Journal DOI: 10.36713/epra1013 | SJIF Impact Factor (2025): 8.619 ISSN: 2347-4378
EPRA International Journal of Economics, Business and Management Studies (EBMS)
Volume: 12 | Issue: 9 | September 2025 -Peer-Reviewed Journal

COLLABORATION OF DIGITAL LEADERSHIP, CHANGE MANAGEMENT, AND TECHNOLOGY READINESS IN ELECTRONIC MEDICAL RECORDS IMPLEMENTATION AT KARIADI HOSPITAL

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Article DOI: https://doi.org/10.36713/epra24055
DOI No: 10.36713/epra24055

ABSTRACT

Digital transformation through the implementation of Electronic Medical Records (EMR) in the healthcare sector faces complex challenges that require a holistic and integrated approach. This study explores the collaboration between digital leadership, change management, and technology readiness in the implementation of EMR at Kariadi Hospital in Semarang using a qualitative narrative approach. Data were collected through in-depth interviews, participant observation, and organizational document analysis, involving key stakeholders ranging from directors to front-line healthcare workers. The study identified five key themes with high levels of user acceptance: digital leadership as a catalyst for transformation, integrated change management as a bridge to adoption, technology readiness as a foundation for user trust, cross-departmental collaboration in the digital ecosystem, and organizational cultural transformation toward a digital mindset. The findings indicate that effective synergy between these three variables creates an ecosystem conducive to technology adoption. Digital leadership through role modeling behavior and strategic communication successfully creates transformation momentum. Comprehensive change management facilitates the transition from manual to digital systems with minimal resistance. Robust technology readiness builds a foundation of trust through reliable infrastructure and a user-friendly interface. Cross-departmental collaboration optimizes integrated workflow and real-time information sharing. The organizational cultural transformation reflects a fundamental shift toward a sustainable digital-first approach.

KEYWORDS: *Digital Leadership, Change Management, Technology Readiness, Electronic Medical Records, Healthcare Digital Transformation*

INTRODUCTION

Digital transformation in the healthcare sector has become a global imperative that cannot be ignored, especially after the World Health Organization (WHO) emphasized in its Global Strategy on Digital Health 2020-2025 that accelerating the adoption of digital technology is a fundamental foundation for achieving Universal Health Coverage. Indonesia, as a country characterized by a double burden of disease and significant limitations in healthcare infrastructure, faces complex challenges in addressing disparities in access to healthcare services across various regions. This situation makes digital transformation not merely an alternative option but an urgent strategic necessity to bridge the existing gap in healthcare services.

In response to this global challenge, the implementation of Electronic Medical Records (EMR) has become a strategic imperative in efforts to increase the competitiveness of healthcare institutions in the era of Industrial Revolution 4.0 and the transition to Society 5.0. The essence of EMR goes beyond the mere concept of document digitization; rather, it embodies the comprehensive vision of an integrated and sustainable healthcare system, as articulated by the WHO. More broadly, EMR implementation contributes significantly to national healthcare system reform by acting as a catalyst for accelerating the integration of services between healthcare facilities, standardizing health data, and optimizing the efficient and targeted allocation of healthcare resources.

In line with this digital transformation vision, the Indonesian government has concretized its national commitment through the issuance of Minister of Health Regulation Number 24 of 2022, which requires all healthcare facilities

to implement an integrated RME system with the SATUSEHAT platform before December 31, 2023. However, the journey from regulation to implementation faces a worrying reality. Empirical data from a survey by the Indonesian Hospital Association (PERSI) reveals that only half of the 3,000 hospitals in Indonesia have completed the RME implementation process to date. Even more worrying, the disparity between regulatory expectations and the reality on the ground is further exacerbated by the imposition of progressive administrative sanctions based on Minister of Health Circular Letter No. HK.02.01/MENKES/1030/2023, which culminates in the threat of revocation of accreditation status for facilities that fail to implement EMR completely by July 31, 2024.

Facing this dilemma, the Indonesian healthcare sector is now experiencing extraordinary urgency. Hospitals are not only under pressure to meet regulatory targets within a limited timeframe but also must overcome various structural and operational barriers that hinder the digital transformation process. The complexity of the national healthcare ecosystem, disparities in digital infrastructure, and fragmented information systems are slowing the adoption of EMR in healthcare facilities. This implementation gap is manifested in various aspects, ranging from limited human resource competencies requiring specialized information technology knowledge, inadequate technological infrastructure despite the Ministry of Health's mandatory implementation, unprepared data security systems that pose a risk of medical information leakage, to the complexity of integration with the SATUSEHAT Platform, where many hospitals are not yet integrated or receive less than 50% of patient visit data.

