

## The Frozen Hybrid: A Lewin-Based Analysis of Stalled EMR Transformation in an Indonesian Regional Hospital

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### ARTICLES

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### ABSTRACT

**Background:** Indonesia's mandated transition to electronic medical records (EMR) under Ministry of Health Regulation No. 24/2022 has resulted in widespread hybrid systems, where hospitals operate neither fully paper-based nor fully electronic, limiting expected efficiency gains. Existing studies largely emphasize technical evaluation frameworks, with limited attention to organizational change dynamics. **Objective:** This study examines organizational barriers and enablers in EMR implementation using Lewin's 3-Stage Change Model and conceptualizes the 'frozen hybrid' as an organizational phenomenon. **Methods:** A qualitative descriptive study was conducted at RSUD Balaraja, a regional public hospital in Indonesia. Nine purposively selected informants participated in in-depth interviews, complemented by observation and document review. Data were analyzed thematically using a deductive-inductive approach aligned with Lewin's stages. Analytical rigor was ensured through triangulation, inter-coder agreement (87%), and member checking. **Results:** The organization achieved partial Unfreeze through regulatory pressure and leadership investment but remained stalled in the Change stage. Three key themes emerged: (1) uneven adoption across units, with outpatient services largely digitalized while inpatient units maintained dual workflows; (2) persistent technical and human barriers, including network instability, system integration failures, workflow misalignment, and increased documentation burden; and (3) absence of sustained change management, reflected in limited training and declining leadership engagement. Partial Refreeze occurred only in selected functions, while hybrid practices became institutionalized in inpatient care. **Conclusion:** The findings introduce the 'frozen hybrid' as a stabilized state of incomplete digital transformation driven by organizational inertia. Achieving full digital integration requires sustained change management, leadership continuity, infrastructure strengthening, workflow redesign, and elimination of dual documentation practices.

### Highlights:

- Network instability, BPJS integration failures, workflow mismatches, and double data entry (30–50% additional documentation time) constitute the primary Change-stage barriers at this facility.
- Findings challenge the dominant technical evaluation paradigm in Indonesian EMR research and provide a replicable organizational change framework applicable to analogous regional hospitals in LMIC digitalization contexts.

## INTRODUCTION

Indonesia's healthcare system is undergoing a nationally mandated digital transformation. Ministry of Health Regulation (Permenkes) No. 24 of 2022 requires all healthcare facilities to implement electronic medical record (EMR) systems, and the national Satu Sehat platform aims to integrate health data across the archipelago.<sup>1</sup> This policy-driven digitalization represents a fundamental organizational change, requiring hospitals to transition from decades-old paper-based documentation to fully digital workflows. Yet evidence suggests that many Indonesian hospitals remain trapped in a 'hybrid divide'—operating neither fully paper-based nor fully electronic, but in a liminal state that undermines the efficiency, data integrity, and interoperability gains digitalization promises.<sup>2,3</sup>

Most EMR implementation research in Indonesia has employed technical evaluation frameworks: PIECES (Performance, Information, Economics, Control, Efficiency, Service),<sup>4,5,6</sup> Technology Acceptance Model (TAM),<sup>7</sup> and HOT-FIT (Human, Organization, Technology-Fit).<sup>8</sup> While these frameworks effectively assess system functionality and user acceptance, they provide limited insight into the organizational change dynamics that determine whether digital transformation succeeds or stalls. The persistence of hybrid paper-electronic systems across Indonesian hospitals<sup>2,9,10</sup> suggests that technical readiness alone is insufficient; organizational change management is the critical missing variable in the Indonesian EMR implementation literature. This gap is not uniquely Indonesian: systematic reviews of EMR implementation in low- and middle-income countries (LMICs) document persistent hybrid documentation as a near-universal pattern in mandated digitalization contexts, driven by a consistent combination of infrastructure constraints, incomplete organizational readiness, and inadequate change management support — organizational factors that technical evaluation frameworks are structurally unable to capture.

