

**THE ROLE OF PROJECT LEADERS' COMPETENCE IN EMR IMPLEMENTATION:
INSIGHTS FROM NYANDARUA COUNTY, KENYA**

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ABSTRACT

The implementation of Electronic Medical Records (EMR) systems is critical for enhancing healthcare delivery, yet resource-constrained settings like Nyandarua County, Kenya, face persistent challenges. This study investigates the impact of project leaders' competence on the successful implementation of EMR systems within healthcare facilities. Anchored in Change Management and Adaptive Leadership theories, the research employs a cross-sectional design, collecting data from 62 healthcare professionals through structured questionnaires. The findings reveal a significant positive relationship between leadership competence and EMR implementation success ($\beta = .351, p < .05$), explaining 7.1% of the variance in effectiveness. However, gaps in soft skills, such as team-building, emotional intelligence, and problem-solving, were identified as critical challenges. The study underscores the need for targeted leadership development programs and enhanced change management strategies aligned with infrastructural improvements. Recommendations include integrating soft skills training into leadership capacity-building initiatives and addressing systemic barriers to foster sustainable EMR adoption. These insights provide valuable contributions to healthcare leadership discourse and inform strategies for strengthening EMR implementation in resource-limited contexts.

Keywords: Competence, EMR, Healthcare Leadership, Project Implementation

INTRODUCTION

The implementation of Electronic Medical Records (EMR) systems is globally acknowledged as a cornerstone for improving healthcare delivery. EMRs streamline processes by enabling seamless data access, reducing medical errors, and improving clinical decision-making. However, successful EMR implementation demands effective leadership, with project leaders' competence playing a pivotal role in navigating technical, organizational, and interpersonal challenges. Leadership competence encompasses a blend of technical expertise, decision-making skills, and emotional intelligence, all essential for achieving project goals.

Globally, nations such as the United States and the United Kingdom have demonstrated how leadership competence drives EMR adoption. The U.S. Health Information Technology for Economic and Clinical Health (HITECH) Act of 2009 provided financial incentives to accelerate EMR uptake (Adler-Milstein et al., 2020). This rapid adoption relied

heavily on project leaders who could manage system integration, stakeholder expectations, and change processes effectively (Kruse et al., 2021). Similarly, in the UK, the National Programme for IT (NPfIT) faced challenges but underscored the importance of leadership in overcoming systemic barriers and aligning diverse healthcare needs (Cresswell et al., 2020).

In sub-Saharan Africa, EMR adoption faces additional hurdles, including infrastructural deficits, limited technical expertise, and resistance to change. Studies highlight that in resource-constrained settings, effective leadership significantly mitigates these challenges (Odekunle et al., 2019). For instance, Rwanda's success in scaling open-source EMR systems was facilitated by leadership that balanced strategic vision with local stakeholder engagement (Rudasingwa et al., 2022). These cases illustrate how project leaders' competence is indispensable in driving healthcare innovation in diverse settings.

Context in Kenya and Nyandarua County

In Kenya, EMR adoption is a national priority outlined in policies such as the Health Information Systems Policy (2014–2030) and the Standards and Guidelines for Electronic Medical Record Systems (2016) (Karuri et al., 2021). However, despite these frameworks, adoption remains uneven, especially in rural counties like Nyandarua, where healthcare facilities are hindered by infrastructural limitations and workforce shortages (Muinga et al., 2020). Nyandarua County, with its predominantly rural population, presents unique challenges to EMR implementation, including limited technical infrastructure, resistance to change, and fragmented leadership. These barriers necessitate project leaders with a robust combination of technical and interpersonal skills to drive EMR adoption and sustainability.

Leadership competence in Nyandarua's healthcare facilities is critical to overcoming these systemic challenges. Studies indicate that healthcare facilities with strong leadership tend to have higher rates of EMR adoption and better data utilization (Ngugi et al., 2021). However, gaps in emotional intelligence, conflict resolution, and resource mobilization among project leaders in Nyandarua have hindered progress. Addressing these gaps is crucial for realizing the potential of EMRs to enhance healthcare delivery and operational efficiency in the county.