Existing empirical evidence further reinforces the complexity of this phenomenon, as demonstrated by findings from the Indonesian Ministry of Health (2023), which revealed that only 42% of national referral hospitals had successfully implemented comprehensive RME. Related studies also demonstrate that implementation failure is often related to a lack of technological readiness and ineffective change management, with 68% of healthcare workers in teaching hospitals still struggling to adapt to new RME systems. Based on these findings, it is clear that the challenges of RME implementation are heavily influenced by the role of digital leadership and technological readiness within the context of change management. While technological readiness is a fundamental foundation supporting successful implementation by ensuring the stability and operational effectiveness of the system, a robust technological infrastructure does not automatically guarantee implementation success without an appropriate change management strategy and competent digital leadership.

More profoundly, change management plays a crucial role as a bridge connecting technological sophistication with practical implementation at the operational level. Field observations indicate that nurses unfamiliar with digital technology often experience anxiety and a lack of confidence in operating RME systems. This situation will worsen without a comprehensive training program and leadership capable of providing it.

THEORETICAL FRAMEWORK

Digital Leadership

Digital leadership refers to a leader's ability to direct, influence, and inspire an organization to adopt and utilize digital technology to achieve strategic goals. This concept encompasses three main dimensions: digital literacy (the ability to understand and use digital technology), strategic thinking (the ability to formulate a comprehensive digital vision), and change facilitation (the ability to facilitate organizational transformation through technology). Digital leadership is not only related to technological mastery but also encompasses the ability to create a culture of innovation, manage resistance to change, and communicate the strategic benefits of technology to all stakeholders. In the healthcare context, digital leadership is a critical success factor in the implementation of complex health information systems such as EMR.

Change Management

Change management is a systematic and structured approach to managing an organization's transition from its current state to its desired future state. This concept is based on the understanding that organizational change requires careful planning, effective communication, and ongoing support to ensure successful adoption. In the context of healthcare technology implementation, change management includes readiness assessment, stakeholder analysis, communication planning, training and development, resistance management, and sustainability planning. Relevant change management theories include Kotter's 8-Step Process, the ADKAR Model, and Lewin's Change Model, which emphasize the importance of creating urgency, building coalitions, and anchoring new approaches in organizational culture.

Technology Readiness

Technology readiness refers to the propensity of an individual or organization to adopt and use new technology to achieve personal or organizational goals. This concept is based on the Technology Readiness Index (TRI), which measures four dimensions: optimism (a positive view of technology), innovativeness (a tendency to be a

technology pioneer), discomfort (a perceived lack of control over technology), and insecurity (distrust of technology and skepticism about its capabilities). In the context of healthcare organizations, technology readiness encompasses infrastructure readiness (the availability of hardware, software, and networks), human resource readiness (human resource competency in using technology), and organizational readiness (policies, procedures, and a culture that supports technology adoption).

Electronic Medical Records (EMR)

An Electronic Medical Record is a comprehensive digital system for storing, managing, and accessing patient health information electronically. EMR includes patient demographic data, medical history, diagnoses, medications, laboratory results, care records, and other clinical information stored in digital format. EMR systems are designed to improve the quality of healthcare through improved accessibility, accuracy, and comprehensiveness of patient information. Key features of EMR include clinical decision support, computerized physician order entry (CPOE), electronic prescribing, patient portals, and interoperability with other healthcare systems. EMR implementation is expected to improve patient safety, reduce medical errors, increase operational efficiency, and support evidence-based medicine.

Healthcare Digital Transformation

EMR is a fundamental and comprehensive process that integrates digital technology into all aspects of a healthcare organization, transforming how the organization operates and delivers value to patients. This concept goes beyond simple digitization or automation. It involves reimagining healthcare delivery models through the use of emerging technologies such as artificial intelligence, big data analytics, cloud computing, the internet of things (IoT), and mobile health technologies. EMR encompasses digital patient experience, digital clinical workflows, digital operational processes, and digital business models, all integrated to create a connected, intelligent, and patient-centric healthcare ecosystem. The main goals of digital transformation in healthcare are achieving better health outcomes, improving patient experience, reducing healthcare costs, and enhancing population health management through evidence-based decision-making and personalized care delivery.