Lewin's 3-Stage Change Model—comprising Unfreeze (creating readiness for change), Change (implementing the transformation), and Refreeze (institutionalizing the new state)—offers a rigorous organizational lens for understanding why digital transformations succeed or stall.<sup>11</sup> This model has been applied in healthcare digitalization and electronic medical record (EMR) implementation contexts, where organizational readiness, leadership, and workflow redesign are critical determinants of success,<sup>12</sup> yet remains underutilized in EMR implementation research. Unlike technical evaluation frameworks — which ask 'does the system work and do users accept it?' — Lewin's organizational process model asks 'has the organization successfully transitioned through the stages necessary for sustained adoption?' This distinction is consequential: a system can score highly on TAM's perceived usefulness and ease-of-use dimensions while the organization remains frozen in a hybrid state, because user acceptance is not equivalent to organizational institutionalization. Lewin's framework illuminates the organizational process variables that technical frameworks are structurally unable to capture: leadership continuity, change culture, workflow redesign, champion formalization, and the structural conditions of Refreeze.

Prior research at RSUD Balaraja has evaluated EMR implementation through technical perspectives: a PIECES framework analysis documented system performance and user satisfaction,<sup>4</sup> and a parallel medical recorder perspective study examined implementation outcomes.<sup>5</sup> The present study constitutes a distinct analytical contribution: rather than evaluating system functionality, it examines the organizational change dynamics—through Lewin's theoretical lens—that explain why a technically deployed EMR system has not achieved full institutionalization. This reanalysis using a change management framework addresses a gap the prior technical studies could not—namely, the organizational inertia producing the hospital's persistent 'frozen hybrid' state.

We ask: What organizational barriers prevent full digital transformation at RSUD Balaraja? What enablers facilitate progress through Lewin's change stages? And why has the hospital not achieved Refreeze—full institutionalization of digital workflows—three years after complete EMR deployment? Understanding these dynamics is essential for Indonesia's national digitalization strategy, as policy mandates and technical deployment alone cannot overcome organizational barriers to change.

## METHODS

### Research Design and Setting

A qualitative descriptive design was employed to explore organizational change dynamics in EMR implementation. This design is appropriate for examining social and organizational phenomena in natural

settings, enabling rich description of the processes, meanings, and contextual factors shaping digital transformation.<sup>13</sup> The study was conducted at RSUD Balaraja, a Type C regional public hospital in Balaraja District, Tangerang Regency, Banten Province, Indonesia. As a government-owned facility serving a mixed urban-rural population of approximately 1.2 million residents, RSUD Balaraja represents the organizational profile of regional Indonesian hospitals undergoing mandated EMR digitalization.

The hospital implemented its MIRSA (hospital-branded) EMR system beginning in 2020, achieving full deployment across registration, outpatient, inpatient, pharmacy, laboratory, and radiology units by 2022. The system operates on a local area network (LAN) with cloud backup and integrates with the national BPJS Kesehatan insurance system. Despite full technical deployment, the hospital continues operating hybrid paper-electronic workflows, particularly in inpatient services—making it a particularly appropriate case for organizational change analysis.

### **Participants and Sampling**

Participants were selected through purposive sampling to ensure diverse organizational perspectives on EMR implementation. Inclusion criteria required: (1) direct involvement in EMR use for at least one year; (2) minimum Diploma III (D3) education in Medical Records and Health Information or equivalent demonstrable expertise through direct EMR involvement; and (3) willingness to provide written informed consent. The D3 educational criterion was treated as a proxy for technical literacy; one participant (Informant 8, SMA education) met all other criteria and demonstrated equivalent direct EMR involvement across four years of continuous operation, justifying inclusion on substantive rather than credential grounds.

Nine informants participated across multiple organizational roles: medical record supervisors, skilled officers, expert officers, an insurance program manager, registration staff, and administrative personnel. This purposive composition enabled systematic mapping of organizational perspectives across the Lewin change stages. Table 1 presents informant characteristics. Data saturation was assessed iteratively: no new thematic categories emerged after the seventh interview, with the eighth and ninth interviews confirming saturation.

### **Data Collection**

Data were collected through three triangulated methods between January and March 2025: (1) in-depth semi-structured interviews (45–90 minutes each, conducted in Indonesian); (2) direct observation of EMR workflows in registration, outpatient, and inpatient units over five observation sessions; and (3) review of hospital documentation including standard operating procedures (SOPs), training records, system logs, and deployment reports. Interview guides were structured around Lewin's three change stages, exploring informants' experiences of initial change readiness, implementation challenges, and institutionalization of digital workflows. All interviews were audio-recorded with participant consent and professionally transcribed.

