private hospital using an explanatory sequential mixed-methods design. Phase 1 involved a cross-sectional survey of 76 of 109 eligible healthcare workers using a DigComp 2.2-adapted questionnaire, with data analyzed descriptively in IBM SPSS Statistics 31. Phase 2 involved semi-structured interviews, non-participant observations, and document review with 19 purposively selected participants across clinical, support, and management/IT groups, followed by a six-phase thematic analysis. Overall, 85.5% of respondents demonstrated high digital competence, although competence was lower among workers aged over 45 years, non-clinical health workers, and those reporting lower organizational support. Qualitative analysis identified four themes: reactive implementation and training gaps; technical infrastructure instability and downstream effects; field-level compromise and interprofessional role shifts; and prolonged hybrid transition with profession-specific motivation. A cross-cutting finding, termed proxy compliance, revealed that EMR documentation was sometimes entered by individuals other than the registered account holder with managerial tolerance. These findings indicate that apparent EMR compliance may not reflect genuine individual competence or technology acceptance. Sustainable EMR implementation requires targeted competency development, reliable infrastructure, accessible procedural guidance, and governance mechanisms that verify authentic system use and accountability.

Article info:

Submitted:
11-08-2026
Revised:
18-09-2026
Accepted:
21-09-2026
Published:
02-10-2026

Keywords:

digital competence, electronic health records, healthcare workforce, organizational support, technology adoption

DOI: <https://doi.org/10.53713/htechj.v4i5.832>

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INTRODUCTION

Electronic Medical Records (EMRs) have become a central component of contemporary health-system digitalization because their effective implementation can improve information continuity, clinical coordination, documentation quality, and patient safety. Healthcare organizations increasingly depend on digital records to support communication across professional groups and to ensure that clinical information is available at the point of care (Elkefi et al., 2023). Evidence from

different healthcare settings nevertheless shows that the availability of technology alone does not guarantee effective use, as implementation depends on the readiness and capability of the workforce expected to interact with the system. Digital competence has therefore become an important determinant of whether healthcare professionals can use EMRs accurately, efficiently, and consistently in routine practice. Recent evidence underscores that digital readiness and capability remain critical prerequisites for successful digital health implementation, particularly when healthcare workers must adapt rapidly to evolving technological environments (Borges do Nascimento et al., 2023; Alotaibi et al., 2025). An umbrella review of systematic reviews similarly found that digital technologies influence healthcare workers' competencies, clinical practice, performance, and workplace processes, reinforcing the importance of workforce capability during digital transformation.

The Indonesian healthcare context makes this issue particularly important because hospitals are increasingly required to implement EMRs under regulatory pressure rather than through a gradual and entirely voluntary process of technological adoption. Hospitals consequently face the simultaneous challenges of meeting institutional requirements, maintaining clinical services, developing adequate digital infrastructure, and preparing healthcare workers with different professional backgrounds and levels of technological experience. Recent national evidence demonstrates substantial heterogeneity in EMR readiness and digital maturity across Indonesian hospitals, including differences in infrastructure, human capital, interoperability, governance, and competence (Amiruddin et al., 2026). Rapid implementation can create an implicit assumption that staff members already possess the competencies required to operate newly introduced systems. Such an assumption may obscure differences in age, professional role, work experience, exposure to computers, and organizational support that influence actual system use, with Indonesian evidence demonstrating significant variations in informatics competence according to age, education, professional position, and work experience (Hariyati et al., 2024). A hospital may therefore appear institutionally ready for EMR implementation while important gaps remain at the individual-user level.

Existing research on EMR adoption has predominantly examined organizational and behavioral readiness through frameworks addressing infrastructure, leadership, organizational resources, perceived usefulness, facilitating conditions, and technology–organization fit. Approaches such as the Doctor's Office Quality–Information Technology framework, Technology Acceptance Model (TAM), Unified Theory of Acceptance and Use of Technology (UTAUT), and Human–Organization–Technology fit (HOT-fit) model have contributed substantially to understanding why healthcare organizations and professionals accept or resist health-information technologies. Contemporary EHR research confirms the relevance of UTAUT constructs such as performance expectancy, facilitating conditions, and organizational support for sustained system use. At the same time, TAM-based studies continue to demonstrate relationships among perceived usefulness, ease of use, trust, actual EHR use, and professional performance (Alsyounf et al., 2024; Al-Momani et al., 2024). These perspectives are valuable because both organizational capacity and individual perceptions of technology influence EMR implementation. Their application may nonetheless provide an incomplete explanation when the basic digital competence required to perform EMR-related tasks has not been established first.