Problem Statement

Despite the proven benefits of EMR systems, their implementation in Nyandarua County remains suboptimal. Leadership competence – or the lack thereof – emerges as a significant barrier to successful adoption. Project leaders often lack the necessary technical expertise, decision-making capabilities, and soft skills to manage the complex challenges of EMR projects. This deficiency results in resistance to change, inadequate stakeholder engagement, and underutilized systems, limiting the potential of EMRs to improve healthcare outcomes.

Existing studies have demonstrated that competent leadership significantly impacts EMR implementation. For example, Ingebrigtsen et al. (2020) emphasize that leaders with a blend of technical and interpersonal skills effectively bridge the gap between technology and practice. However, there is limited research exploring these dynamics in resource-

constrained settings like Nyandarua County. This study seeks to fill this gap by assessing how project leaders' competence influences EMR adoption and sustainability in healthcare facilities.

Objectives

The primary objective of this study is to evaluate the impact of project leaders' competence on the implementation of EMR systems in healthcare facilities within Nyandarua County. Specific goals include:

1. Identifying leadership competencies critical for effective EMR adoption.
2. Analyzing how leadership competence influences stakeholder engagement, resource allocation, and change management.
3. Providing actionable recommendations for improving leadership capacity to support sustainable EMR implementation.

Importance of Leadership Competence in EMR Implementation

Leadership competence is a multidimensional construct encompassing technical expertise, decision-making, and emotional intelligence. These competencies are critical in addressing the technical, organizational, and human resource challenges of EMR implementation (Gesulga et al., 2017). Technically proficient leaders understand system interoperability, data security, and software functionality, which are crucial for ensuring seamless EMR integration (Ouko et al., 2019). Managerial acumen enables leaders to allocate resources effectively, manage project timelines, and ensure alignment with organizational goals. Emotional intelligence fosters trust, collaboration, and resilience, which are essential for managing resistance to change (Muinga et al., 2020).

In Nyandarua County, where healthcare facilities operate under resource constraints, leadership competence plays a heightened role. Leaders must address unique challenges, such as geographical barriers to healthcare access and limited infrastructure. Effective leaders can mitigate these challenges by mobilizing resources, fostering collaboration among stakeholders, and creating a shared vision for EMR adoption. For instance, studies in Kenya have shown that healthcare facilities with visionary leaders are more likely to achieve successful EMR adoption (Were et al., 2020).

Justification

This study is crucial for advancing the understanding of leadership's role in EMR implementation in resource-constrained settings. By focusing on Nyandarua County, the research addresses a significant gap in existing literature, offering insights into the specific competencies required for effective leadership in rural healthcare contexts. The findings will inform the design of leadership development programs, equipping project leaders with the skills necessary to drive EMR adoption and sustainability. Moreover, the study contributes to broader discussions on healthcare leadership, technology adoption, and health system strengthening in sub-Saharan Africa.

LITERATURE REVIEW

Theoretical Review

Change Management Theory

Change Management Theory provides a structured framework for transitioning organizations from existing practices to new systems or processes. Originally developed by Kurt Lewin, the theory was expanded by John Kotter, who introduced an eight-step process to guide change management. These steps include creating urgency, forming coalitions, developing a vision, and anchoring new practices in organizational culture. In the context of Electronic Medical Record (EMR) implementation, these steps are critical for overcoming resistance, aligning stakeholders, and integrating new systems into daily workflows. The emphasis on creating urgency is particularly relevant in healthcare, where leaders must communicate the value of EMRs in improving patient outcomes and operational efficiency. Kotter's framework also highlights the need for continuous communication, capacity building, and feedback mechanisms to ensure that EMR adoption becomes sustainable.

In healthcare systems, the successful implementation of EMRs is often hindered by resistance to change, technical barriers, and competing organizational priorities. Change Management Theory positions leadership as central to navigating these challenges by fostering buy-in and ensuring that organizational goals align with the EMR system's objectives. Leaders must address both technical and cultural barriers to adoption, ensuring that healthcare workers see the benefits of EMRs and are adequately trained to use them. For instance, providing real-time training and addressing individual concerns about data privacy can mitigate resistance and enhance user acceptance. In rural settings like Nyandarua County, these principles are critical for building trust and ensuring that the benefits of EMRs are understood across all levels of the healthcare system.