### **Data Analysis**

Interview transcripts were analyzed thematically using NVivo 12 Plus software. A deductive-inductive approach was applied: initial coding was structured around Lewin's three stages (Unfreeze, Change, Refreeze), providing theoretical anchoring; inductive sub-themes emerged from the data within each stage. Open coding identified organizational barriers and enablers; axial coding mapped these to change stages and examined relationships between codes; selective coding synthesized patterns across informants and organizational units.

To enhance analytical rigor, two researchers independently coded a 30% subset of transcripts, achieving an inter-coder agreement rate of 87%. Discrepancies were resolved through discussion and consensus. Member-checking was conducted with three informants who reviewed key interpretations for accuracy and representativeness. Negative case analysis was applied: instances contradicting emerging themes (e.g., senior staff expressing enthusiasm for EMR; outpatient units achieving near-complete digitalization) were systematically examined to refine and qualify interpretations.

### **Trustworthiness**

Trustworthiness was established through four criteria following Lincoln and Guba's framework.<sup>14</sup> Credibility was supported by prolonged engagement at the study site, data triangulation across three

collection methods, member checking, and inter-coder agreement. Transferability is addressed through thick description of the organizational context (Table 1; Section 2.1), enabling readers to assess applicability to comparable regional Indonesian hospitals. Dependability was ensured through a detailed audit trail—interview guides, coding manuals, and NVivo project files are retained and available on request. Confirmability was supported by reflexivity: both researchers maintain institutional affiliation with Universitas Esa Unggul, which has a prior research relationship with RSUD Balaraja. This positionality was actively managed through inter-coder checking, member validation with informants from all organizational levels, and systematic negative case analysis to minimize confirmatory bias.

### Ethical Considerations

Ethical approval was obtained from the Research Ethics Committee of Universitas Esa Unggul and institutional approval from the Director of RSUD Balaraja prior to data collection. All participants provided written informed consent. Informant identities were anonymized and data stored securely with access restricted to the research team. Participation was voluntary; informants were informed of their right to withdraw at any time without consequence.

## RESULTS

Thematic analysis organized around Lewin's three stages generated three primary stage-level themes and one cross-cutting theme, summarized in Table 2. All nine informants contributed perspectives across multiple stages. Informant quotations are presented in the original Indonesian with English translations where applicable.

**Table 1. Informant characteristics (n = 9)**

No.	Gender	Age (yrs)	Education	Position	Tenure (yrs)
1	Female	49	D3 Medical Records	Medical Record Supervisor	15
2	Male	35	D4 Medical Records	Skilled Medical Record Officer	8
3	Female	28	D3 Medical Records	Skilled Medical Record Officer	5
4	Male	42	D4 Medical Records	First Expert Medical Record Officer	12
5	Female	31	D3 Medical Records	First Expert Medical Record Officer	6
6	Male	38	D4 Medical Records	Health Insurance Program Manager	10
7	Female	24	D3 Medical Records	Registration Staff	2
8	Female	27	SMA	Administrative Staff	4
9	Female	33	D3 Medical Records	Skilled Medical Record Officer	7

*D3 = Diploma III (3-year vocational degree); D4 = Diploma IV (4-year applied degree); SMA = Sekolah Menengah Atas (senior secondary school). Informant 8 met inclusion criteria through four years of direct EMR involvement.*

### Unfreeze Stage: Partial Organizational Readiness

#### Regulatory pressure as primary unfreezing force

The Ministry of Health Regulation No. 24/2022 functioned as the principal external disruption required to unfreeze the organization from paper-based inertia. All nine informants cited regulatory compliance as the primary driver for digitalization. Informant 1 (Medical Record Supervisor, 15 years' tenure) stated: 'The regulation forced us to move. We couldn't continue with paper forever.' This regulatory imperative created institutional urgency consistent with Lewin's conceptualization of unfreezing as requiring external disruption to overcome organizational inertia.<sup>11</sup>

However, regulatory mandate alone did not produce genuine participatory readiness. Several informants described the initial change as unilaterally top-down: ‘Management decided, and we had to follow. There was no real discussion about whether we were ready’ (Informant 4). This observation indicates that while the Unfreeze stage was externally initiated, the psychological readiness that Lewin identifies as necessary for successful stage progression was incompletely achieved.