RESEARCH METHODS

This study adopted a narrative qualitative approach to explore the complex collaboration between digital leadership, change management, and technology readiness in the implementation of EMR at Kariadi Hospital in Semarang. The choice of narrative qualitative methodology was based on its ability to understand complex experiences and organizational dynamics through the perspectives and stories of participants directly involved in the digital transformation process (Creswell & Poth, 2018). This approach aligns with the recommendations of Braithwaite et al. (2017), who emphasized the importance of qualitative methodology in understanding the complexity of health technology implementation in a multifaceted and dynamic hospital environment.

The narrative research design allows for an in-depth analysis of the digital transformation process, with a particular focus on the individual and collective experiences of healthcare workers during the EMR adoption period (Polkinghorne, 2020). Research participants were purposively selected and included key stakeholders from various organizational levels: directors, IT managers, department heads, physicians, nurses, and administrative staff with direct involvement and significant experience in EMR implementation. A purposive sampling technique was used to ensure a comprehensive representation of diverse perspectives and experiences in the digital transformation process (Palinkas et al., 2015).

Data collection was conducted through a triangulation of methods, including semi-structured in-depth interviews, participant observation, and organizational document analysis. In-depth interviews were designed to explore participants' personal experiences, perceptions, and evaluations of the RME implementation process. Participant observation was conducted to understand organizational dynamics and interactions between stakeholders in a natural context. Organizational document analysis included policy documents, training materials, communication records, and performance reports relevant to RME implementation.

Data analysis employed a narrative thematic approach with a step-by-step coding technique to identify patterns, themes, and complex relationships among research variables (Braun & Clarke, 2019). The analysis process began with open coding to identify basic concepts, followed by axial coding to develop categories and relationships between concepts, and selective coding to integrate findings into a coherent theoretical framework. Data validity and reliability were ensured through multiple validation strategies, including source triangulation, member checking with participants, and peer debriefing with expert reviewers, in accordance with Lincoln & Guba's (2016) criteria for credible and trustworthy qualitative research.

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RESULTS AND DISCUSSION

Digital Leadership as a Catalyst for Transformation

The implementation of RME at Kariadi Hospital demonstrates that digital leadership plays a fundamental role as a driving force in successful healthcare technology transformation. The director and senior managers demonstrated effective digital leadership characteristics through a combination of high digital literacy, forward-looking strategic thinking, and change facilitation skills that effectively communicated the digital transformation vision to all organizational stakeholders. A concrete manifestation of digital leadership was reflected in the formation of a Digital Health Steering Committee consisting of representatives from each department, creating a governance structure that facilitated cross-functional collaboration and inclusive, participatory decision-making.

The president director personally led the initiative by demonstrating commitment through the consistent use of the RME system in daily operations, creating a visible example that served as a powerful catalyst in shaping positive perceptions of digital technology among healthcare professionals. This role-modeling behavior generated a cascading effect that encouraged enthusiastic adoption at various levels of the organization, significantly reducing the initial resistance and skepticism that commonly arise in technology implementation initiatives. The leadership approach implemented followed the digital health leadership framework of World Health Assembly Resolution 71.7, emphasizing participatory leadership in digital healthcare transformation.

Substantial investment in leadership development programs is a key component in building sustainable digital leadership capabilities. Management allocates resources for executive coaching, digital leadership training, and participation in national and international digital health conferences to continuously enhance leadership competencies. These programs are designed to develop transformational leadership skills essential for navigating the complex digital transformation journey in healthcare organizations, creating a sustainable leadership pipeline capable of facing the evolving digital health landscape.

Sustainability planning in digital leadership includes comprehensive succession planning and knowledge management systems that ensure the continuity of digital leadership capabilities despite management structure changes. Developed leadership transition protocols to ensure that the digital vision and strategic direction can be maintained over the long term. An established long-term leadership development pipeline creates a pool of digitally competent leaders ready to take on key roles in ongoing digital transformation initiatives, ensuring organizational resilience and adaptability.

The leadership team's strategic communication approach includes a multi-channel communication strategy that ensures consistent messaging about the benefits and strategic importance of RME implementation. Town hall meetings, departmental presentations, and personalized communication sessions are used to proactively address individual concerns and build organizational commitment to digital transformation initiatives. The leadership team also implemented an open-door policy that facilitated two-way communication and feedback collection from front-line staff, creating an inclusive environment that supported collaborative problem-solving and continuous improvement in the implementation process.