Digital competence is a related but conceptually distinct dimension of EMR implementation, as acceptance of a technology does not necessarily demonstrate the capability to use it effectively. Research specifically examining digital competencies among healthcare professionals remains less developed than the broader literature on technology acceptance and organizational readiness. Available reviews indicate considerable variation in how digital competence is conceptualized and measured across healthcare settings, with no universally accepted instrument for assessing the

construct in clinical populations (Longhini et al., 2022; Mainz et al., 2024). Recent systematic evidence further identifies education, professional experience, digital infrastructure, technological competence, and age as determinants of healthcare professionals' digital health literacy, emphasizing that competence cannot be inferred simply from exposure to technology (Özatkan & Tekin, 2026). This measurement heterogeneity complicates comparisons across studies and makes it difficult to determine whether implementation difficulties reflect limited technological acceptance, inadequate organizational conditions, insufficient digital skills, or an interaction among these factors. Assessing acceptance without establishing baseline competence may therefore misattribute problems to the technology or organization when part of the difficulty originates from users' capabilities.

A further research gap concerns the limited integration of quantitative assessments of digital competence with qualitative evidence describing how healthcare workers actually experience EMR implementation in everyday clinical and administrative practice. Cross-sectional surveys can identify which groups demonstrate comparatively lower competence or perceive weaker organizational support, yet numerical patterns alone cannot adequately explain how those disparities are produced, negotiated, or compensated for during routine work (Molloy-Paolillo et al., 2023; Mensah et al., 2024). Qualitative inquiry can reveal implementation processes that remain invisible in questionnaire data, including informal workarounds, interprofessional redistribution of tasks, training deficiencies, infrastructure-related disruptions, and differences in professional motivation (Robertson et al., 2024). Integrating these forms of evidence is therefore necessary to move beyond identifying competence gaps to understanding the organizational and experiential mechanisms that underlie them. Mixed-methods EHR research has specifically shown that quantitative usage indicators and qualitative accounts can yield different pictures of implementation, making integration valuable for explaining actual user experience.

The novelty of this study lies in examining digital competence and lived EMR experience sequentially while treating established technology-adoption frameworks as sensitizing perspectives rather than if recorded technology use necessarily reflects genuine individual acceptance or capability. The explanatory sequential design allows quantitative patterns in digital competence and perceived organizational support to guide subsequent phenomenological exploration across clinical, support, and management/IT stakeholder groups. This approach is particularly relevant in a setting where implementation has progressed under substantial regulatory pressure and where formal indicators of system use may not fully represent how documentation is performed in practice (Molloy-Paolillo et al., 2023; Robertson et al., 2024). Evidence that healthcare professionals develop workarounds in response to system limitations, situational constraints, and routine work requirements further supports the need to distinguish recorded system use from the processes through which that use is achieved (Tazkarji et al., 2024). The study consequently provides an opportunity to identify discrepancies between apparent EMR compliance and the everyday processes by which healthcare workers achieve it.

This study aimed to assess healthcare workers' digital competence and their perceived organizational support for EMR use, and to explain the quantitative patterns by exploring participants lived experiences of implementation. Attention was given to demographic and professional groups with comparatively lower competence, as well as to the organizational, technical, and interpersonal conditions that shape their use of EMRs. The study is urgent because hospitals undergoing rapid digital transformation require evidence that distinguishes formal implementation from effective and sustainable use. Contemporary implementation research shows that successful digital-health adoption depends on the alignment of workforce characteristics, workflow demands, training, technical support, organizational arrangements, and implementation context (Barnes et al., 2022;

Weik et al., 2024). Evidence from real-world digital record implementation also emphasizes the importance of interoperability, provider training, and sustained organizational support for maintaining adoption beyond initial deployment (Davis et al., 2024). A clearer understanding of how competence, organizational support, infrastructure, professional roles, and workplace adaptations interact may help hospitals design more targeted training, improve implementation governance, and ensure that EMR compliance reflects meaningful digital capability rather than administrative completion alone.