### **Leadership commitment without change management strategy**

Hospital leadership demonstrated commitment through financial investment in the MIRSA system and mandating its use across all units. However, informants consistently identified the absence of a comprehensive change management strategy as a critical Unfreeze-stage gap. Training was limited to basic system navigation: ‘We got one training session showing how to view patient data. That was it. No training on advanced features or how to integrate it into our daily workflow’ (Informant 3). Informant 5 elaborated: ‘We learned how to open the system and search for patients. But we didn’t learn how to handle errors, integrate data across units, or use reporting features.’

This pattern contrasts with evidence from successful digital transformations in Indonesian hospitals. Research at Rahman Rahim Hospital documented that effective transformation required coordinated change strategies encompassing phased implementation, continuous stakeholder communication, and sustained role-specific training programs.<sup>15</sup> The absence of equivalent strategies at RSUD Balaraja created readiness gaps that propagated into the Change stage.

### **Fragmented staff readiness**

Individual readiness for change varied significantly across informants. Younger staff with higher digital literacy expressed enthusiasm: ‘I was excited. Electronic systems are faster and more modern’ (Informant 7). Senior staff with long paper-based tenure exhibited resistance: ‘I’ve worked with paper for 15 years. Suddenly changing to computers felt overwhelming’ (Informant 1). This fragmentation in individual readiness reflects the absence of a unified organizational culture supporting digital transformation—a finding consistent with quantitative evidence indicating that organizational culture significantly influences individual readiness for change in Indonesian hospital EMR contexts (Wardani et al.:  $\beta=0.67$ ,  $t=7.40$ ,  $p<0.001$ ).<sup>16</sup>

### **Change Stage: The Emergence and Persistence of the Hybrid Divide**

#### **Differential adoption across organizational units**

EMR adoption varied substantially across hospital units, producing an internal hybrid divide. Outpatient registration achieved near-complete digitalization: ‘In registration, we’re almost 100% electronic now. We only use paper for backup when the system is down’ (Informant 7). This unit benefited from simpler workflows, more stable network access, younger staff with higher digital literacy, and perceived efficiency gains for straightforward patient interactions.

In contrast, inpatient services maintained persistent hybrid workflows. Ward staff continued dual documentation, entering data both electronically and on paper: ‘In the inpatient ward, we still write everything on paper first, then enter it into the system later. It takes double the time’ (Informant 3). Multiple factors drove this persistence: regulatory requirements for paper signatures on clinical documents, concerns about data loss during network outages, and workflow mismatches between EMR interface design and complex inpatient documentation practices.

#### **Technical barriers: network instability and integration failures**

Network instability emerged as the most frequently cited technical barrier across all nine informants. Regular LAN disruptions lasting minutes to hours occurred weekly, forcing immediate reversion to paper documentation: ‘When the network goes down, we have no choice. We write on paper and enter it later when the system comes back’ (Informant 2). These recurrent disruptions reinforced paper as a pragmatic risk management strategy—a necessary safety net against system unreliability.

BPJS Kesehatan integration failures compounded network instability. The MIRSA system’s connection to the national insurance verification platform failed with sufficient frequency that informants described it as a near-daily occurrence: ‘BPJS errors happen almost daily. We can’t verify coverage, so we have to call the BPJS office or ask patients to bring paper documents’ (Informant 6). These integration failures forced manual workarounds that independently perpetuated hybrid workflows irrespective of

network status. Sutanto et al.'s survey of 150 staff across 12 Indonesian hospitals identified inconsistent internet connectivity as a primary barrier to electronic recordkeeping, confirming that infrastructure gaps function as structural determinants of hybrid states.<sup>2</sup>

### **Human barriers: workflow mismatch and passive resistance**

EMR interface design did not align with inpatient clinical documentation practices, particularly for nursing notes and physician orders. Informants described a documentation mismatch that undermined perceived efficiency: 'The system has fields we don't need and doesn't have fields we do need. So we write on paper where we can document properly, then try to fit it into the system' (Informant 5). For complex multi-morbidity cases, electronic documentation was perceived as slower than paper: 'For simple cases, electronic is faster. But for complicated patients with multiple conditions, paper is still faster because we can write freely' (Informant 4).