Integrated Change Management as a Bridge to Adoption

The comprehensive change management strategy at Kariadi Hospital demonstrates a sophisticated understanding of the complexity inherent in digital transformation processes in healthcare organizations. The strategic approach implemented integrates multiple dimensions of change management, including individual behavior modification, organizational culture transformation, and structural adjustments necessary to support successful RME adoption. The framework adopted the WHO Digital Implementation Investment Guide (DIIG) principles, emphasizing stakeholder engagement, capacity building, and comprehensive sustainable implementation practices.

Cross-Departmental Collaboration in a Digital Ecosystem

The cross-departmental collaboration framework implemented at Kariadi Hospital creates an integrated ecosystem that facilitates seamless information sharing and coordination of care across multiple specialties and service lines. The workflow integration capabilities of the RME system enable real-time communication and comprehensive information exchange between departments, significantly improving operational efficiency and reducing delays in patient care processes. This integration aligns with the WHO Classification of Digital Health Interventions, which emphasizes the critical importance of communication platforms and data services in improving health outcomes and care coordination.

Sophisticated coordination mechanisms developed to support collaborative care delivery include clinical decision support tools embedded in the RME system. These tools provide evidence-based recommendations accessible to

all care team members, facilitating informed decision-making and ensuring consistency in treatment approaches across different specialties. Automated notification systems alert relevant departments about critical patient information, lab results, or treatment updates, ensuring timely response and maintaining continuity of care across different service areas with minimal delays.

Joint governance structures established to manage interdepartmental collaboration include Clinical Integration Committees comprising representatives from major departments and specialties. These committees are responsible for developing collaborative protocols, resolving potential conflicts, and identifying opportunities for improving coordination through technology enhancements. Regular interdisciplinary meetings facilitated by RME system capabilities enable comprehensive case discussions and collaborative treatment planning that involve multiple specialists simultaneously, improving care quality and patient outcomes.

Quality improvement initiatives that leverage collaborative capabilities from the RME system show significant improvements in patient safety indicators, care coordination metrics, and overall operational efficiency. Shared dashboards and comprehensive reporting tools enable departments to monitor their performance in the context of broader organizational objectives, fostering accountability and a culture of continuous improvement. Collaborative analytics capabilities enable the identification of best practices that can be shared across departments to improve overall care quality and standardize excellence in patient care delivery.

Innovation projects that emerged from interdepartmental collaboration include the development of specialized workflows for complex patient populations, seamless integration with external healthcare providers, and implementation of population health management tools that leverage comprehensive data from multiple departments. This collaborative innovation approach creates valuable organizational learning opportunities and fosters a sustainable culture of continuous improvement that is beneficial for the long-term sustainability of digital health initiatives. Cross-departmental teams continue working together to identify new opportunities for leveraging technology to improve patient care and operational efficiency.

Organizational Culture Transformation Towards a Digital Mindset

A cultural transformation analysis at Kariadi Hospital revealed a comprehensive shift in organizational values, beliefs, and behaviors that actively support the adoption of digital-first approaches in healthcare delivery. This transformation process involved fundamental changes in how healthcare professionals perceive and interact with technology, successfully moving from viewing technology as an additional burden to enthusiastically embracing digital tools as essential components of modern healthcare practice. The implemented cultural change initiatives followed the WHO Global Strategy on Digital Health principles for building resilient health systems through sustainable digital transformation.

Generational dynamics in the cultural transformation demonstrated a complex but successful interplay between digital natives who readily adopt new technologies and senior professionals who initially require more structured support to develop digital competencies. Developed mentorship programs effectively facilitated knowledge transfer between generations, with younger staff providing technical guidance while experienced professionals shared valuable clinical expertise and best practices. Cross-generational learning initiatives created a highly collaborative environment that leveraged the diverse strengths of different age groups to achieve optimal technology adoption outcomes.

Implemented values alignment initiatives focused on connecting technology adoption with core healthcare values such as patient safety, quality care, and professional excellence. Developed communication strategies effectively emphasize how RME technology enhances rather than replaces human caring and clinical expertise, successfully addressing initial concerns about potential depersonalization of healthcare delivery. Story-telling approaches utilize compelling success stories and positive patient outcomes achieved through effective use of digital tools, creating strong emotional connections with technology benefits.