METHOD

Design

This study employed an explanatory sequential mixed-methods design, comprising a cross-sectional quantitative survey followed by a descriptive phenomenological inquiry. Phase 1 assessed healthcare workers' digital competence and perceived organizational support related to Electronic Medical Record (EMR) use, with the findings informing participant selection and the focus of Phase 2. The qualitative phase explored experiences underlying the quantitative patterns. It used the Technology Acceptance Model (TAM), Unified Theory of Acceptance and Use of Technology (UTAUT), Human–Organization–Technology fit (HOT-fit), and Diffusion of Innovations (DOI) as sensitizing frameworks for interview development and interpretation rather than as models for statistical testing.

Setting and Time

The study was conducted at Hospital Y, a private type-C hospital in Indonesia that received paripurna accreditation from the Indonesian Hospital Accreditation Commission in 2022. Data collection was conducted sequentially. The quantitative survey was undertaken in January 2026. The qualitative phase was conducted between May and July 2026, allowing findings from the quantitative phase to inform participant selection and the focus of subsequent qualitative exploration.

Population, Sample, and Sampling

Quantitative Phase

Phase 1 included all 109 healthcare workers at Hospital Y who had been employed for at least three months and routinely used the EMR system. A total-population approach was applied, with 76 participants completing the survey, yielding a 69.7% response rate across professional groups involved in EMR use.

Qualitative Phase

Phase 2 included 19 participants recruited through purposive and snowball sampling to represent three EMR stakeholder groups: clinical users ($n = 8$; physicians, nurses, and midwives), support staff ($n = 6$; health-information personnel, radiographers, admission staff, and pharmacists), and management/IT personnel ($n = 5$). Participant selection was informed by patterns identified in Phase 1. Sampling continued until thematic saturation was reached; core themes emerged by the sixth interview, with additional clinical participants recruited to confirm the stability and adequacy of the thematic structure.

Instrument and Measurement Properties

Quantitative Instrument

Quantitative data were collected using a self-administered questionnaire comprising demographic characteristics, five items on perceived organizational support, and eight digital competence items adapted from the DigComp 2.2 framework. The 13 items were rated on a four-

point forced-choice scale to minimize central-tendency bias. All items met the validity criteria ($r = 0.419\text{--}0.796$, $p < 0.05$), with satisfactory internal consistency (Cronbach's $\alpha = 0.832$). Digital competence scores were classified as low, moderate, or high for descriptive and subgroup analyses.

Qualitative Data Collection Instruments

Qualitative data were collected through semi-structured interviews informed by the quantitative findings and guided by TAM, UTAUT, HOT-fit, and DOI as sensitizing frameworks rather than predetermined coding structures. Structured observations at EMR workstations and organizational document review were used to triangulate interview findings and compare participants' accounts with observed practices and institutional evidence.

Data Collection Procedure

Quantitative data were collected in January 2026 using a self-administered questionnaire distributed to all 109 eligible healthcare workers, with 76 completed responses. Preliminary analyses identified patterns in digital competence across demographic, professional, and organizational-support subgroups, which informed the subsequent qualitative phase. Qualitative data were collected between May and July 2026 through semi-structured interviews with 19 participants from clinical, support, and management/IT groups, lasting 11–59 minutes. Non-participant observations at EMR workstations and organizational document review provided additional contextual evidence. Recruitment and data collection proceeded iteratively until thematic saturation was achieved. Interview, observational, and documentary data were triangulated, with AI-assisted transcription followed by manual coding and thematic interpretation by the researchers.

Data Analysis

Quantitative Analysis

Quantitative data were analyzed using IBM SPSS Statistics version 31. Descriptive statistics summarized participant characteristics, perceived organizational support, and digital competence. Digital competence was categorized as low, moderate, or high, with cross-tabulations used to examine subgroup patterns by demographic characteristics, profession, tenure, and organizational support. Analyses were descriptive and exploratory, with no causal inference intended.