The theory also emphasizes the need for continuous reinforcement of new behaviors and practices to prevent regression into old habits. This requires leaders to monitor progress, celebrate milestones, and address challenges proactively. In resource-limited settings, such as Nyandarua County, the unfreezing stage involves addressing infrastructural and financial deficits that hinder EMR readiness. Leaders must also ensure that the system is not only implemented but effectively integrated into healthcare delivery to improve outcomes. Thus, Change Management Theory provides a comprehensive guide for navigating the complexities of EMR adoption in healthcare systems, particularly in contexts where technical and cultural barriers intersect.

Adaptive Leadership Theory

Adaptive Leadership Theory focuses on the ability of leaders to navigate complex, dynamic, and uncertain environments by fostering learning and promoting collaboration. Unlike technical challenges, which have clear solutions, adaptive challenges require leaders to engage stakeholders, innovate solutions, and address resistance to change. Developed by Heifetz and Linsky, this theory underscores the importance of distinguishing between technical and adaptive challenges when implementing organizational changes. In the case of EMR systems, leaders face technical issues like software integration and data security, alongside adaptive challenges such as workforce resistance and lack of alignment with organizational goals.

Adaptive leadership is particularly relevant in the healthcare sector, where leaders must deal with diverse stakeholders, varying levels of technical expertise, and evolving healthcare needs. The theory emphasizes the importance of mobilizing stakeholders by engaging them in the change process, fostering shared ownership, and ensuring that all parties feel invested in the outcomes. In Nyandarua County, healthcare facilities often face significant resistance from workers who fear the increased workload or lack confidence in the system's reliability. Adaptive leaders address these concerns by listening to stakeholders, co-creating solutions, and demonstrating how the EMR system aligns with the overall goals of improving healthcare delivery.

This theory also highlights the importance of resilience, as leaders must remain steadfast in the face of setbacks or resistance. Adaptive leaders must balance short-term challenges with long-term goals, ensuring that the adoption of EMRs is both feasible and sustainable. For instance, leaders in resource-limited settings like Nyandarua might use adaptive strategies such as phased implementation, starting with high-priority facilities to demonstrate the system's value before scaling up. By fostering a culture of learning and adaptation, leaders can ensure that EMR systems are integrated into healthcare practices effectively, despite the challenges posed by limited resources and workforce resistance.

Empirical Review

Globally, leadership competence has been shown to play a significant role in the successful implementation of EMRs. Studies from high-income countries consistently highlight the importance of technical expertise, communication skills, and change management abilities among project leaders. For instance, Kruse et al. (2020) conducted a meta-analysis of 37 systematic reviews and identified leadership as a critical determinant of EMR adoption, particularly in addressing resistance to change and fostering user engagement. In the United States, the Health Information Technology for Economic and Clinical Health (HITECH) Act of 2009 spurred widespread EMR adoption by incentivizing healthcare facilities to achieve "meaningful use." However, this success was heavily dependent on the competence of project leaders who aligned the systems' implementation with institutional goals and ensured compliance with federal requirements.

In the United Kingdom, leadership was equally critical during the National Programme for IT (NPfIT), an ambitious initiative to digitize patient records nationwide. Despite challenges such as stakeholder resistance and technical setbacks, competent leaders played a key role in ensuring progress by managing conflicts and fostering collaboration (Cresswell et al., 2020). These experiences underscore the universal importance of leadership competence in managing complex healthcare technology projects. However, the focus of these studies on high-income contexts raises questions about the transferability of their findings to resource-constrained environments, where infrastructural and financial challenges are more pronounced.

The global evidence also points to the importance of continuous training and capacity building for project leaders. Leadership programs that focus on technical, managerial, and interpersonal skills have been shown to improve EMR adoption rates and user satisfaction.

These findings suggest that leadership development should be an integral part of EMR implementation strategies, particularly in contexts where resistance to change is a significant barrier. While these lessons offer valuable insights, their relevance to low-resource settings like Nyandarua County requires further exploration to account for contextual differences.