This perceived inefficiency drove passive resistance among senior staff: 'Some of the older nurses just don't trust the computer. They'll enter data because they have to, but they keep their own paper notes' (Informant 1). Passive resistance—behavioral compliance without psychological acceptance—represents incomplete unfreezing manifesting in the Change stage. Staff who never fully accepted the need for change continued old practices alongside mandated new ones.

### **Double entry burden**

The most tangible consequence of hybrid workflows was double data entry—entering identical information first on paper, then electronically. Informant 3 described: 'Memerlukan waktu lebih untuk proses mencatatnya' ['It requires more time for the recording process']. Across inpatient informants, estimates of additional documentation time attributable to dual entry ranged from 30 to 50% per patient, with the highest burden in wards with complex multi-condition caseloads.

Double entry also elevated error risk. Manual transcription from paper to electronic introduced discrepancies between records: 'Sometimes what's written on paper doesn't match what's in the system because someone made a typing error or forgot to enter something' (Informant 2). These discrepancies undermine data integrity—a foundational benefit of EMR systems. Pribadi et al. documented equivalent hybrid workflow inconsistencies at a Sidoarjo regional hospital, noting that partial digitalization creates compliance risks and data integrity gaps.<sup>9</sup>

### **Championing behavior as critical enabler**

Despite the barriers documented above, a consistent enabler emerged: championing behavior by digitally literate staff who actively promoted EMR use and provided informal peer training. 'There are a few people in each unit who really understand the system and help others. They're like informal trainers' (Informant 7). These champions—typically younger staff with higher digital literacy—facilitated peer learning and problem-solving in the absence of formal training support.

This finding is consistent with Wardani et al.'s quantitative demonstration that individual readiness predicts championing behavior in EMR implementation ( $\beta=0.42$ ,  $t=4.10$ ,  $p<0.001$ ).<sup>16</sup> At RSUD Balaraja, champions operated informally and without organizational recognition or resource support. Their impact, while real, remained constrained by the absence of formal champion roles—a missed organizational opportunity to scale peer learning.

## **Refreeze Stage: Partial Institutionalization and the Frozen Hybrid**

### **What has been institutionalized**

Certain digital practices have achieved Refreeze status at RSUD Balaraja. Information security protocols are fully institutionalized: individual password authentication, role-based access restrictions, and data security policies are understood, followed, and no longer questioned. 'Everyone knows they can only access what they're authorized to see. That's just how it works now' (Informant 6). Outpatient registration workflows are similarly institutionalized: staff operate almost entirely electronically, reverting to paper only during system outages. 'Electronic registration is just normal now. We don't think about it' (Informant 7). These units have achieved Refreeze because digital workflows are perceived as faster, reliable enough, and culturally accepted within their unit subculture.

### **The frozen hybrid in inpatient services**

Inpatient documentation has not achieved Refreeze. More critically, the hybrid state itself has become institutionalized—a frozen hybrid rather than a transitional condition. ‘We’ve been doing double entry for three years now. It’s just how we work’ (Informant 3). The significance of this observation is that hybrid dual documentation has achieved its own equilibrium: it is no longer experienced as a temporary workaround but as the organizational norm. ‘Even when the system is working fine, we still write on paper first. It’s habit now’ (Informant 5).

Several organizational factors prevent Refreeze in inpatient services. Regulatory requirements for paper signatures on certain clinical documents (informed consent, surgical notes) mandate some paper use. Network instability creates persistent uncertainty that makes paper retention rational. Unresolved workflow mismatches mean electronic documentation remains less efficient than paper for complex inpatient cases. Inadequate training means staff have not developed full competency with advanced EMR reporting and integration features.

**Applying Kotter’s 8-Step model: missing change management stages**

Triangulating Lewin’s framework with Kotter’s 8-Step Change Model<sup>17</sup> clarifies why Refreeze has not been achieved. RSUD Balaraja successfully completed Step 1 (create urgency through regulatory mandate) and partially Step 2 (build a guiding coalition through leadership commitment). Steps 3–8 were largely absent: no clear strategic vision for full digitalization (Step 3); no formal coalition of champions (Step 4); network instability and training gaps were not systematically removed (Step 5); short-term wins were not communicated or celebrated (Step 6); momentum was not sustained post-deployment (Step 7); and change was not institutionalized through updated SOPs and performance metrics (Step 8). This Kotter analysis reveals that the frozen hybrid state results from incomplete change management execution, not technical system failure.