Qualitative Analysis

Qualitative data were analyzed using a six-phase thematic analysis, encompassing data familiarization, coding, theme development, review, refinement, and interpretation. Initial coding was conducted within each stakeholder group before integration into cross-cutting themes to preserve role-specific perspectives. TAM, UTAUT, HOT-fit, and DOI were applied as sensitizing frameworks rather than predetermined coding structures. Trustworthiness was strengthened through triangulation of interviews, observations, and document review, supported by an audit trail, reflexive journaling, and verbatim quotations.

Mixed-Methods Integration

Mixed-methods integration occurred through the sequential design's connecting and explanatory functions. Quantitative findings identified demographic, professional, and organizational patterns in digital competence and informed the focus and participant composition of Phase 2. Qualitative findings then explained how organizational, technical, professional, and contextual factors shaped these patterns, allowing integrated interpretation of digital competence alongside participants' lived experiences of EMR implementation.

Ethical Declaration

Ethical approval for both study phases was granted by the Health Research Ethics Committee, Faculty of Health Sciences, Universitas Muhammadiyah Surabaya (quantitative phase: 175/KEPK/F/XII/FIK/2025; qualitative phase: 085/KEPK/F/IV/FIK/2026). All participants provided informed consent prior to participation, and all procedures were conducted in accordance with the approved protocols and the principles of voluntary participation.

RESULT

Phase 1: Digital Competence and Its Determinants

Among the 76 respondents, nurses constituted the largest professional group (34.2%), followed by other health workers (21.1%), physicians (18.4%), midwives (13.2%), and administrative staff (13.2%). Most participants were female (92.1%), aged 25–35 years (42.1%), and had more than three years of employment at the hospital (75.0%). Educational attainment was predominantly at the bachelor's level (48.7%), followed by diploma (32.9%) and postgraduate qualifications (14.5%). Self-reported computer experience was most classified as intermediate (68.4%).

Overall, digital competence was high: 85.5% of respondents were classified as high, 13.2% as moderate, and 1.3% as low. Account-security awareness received the highest mean score (3.28/4), whereas access to user guides (2.61/4) and clarity of EMR training (2.82/4) received the lowest scores. Perceived organizational support showed a comparable pattern: 92.1% of respondents agreed or strongly agreed that computers were readily available, 88.2% reported responsive IT support, and only 55.3% considered user guides readily accessible.

Subgroup analysis revealed marked differences in the proportion of respondents with high digital competence. The proportion declined from 100.0% among staff younger than 25 years to 63.2% among those older than 45 years. High competence was also less frequent among other health workers (50.0%) than among nurses (96.2%) and physicians (92.9%). A similar gradient was observed for perceived organizational support, ranging from 66.7% among respondents reporting low support to 100.0% among those reporting high support. These descriptive patterns across age, professional group, and organizational support informed the focus of the subsequent qualitative phase.

Table 1. Proportion of Respondents with High Digital Competence, by subgroup (N = 76)

Subgroup	Category	% High Competence
Age	< 25 years	100.0
	25–35 years	93.8
	36–45 years	90.0
	> 45 years	63.2
Profession	Physician	92.9
	Nurse	96.2
	Midwife	90.0
	Other health workers	50.0
	Administrative staff	81.3
Tenure	< 1 year	100.0
	1–3 years	93.3
	> 3 years	82.5
Organizational support	Low	66.7
	Moderate	81.1
	High	100.0

Phase 2: Lived Experience of EMR Implementation

The 19 phenomenological participants ranged from their early twenties to over fifty and were mostly female, consistent with the hospital's workforce: eight were clinical users (physicians, nurses, midwives), six were support staff (health-information staff, radiographers, admission staff, pharmacists), and five were management or IT staff. Thematic analysis produced four cross-cutting themes and one cross-cutting finding that sits outside all four theoretical frameworks.

Theme 1: Reactive implementation and training gap.

Modules rolled out piecemeal from 2022 to 2026, driven more by the sanction letter than by an internal plan. Clinical participants said they were handed a login and told to get on with it; one recalled staff were "just given a password and an email and told to get on with it" (Group A). Training covered software features, not the reasoning behind EMR. No written SOPs were found at any workstation during observation, even though shared password lists, taped up as an informal fix, were.

Theme 2: Technical infrastructure instability and downstream ripple effects.