Recognition and reward systems developed to support cultural transformation include comprehensive technology proficiency certifications, innovation awards, and performance metrics that appropriately incorporate digital health competencies. Updated career development pathways include digital health skills as essential competencies for advancement opportunities, creating strong incentives for continuous learning and technology adoption. Available professional development opportunities include participation in prestigious digital health conferences, valuable certification programs, and collaborative research projects that enhance both technical skills and professional recognition.

The long-term sustainability of cultural transformation is ensured by strategically embedding a digital mindset in organizational policies, procedures, and standard operating practices. Updated recruitment and selection criteria appropriately prioritize candidates with existing digital health competencies or demonstrated willingness to develop these essential skills. Comprehensive orientation programs for new employees include thorough digital health training and structured mentorship assignments that facilitate smooth integration in a digitally-enabled work environment. Continuous cultural assessment mechanisms effectively monitor progress in the transformation journey and proactively identify areas that require additional support or intervention to maintain strong momentum toward complete digital culture adoption.

CONCLUSION

Research Conclusions

The successful implementation of RME at Kariadi Hospital in Semarang confirms that effective collaboration between digital leadership, change management, and technology readiness creates a solid foundation for digital healthcare transformation. Digital leadership proved to be a fundamental catalyst through the formation of a clear strategic vision, demonstration of personal commitment through role-modeling behavior, and consistent communication about the strategic benefits of RME implementation. The established Digital Health Steering Committee facilitated participatory governance and cross-functional collaboration, essential for sustainable transformation.

Change management served as a critical mediator connecting technology readiness with practical adoption at the operational level. A comprehensive multi-phased approach, customized training programs, and super-user networks successfully minimized resistance and maximized user acceptance. Technology readiness created a foundation of trust through robust infrastructure, an intuitive user interface, and responsive technical support, ensuring system reliability and user confidence.

Cross-departmental collaboration optimized integrated workflows and facilitated real-time information sharing, significantly improving operational efficiency and care quality. Clinical Integration Committees and shared governance structures ensured sustainable coordination mechanisms. The organizational culture transformation demonstrates a fundamental shift from a paper-based paradigm to an inclusive and sustainable digital-first approach, with the successful integration of generational diversity and values alignment.

Theoretical Implications

The research findings enrich theoretical understanding of digital health transformation by validating an integrated approach that combines the Technology Acceptance Model (TAM), Kotter's Change Management Theory, and the Technology Readiness Index (TRI). The research confirms the mediating role of change management in the relationship between technology readiness and implementation success, contributing to a theoretical framework for digital health adoption. The identified dynamic interaction model between leadership, change management, and technology readiness provides a theoretical foundation for understanding complex organizational transformation processes in healthcare settings.

Practical Implications

This research provides an actionable framework for healthcare organizations planning or implementing digital transformation initiatives. Identified best practices can be adapted to develop comprehensive RME implementation strategies that consider leadership development, change management planning, and technology infrastructure requirements. Proven effective governance structures, training methodologies, and communication strategies can serve as templates for similar healthcare organizations. Policymakers can utilize the findings to develop supportive regulations and guidelines that facilitate successful digital health transformation.

Research Limitations

This research has several limitations that need to be acknowledged. The single case study design at Kariadi Hospital may limit generalizability to healthcare organizations with different characteristics, sizes, or contexts. The focus on internal organizational factors does not comprehensively examine external influences such as the regulatory environment, vendor relationships, or broader industry dynamics. Temporal limitations prevent long-term evaluation of the sustainability and evolution of digital transformation outcomes. Additionally, the subjective nature of qualitative data may introduce interpretation biases despite rigorous validation procedures.

Future Research Recommendations

Future research should conduct comparative studies across multiple healthcare organizations with varying characteristics to enhance external validity. Longitudinal studies examining the long-term sustainability of digital

transformation initiatives and their impact on organizational performance metrics will provide valuable insights about the durability of success factors. Mixed-methods approaches incorporating quantitative measurements of adoption rates, user satisfaction scores, and operational metrics will strengthen the evidence base. Research exploring external factors' influence on implementation success, including regulatory support, vendor partnerships, and technological innovations, would develop a more comprehensive understanding of digital health ecosystem dynamics. Cross-cultural studies examining digital health transformation in different healthcare systems would contribute to a global knowledge base for digital health implementation strategies.

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