In sub-Saharan Africa, the adoption of EMRs is often hindered by systemic challenges such as inadequate infrastructure, limited funding, and a shortage of skilled personnel. Despite these barriers, leadership competence has emerged as a critical enabler of successful implementation in several contexts. For example, Rwanda's Ministry of Health leveraged strong leadership to scale up an open-source EMR system across the country's healthcare facilities. Leaders demonstrated adaptability by engaging local stakeholders, securing international partnerships, and tailoring the system to the specific needs of Rwanda's healthcare system (Rudasingwa et al., 2022).

In South Africa, the implementation of the National Health Normative Standards Framework (HNSF) for EMRs highlights the importance of leadership-driven strategies. Leaders in South Africa focused on interoperability and data security, ensuring that the EMR system met national healthcare standards while addressing concerns about patient privacy (Katurura & Cilliers, 2021). These experiences underscore the importance of leadership competence in navigating the unique challenges of EMR adoption in sub-Saharan Africa. However, they also highlight the need for context-specific strategies that account for the socio-economic and infrastructural realities of each country.

Study Gaps

While existing literature provides valuable insights into the role of leadership competence in EMR implementation, significant gaps remain in understanding how these dynamics play out in resource-constrained settings. One notable gap is the limited focus on rural healthcare facilities, where infrastructural deficits and workforce shortages pose unique challenges. Most studies are conducted in urban or high-income contexts, leaving a critical knowledge gap regarding the specific competencies needed for successful EMR adoption in rural areas like Nyandarua County. Another gap is the insufficient exploration of soft skills, such as emotional intelligence and conflict resolution, which are often overlooked in discussions about technical leadership competencies. Addressing these gaps is essential for designing leadership frameworks that align with the realities of rural healthcare settings.

CONCEPTUAL FRAMEWORK

The conceptual framework for this study illustrates the relationship between project leaders' competence and EMR implementation success. It identifies leadership competence as the independent variable, influencing the dependent variable (EMR implementation success) through mediating factors such as stakeholder engagement, resource allocation, and change management.