Network drops, especially in older ward sections staff called the "clinic bunker," interrupted data entry and pushed the consequences downstream: a physician's delayed input became an incomplete nursing or pharmacy record, and support staff absorbed complaints for problems they had not caused. One participant described being "chased" over paperwork held up further upstream (Group B), a technical failure that became interpersonal friction between units that were not at fault.

Theme 3: Field-level compromise tactics and interprofessional role shift.

Staff coped by printing WhatsApp instructions as makeshift guides, keeping parallel Excel logs, and senior physicians delegating data entry to nurses or midwives during busy periods, a practice management tolerated rather than corrected. Clinical staff called this balancing act "typing on autopilot."

Theme 4: Prolonged hybrid transition and varied motivation.

Nearly four years in, paper and digital records still coexist in places. Motivation split along professional lines: physicians cited medicolegal protection; nurses and support staff cited efficiency; managers cited obligation, while an automated early-warning flag for incomplete records showed management building preventive controls rather than relying on appeals to compliance.

Across all four themes sat proxy compliance: EMR entries recorded under one clinician's account had, in several cases, actually been entered by someone else on their behalf, with management aware and unbothered. This is different from a workaround in procedure; it is a transfer of identity and accountability, and it means recorded compliance in the system is not always the same as the account holder's own technology acceptance, a distinction the Phase 1 competence data could not have revealed on its own.



Figure 1. Weighted Word Cloud of Key Concepts from the Phase 2 Thematic Analysis

DISCUSSION

The integration of the quantitative and qualitative findings indicates that EMR adoption at Hospital Y cannot be understood solely through individual digital competence or organizational readiness. Evidence from other health systems similarly indicates that EMR implementation reflects the interaction of workforce readiness, organizational capacity, and implementation conditions rather than a single technological or individual determinant (Yilma et al., 2023; Provenzano et al., 2024). Most healthcare workers demonstrated high digital competence, with 85.5% classified in the high category, yet substantial variation remained across age groups, professional categories, and levels of perceived organizational support. The qualitative findings provided an explanatory layer by showing that EMR use occurred within a context of reactive implementation, uneven training, infrastructure instability, hybrid paper–digital workflows, and informal redistribution of documentation responsibilities, challenges also reported in private hospital settings undergoing digital transition (Afriyie et al., 2026). These findings suggest that apparently successful EMR adoption may coexist with operational vulnerabilities that are not captured by competence scores or routine system-use indicators. The identification of proxy compliance is particularly important because it demonstrates that documented EMR activity may not always represent direct use by the account holder. The combined findings therefore support a broader interpretation of EMR implementation as an interaction between individual capability, organizational support, technical reliability, professional roles, regulatory pressure, and informal workplace adaptation.

The high overall level of digital competence observed in this study is consistent with the demographic profile of a workforce concentrated in productive age groups and characterized predominantly by intermediate computer experience. Previous research has similarly shown that younger healthcare professionals and those with greater exposure to computers tend to demonstrate stronger readiness for digital health technologies (Gelchu et al., 2025; Jarva et al., 2024). The present findings extend this evidence by showing that digital competence may be relatively strong even when implementation processes remain organizationally imperfect. Infrastructure-related support was generally rated positively, particularly computer availability and IT responsiveness, which is broadly consistent with earlier DOQ-IT assessments describing hospitals in Surabaya as highly prepared for digital implementation. Educational support remained comparatively weak, particularly regarding accessible user guidance and the clarity of EMR training. Evidence from a recent scoping review indicates that effective EHR training should account for computer literacy, role-specific needs, documentation expectations, opportunities for practice, and access to implementation support (Nguyen et al., 2024). The qualitative findings help explain this discrepancy by showing that training was introduced reactively and often followed system rollout rather than preceding it. Digital readiness should therefore not be interpreted as evidence that healthcare workers no longer require systematic training, particularly when system changes involve new responsibilities, documentation standards, and medicolegal accountability.