**Table 2. Organizational barriers and enablers mapped to Lewin’s 3-Stage Change Model at RSUD Balaraja**

Lewin Stage	Organizational Barriers	Organizational Enablers
Unfreeze	Absence of comprehensive change management strategy Superficial training (basic viewing only; no role-specific or advanced features) Fragmented organizational culture (no unified digital culture) Top-down mandate without participatory staff consultation	Regulatory pressure (Permenkes No. 24/2022) creating urgency Leadership investment in MIRSA system Younger staff with higher digital literacy showing receptivity Initial enthusiasm in outpatient registration units
Change	Weekly network instability forcing paper fallback BPJS Kesehatan integration failures requiring daily manual workarounds Workflow mismatch between EMR design and inpatient clinical documentation Double data entry burden (30–50% additional time) Passive resistance from senior long-tenured staff Inadequate role-specific training post-deployment	Championing behavior by digitally literate staff (informal peer trainers) Near-complete digitalization in outpatient registration Informal peer support networks Perceived efficiency gains in simple outpatient cases
Refreeze	Persistent hybrid workflows institutionalized as organizational routine Regulatory requirements for paper signatures (informed consent, surgical notes) Ongoing network instability perpetuating paper as safety net Workflow mismatches	Institutionalized security protocols (individual passwords, role-based access) Full digitalization of outpatient registration unit Embedded data security culture Subset of staff with full EMR competency

unresolved Organizational inertia  
(‘frozen hybrid’ state solidified)  
Absence of updated SOPs mandating  
digital-only workflows Withdrawn  
leadership attention post-  
deployment

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*SOPs = Standard Operating Procedures; BPJS = Badan Penyelenggara Jaminan Sosial (National Health Insurance); Permenkes = Peraturan Menteri Kesehatan (Ministry of Health Regulation).*

## DISCUSSION

### The Frozen Hybrid as Organizational Construct

The central theoretical contribution of this study is the ‘frozen hybrid’ construct: a state in which incomplete digital transformation has crystallized into a new organizational equilibrium. In classical Lewin’s theory, the Change stage is a temporary transition toward Refreeze.<sup>11</sup> At RSUD Balaraja, however, the Change stage has itself refrozen into an institutionalized hybrid routine—dual paper-electronic documentation is no longer transitional but normative. This construct extends Lewin’s model by recognizing that organizations can stabilize at intermediate states, not only at the intended final state.

The frozen hybrid construct constitutes a formal theoretical extension of Lewin’s 3-Stage Change Model in three respects. First, it identifies a fourth implicit organizational state — *institutionalized incompleteness* — in which an organization stabilizes at the Change stage rather than progressing to Refreeze, because the partially transformed state has itself acquired the equilibrium properties of Refreeze: routine, culturally normalized, and resistant to further change. Second, it respecifies the directionality of organizational inertia: where Lewin’s model addresses inertia resisting the *initiation* of change (the Unfreeze challenge), the frozen hybrid construct addresses inertia resisting the *completion* of change (the Refreeze challenge). Third, it shifts the diagnostic focus from individual psychological readiness — Lewin’s original emphasis — to structural organizational conditions (infrastructure reliability, SOP mandates, leadership continuity, champion formalization) that govern whether a Change-stage organization can progress to full Refreeze. These three extensions are empirically grounded in the RSUD Balaraja case and are theoretically applicable to any organizational context in which mandated digital transformation produces stable hybrid rather than fully digital states.

The frozen hybrid is qualitatively different from a hybrid system maintained deliberately as a transitional strategy. At RSUD Balaraja, dual documentation has persisted for three years post-deployment without active organizational effort to eliminate it. Staff describe paper-first documentation as ‘habit’ and ‘just how we work’—language indicating cultural normalization rather than strategic risk management. This normalization creates organizational inertia that is harder to overcome than initial resistance, because it has become embedded in the organizational identity of inpatient units.

The frozen hybrid phenomenon is not unique to RSUD Balaraja. Sutanto et al.’s multi-hospital study found that many Indonesian hospitals operate persistent hybrid systems,<sup>2</sup> and Pribadi et al. documented equivalent dual documentation at a Sidoarjo hospital.<sup>9</sup> International evidence indicates that hybrid EMR states frequently persist for years across LMIC hospital systems — not as idiosyncratic failures but as a structurally predictable outcome of mandated digitalization in resource-constrained organizational environments. This pattern has been documented across low- and lower-middle-income countries, consistently attributed to the same organizational triad: inadequate change management, infrastructure insufficiency, and incomplete training.<sup>18</sup> However, the present study’s application of Lewin’s framework advances understanding by characterizing these states not as temporary implementation phases but as potentially stable organizational equilibria requiring deliberate change intervention to overcome.

### Organizational Culture as Primary Mediator

Organizational culture emerged as the primary mediator of differential adoption trajectories across units—a finding with direct implications for intervention design. Outpatient registration, with a younger workforce and simpler workflow profile, developed a unit-level digital subculture that supported

Refreeze. Inpatient wards, with senior staff and complex documentation requirements, maintained a paper subculture that resisted Refreeze. This differential reflects Wardani et al.'s quantitative evidence that organizational culture strongly influences individual readiness ( $\beta=0.67$ ) and championing behavior ( $\beta=0.42$ ) in EMR implementation.<sup>16</sup>

The fragmentation of organizational culture into unit-level subcultures—rather than a hospital-wide digital transformation culture—reflects the absence of a comprehensive change management strategy during the Unfreeze stage. Organizations that achieve full digital Refreeze typically build unified change cultures through sustained communication, visible leadership modeling, and cross-unit learning.<sup>19</sup> At RSUD Balaraja, the absence of these mechanisms allowed existing unit subcultures to determine adoption trajectories independently, producing the differential Refreeze pattern observed.

#### **Digital Leadership: Commitment Without Continuity**

Leadership commitment was evident in the decision to invest in MIRSA and mandate its use. However, digital leadership—defined as visible, sustained, and strategic commitment to organizational transformation beyond technical deployment<sup>19</sup>—was largely absent. After the deployment phase, leadership attention shifted: 'Management pushed for EMR at the beginning, but now they don't really follow up. As long as we're using it, they're satisfied' (Informant 4).

This withdrawal of active leadership attention is a critical structural gap. Evidence from Kariadi Hospital demonstrates that digital leadership—including regular communication, visible role-modeling, barrier removal, and progress celebration—is necessary to achieve full adoption.<sup>20</sup> Similarly, the Rahman Rahim Hospital case shows that sustained change management support, not one-time deployment, enables organizations to progress through Lewin's stages.<sup>14</sup> At RSUD Balaraja, leadership satisfied itself with technical deployment (Change stage activity) without ensuring organizational institutionalization (Refreeze stage requirements). This distinction between technical project completion and organizational transformation completion is the central conceptual gap this study identifies.

#### **Infrastructure as Organizational Decision, Not Technical Detail**

Network instability was the most frequently cited technical barrier, but it is fundamentally an organizational governance issue. The hospital has sustained network infrastructure inadequate for reliable EMR operation for three years post-deployment, despite consistent informant reports of weekly disruptions: 'We've complained about network problems for years, but nothing changes' (Informant 2). This persistence of infrastructure inadequacy reflects organizational priority setting—infrastructure investment is treated as a technical overhead rather than a strategic enabler of transformation.

Multi-hospital research confirms that infrastructure gaps are widespread in Indonesian hospitals, particularly outside Java,<sup>2</sup> and that addressing them requires sustained organizational commitment to investment rather than one-time technical deployment.<sup>9</sup> The rational consequence of unreliable infrastructure is staff adoption of paper as a safety net against data loss—a pragmatic individual response that, in aggregate, perpetuates the frozen hybrid at the organizational level. Eliminating hybrid workflows therefore requires addressing infrastructure inadequacy as an organizational governance priority.

#### **Implications for EMR Implementation Practice and Policy**

This study has four direct implications for hospital administrators and health information management professionals. First, EMR implementation must be conceptualized as organizational transformation, not technical deployment. The Lewin and Kotter frameworks operationalize what this means in practice: comprehensive change roadmaps, sustained leadership engagement, role-specific training, workflow redesign, updated SOPs, and formalized champion roles. Second, hybrid workflows should be treated as active organizational risks, not acceptable transitional states. The longer they persist, the more they solidify into frozen hybrid equilibria that require active change management to overcome. Third, organizational culture assessment should precede and inform implementation strategy, ensuring that unit-level subcultures are identified and addressed through differentiated change approaches. Fourth, champion roles should be formalized and resourced—the informal championing behavior observed at RSUD Balaraja represents an underutilized organizational asset.