The age-related gradient in digital competence highlights the continuing importance of workforce heterogeneity in EMR implementation. High digital competence declined from 100.0% among workers younger than 25 years to 63.2% among those older than 45 years, consistent with evidence of age-related variation in healthcare professionals' engagement with digital solutions and competence development (Jarva et al., 2024; Erfani et al., 2025). The qualitative findings complicate a straightforward interpretation of this relationship because some senior clinicians appeared to maintain satisfactory EMR documentation through assistance from other healthcare workers. Proxy compliance may therefore conceal part of the competence gap by allowing an account to appear active and compliant even when another person has entered documentation. This distinction is

methodologically important because self-reported competence, account-based usage statistics, and actual independent system use may represent different constructs. EHR audit-log research supports this distinction, as audit data can provide time-sequenced behavioral measures of how individual clinicians interact with electronic systems, rather than relying solely on self-reported use (Kannampallil & Adler-Milstein, 2023). A clinician may appear to be an effective EMR user according to system records, yet rely substantially on nurses or midwives to perform documentation tasks. Future assessments of digital competence may therefore need to distinguish between perceived capability, independently demonstrated capability, and recorded account activity to avoid overestimating individual adoption.

Professional differences in digital competence should also be interpreted within the structure of the EMR workflow rather than solely as individual skill deficits. Other health workers demonstrated a markedly lower proportion of high competence at 50.0%, compared with 96.2% among nurses and 92.9% among physicians. The qualitative findings indicate that support personnel frequently occupied downstream positions in the documentation process, making their work dependent on the completeness and timeliness of information entered by clinicians. Research on EHR documentation demonstrates that mismatches between electronic documentation structures and clinical workflows can lead to redundant tasks, increased workload, and workflow inefficiencies (Lindsay & Lytle, 2022; van Offenbeek et al., 2024). Network interruptions or delayed physician documentation could result in incomplete records, workflow disruptions, and interpersonal tension in units that were not responsible for the original problem. This finding is consistent with broader HOT-fit evaluations in Indonesian hospitals in which the Technology dimension has often emerged as a relatively weak component of implementation. Global evidence also indicates that infrastructure reliability remains a persistent barrier well into an EMR system's life (Finnegan & Mountford, 2025). Professional disparities in EMR performance may therefore reflect workflow position and technological dependency as much as individual competence.

The reactive nature of EMR implementation represents another important explanation for the gap between measured competence and lived experience. Participants described a rollout process strongly shaped by regulatory pressure, with modules introduced incrementally and training often focused on software functions rather than on the rationale, accountability, and workflow implications of electronic documentation. Evidence from EHR implementation research emphasizes that training effectiveness depends on personalization, appropriate pacing, opportunities to practice, clear documentation expectations, and continued implementation support (Nguyen et al., 2024). The absence of readily available written SOPs at workstations further suggests that implementation support had not kept pace with technological deployment. Staff responded by producing informal solutions, including printed WhatsApp instructions, parallel Excel records, and interpersonal assistance. Comparable research shows that EHR workarounds commonly emerge when formal system design does not adequately fit clinical work practices and that such accommodations may subsequently reinforce existing sociotechnical misfits (Van Offenbeek et al., 2024; Nguyen et al., 2026). These practices demonstrate organizational adaptability, yet they also indicate that formal implementation structures were insufficient to support consistent use. Informal workarounds may sustain service delivery in the short term while simultaneously normalizing practices that weaken standardization, traceability, and accountability. EMR training should therefore address not only how to operate system functions but also why specific documentation procedures matter for patient safety, continuity of care, legal responsibility, and institutional governance.

The findings also have theoretical implications for the application of TAM, UTAUT, HOT-fit, and DOI to mandatory health-information technologies. Systematic evidence confirms that TAM and UTAUT remain useful frameworks for explaining healthcare professionals' acceptance of digital

technologies, particularly through constructs related to perceived usefulness, ease of use, facilitating conditions, and behavioral intention (Rouidi et al., 2022; Tetik et al., 2024). These frameworks remained useful for interpreting perceived usefulness, facilitating conditions, organizational fit, social influences, and patterns of adoption, yet two findings extend beyond their conventional assumptions. Regulatory pressure was a central driver of implementation, meaning adoption was not primarily initiated by voluntary acceptance or gradual diffusion but by an externally imposed compliance requirement. Indonesian evidence has similarly shown that government regulation can operate as a predominant environmental determinant of health-information technology adoption, demonstrating that institutional pressure may shape adoption independently of individual willingness (Harahap et al., 2022). Proxy compliance poses an additional theoretical problem because TAM and UTAUT generally assume that the individual recorded as using the technology is the same individual whose acceptance and behavioral intention are being represented. EMR documentation performed by another healthcare worker disrupts this assumed correspondence between user identity, technology acceptance, and recorded behavior. The same issue affects HOT-fit interpretations because apparently successful alignment between organizational objectives and system-use indicators may partly reflect informal accommodation rather than genuine alignment between users, organizational processes, and technology. Future technology-adoption research may therefore benefit from distinguishing authentic use from delegated or proxy use, particularly in regulated clinical environments where documentation is linked to professional accountability.