For Indonesian health policy, the persistence of frozen hybrid states across regional hospitals threatens the Satu Sehat interoperability strategy, which depends on fully electronic records for national

health data integration. Policy interventions should move beyond mandate and technical deployment toward organizational change support: change management capacity building for hospital administrators, standardized training curricula for EMR implementation teams, infrastructure investment requirements as conditions of regulatory compliance, and monitoring frameworks that assess organizational readiness alongside technical deployment.

### **Limitations**

Several limitations should be acknowledged. First, the single-site design limits transferability; comparative multi-site research across regional hospitals at different Lewin stages would strengthen generalizability. Second, the qualitative design cannot quantify relative barrier impacts; future mixed-methods research incorporating quantitative organizational readiness measures would enable causal pathway testing. Third, cross-sectional data collection limits causal inference; longitudinal study tracking hospitals through Lewin's stages over time is needed. Fourth, the researchers' prior institutional relationship with RSUD Balaraja (reflected in co-authored technical studies<sup>45</sup>) introduces positionality risks that were actively managed through inter-coder checking and member validation but cannot be fully eliminated. Fifth, patient perspectives on hybrid workflows were not captured; future research should incorporate patient-level service quality implications of hybrid documentation systems.

### **CONCLUSION**

This study suggests that RSUD Balaraja has achieved partial but not full digital Refreeze three years after complete EMR deployment, exhibiting a 'frozen hybrid' state—an organizational equilibrium in which dual paper-electronic documentation has become institutionalized rather than transitional. The Unfreeze stage was initiated through regulatory pressure and leadership investment, but incomplete change management left staff psychologically unprepared and organizationally unsupported for full digital transformation. The Change stage is characterized by persistent barriers—weekly network instability, BPJS integration failures, workflow mismatches, and double data entry burden—operating alongside enabling forces of championing behavior and outpatient digitalization. Full Refreeze has been achieved only in security protocols and outpatient services; inpatient hybrid workflows have solidified into organizational habit.

Organizational barriers—inadequate change management, insufficient training, fragmented organizational culture, and withdrawn digital leadership—outweigh technical constraints in determining this outcome. The persistence of hybrid workflows even when systems function properly indicates that the frozen hybrid is primarily an organizational, not a technical, phenomenon. This finding calls for reexamination of the dominant focus on technical evaluation frameworks in Indonesian EMR research. TAM, PIECES, and HOT-FIT answer whether a system is technically functional and user-acceptable — an evaluation question. Lewin's organizational process model answers the different and complementary question of whether the organization has structurally institutionalized digital workflows — a transformation question. Both questions are necessary; neither is sufficient alone. Incorporating organizational process analysis alongside technical evaluation as a standard component of EMR implementation research would substantially strengthen the evidence base for Indonesia's national digitalization strategy.

Achieving full digital Refreeze requires seven systematic interventions: (1) comprehensive change management roadmaps incorporating Kotter's 8-Step process; (2) sustained digital leadership with visible commitment, strategic vision, and barrier removal; (3) infrastructure investment eliminating network instability as a safety-net driver of paper retention; (4) role-specific training programs developing full EMR competency across all clinical and administrative roles; (5) workflow redesign aligning EMR interfaces with inpatient clinical documentation practices; (6) updated SOPs mandating digital-only workflows and eliminating dual documentation as acceptable practice; and (7) formalization and resourcing of champion roles to scale peer learning.

The frozen hybrid construct introduced in this study extends Lewin's theoretical framework by recognizing that organizations can stabilize at intermediate change stages, not only at the intended final state. This theoretical contribution, grounded in the Indonesian regional hospital context, is applicable to

a broad range of organizational contexts — across LMICs undergoing mandated health digitalization, and more broadly to any health system in which politically or regulatorily driven EMR adoption outpaces organizational change management capacity. The frozen hybrid state has been documented across national healthcare systems at vastly different resource levels, suggesting it reflects a universal tension in mandated digitalization between institutional compliance timelines and organizational transformation readiness. Future research should test the frozen hybrid construct through multi-site comparative studies, develop quantitative operational measures of organizational change stage, and evaluate the effectiveness of the intervention bundle proposed in overcoming frozen hybrid states.

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## CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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