The practical implications of these findings extend beyond increasing access to computers or delivering additional software demonstrations. Training programs should explain the clinical, organizational, and legal rationale for EMR documentation before emphasizing technical functions, with differentiated support directed toward older workers and professional groups demonstrating lower competence. Recent evidence supports role-specific EHR training and emphasizes the importance of tailoring competence development to users' digital skills, learning needs, and organizational context (Nguyen et al., 2024; Jarva et al., 2024). Written SOPs and accessible user guides should accompany each EMR module from the start of implementation, rather than being developed only after operational problems emerge. Infrastructure investment should prioritize areas with recurring connectivity problems because failures in a single unit can cause downstream disruptions across multiple professional groups. Routine monitoring should also verify the identity of the person entering clinical information, rather than relying exclusively on account-level completion indicators. Audit logs offer a particularly relevant mechanism because they capture time-sequenced user activity and can provide behavioral measures of clinical system use at scale (Kannampallil & Adler-Milstein, 2023). Proxy compliance deserves particular attention because documentation under another clinician's credentials may create implications for medicolegal accountability, auditability, information security, and BPJS claims. Organizational leaders should treat such practices as governance issues requiring transparent assessment rather than as informal solutions to workload or competence constraints.

Several limitations should be considered when interpreting these findings. The study was conducted in a single type-C private hospital, which limits transferability to hospitals with different ownership structures, workforce characteristics, information systems, or implementation maturity. Digital competence was measured through self-report and may therefore be affected by social-desirability bias or inaccurate self-assessment; contemporary reviews also demonstrate considerable heterogeneity in how healthcare professionals' digital competence is conceptualized and assessed (Longhini et al., 2024). The quantitative subgroup analyses were descriptive and exploratory, preventing causal interpretation of relationships involving age, profession, tenure, or organizational support. The qualitative phase did not include personnel from delivery rooms or

operating theatres because their EMR modules were still under separate development, leaving some high-intensity clinical environments underrepresented. Both phases also captured a particular period within an ongoing implementation process, meaning that staff experiences and organizational practices may change as the system matures. Future research should examine proxy compliance directly through triangulation with duty rosters, access logs, timestamps, or other system-level audit data. Audit-log methodologies can objectively characterize clinician–EHR interactions and have been proposed as a valuable source for understanding workflow, collaboration, and actual system-use behaviors (Kannampallil & Adler-Milstein, 2023; Huilgol et al., 2022). Longitudinal research should also determine whether competence gaps, hybrid documentation, and informal delegation persist after full implementation.

CONCLUSION

This study demonstrates that successful EMR implementation depends not only on healthcare workers' digital competence but also on organizational support, infrastructure reliability, professional roles, and the conditions under which technology adoption occurs. Although most participants showed high digital competence, persistent gaps among older staff, non-clinical health workers, and those experiencing lower organizational support were compounded by reactive training, unstable infrastructure, prolonged hybrid workflows, and informal redistribution of documentation tasks. The identification of proxy compliance, in which EMR entries are completed by individuals other than the registered account holders, highlights a critical discrepancy between recorded system use and authentic technology adoption, with important implications for accountability, information governance, and medicolegal practice. Hospitals implementing EMR should prioritize targeted competency development, timely SOPs, reliable infrastructure, and routine auditing of actual system use to ensure that regulatory compliance reflects genuine, safe, and sustainable digital transformation.

ACKNOWLEDGEMENT

The authors thank the Director and management of Hospital Y for institutional permission and support, and all participating healthcare workers for their time and candor across both study phases.

CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or non-financial, in relation to this manuscript.

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