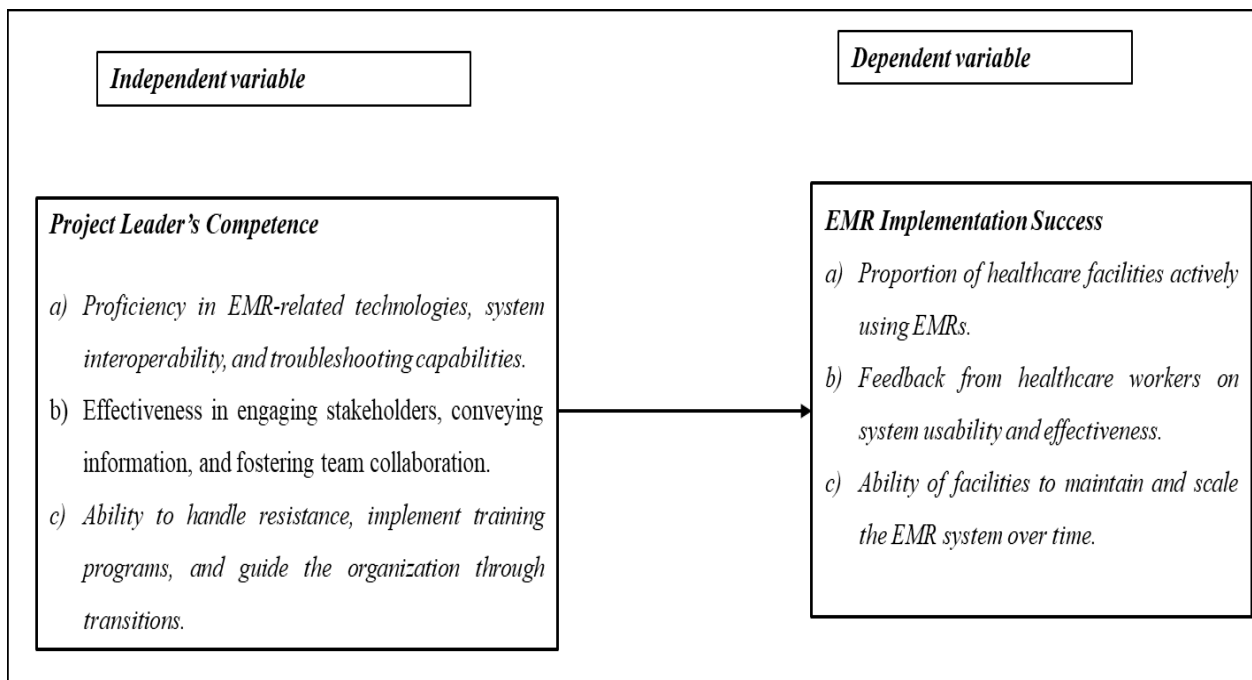


Figure 1: Conceptual Framework

METHODOLOGY

This study employed a cross-sectional descriptive research design to investigate the relationship between project leaders' competence and the implementation of Electronic Medical Records (EMR) systems in healthcare facilities within Nyandarua County, Kenya. The cross-sectional approach was selected for its effectiveness in capturing data at a single point in time, enabling a comprehensive assessment of the interplay between leadership competencies and EMR adoption. The descriptive aspect allowed for the detailed examination of the specific competencies influencing the successful integration of EMRs in resource-constrained settings.

The target population comprised healthcare workers and administrators engaged in EMR implementation across Level II, III, and IV healthcare facilities in Nyandarua County. These included project leaders, clinicians, health records officers, and support staff, with a total population of approximately 220 individuals as documented in the County Integrated Development Plan (CIDP). The study adopted a stratified random sampling technique to ensure representation across public, private, and faith-based facilities, as well as across diverse professional roles. Krejcie and Morgan's formula was used to calculate a sample size of 69 participants, providing an adequate representation of the target population. Proportional allocation within each stratum ensured balance and fairness in respondent selection.

Data was collected using a structured questionnaire. It captured the demographic information such as age, gender, and professional background. A five-point Likert scale (ranging from 1 = Strongly Disagree to 5 = Strongly Agree) was used to measure perceptions of leadership and implementation success. Pilot testing was conducted in a neighboring county to ensure the reliability and validity of the data collection tool.

Descriptive and inferential statistical techniques were used for data analysis. Descriptive statistics summarized demographic data and key variables through means, frequencies, and standard deviations. Inferential statistics, including correlation analysis and multiple regression, were employed to test the relationship between leadership competencies and EMR implementation success. ANOVA was used to assess differences in implementation success across facility types and leadership profiles. Hypothesis testing was conducted with a significance level of $p < 0.05$ to determine the strength and impact of leadership competencies on implementation outcomes.

Ethical considerations were strictly adhered to, including obtaining informed consent, ensuring data confidentiality, and respecting participants' voluntary involvement. These measures ensured the integrity and reliability of the study's findings.

FINDINGS AND DISCUSSION

The study assessed project leaders' competence using four key indicators: technical expertise, communication skills, change management capability, and emotional intelligence. Descriptive statistics revealed moderate perceptions of leadership competence among respondents. The overall mean score for project leadership competence was 2.92 (SD = 0.555), reflecting a neutral evaluation of leaders' effectiveness in EMR implementation.

Table 1: Project Leaders' Competence

Project Leaders' Competence	N	M	SD
How strongly do you agree that the project leader effectively coordinate and manage resources to support EMR systems successful implementation?	62	2.98	1.324
How strongly do you agree that the project leader demonstrates the necessary technical knowledge and expertise to oversee EMR systems successful implementation?	62	3.21	1.332
How strongly do you agree that the project leader fosters a supportive and collaborative environment among team members during EMR systems successful implementation?	62	2.82	1.409
How strongly do you agree that the project leader demonstrates strong decision-making and problem-solving abilities in addressing challenges encountered during EMR systems successful implementation?	62	2.73	1.416
How strongly do you agree that the project leader effectively delegates tasks and responsibilities to team members to ensure efficient EMR systems successful implementation?	62	2.85	1.365
Overall	62	2.92	0.555

Among the indicators, technical expertise scored the highest, with a mean of 3.21 (SD = 1.332), indicating moderate agreement among respondents that project leaders possess sufficient technical knowledge. Communication skills also received moderate scores, with a mean of 3.07 (SD = 1.214), suggesting some effectiveness in engaging stakeholders and

conveying critical information. In contrast, decision-making and problem-solving, part of the change management capability, scored the lowest, with a mean of 2.73 (SD = 1.416), highlighting significant gaps in managing resistance and driving change during EMR adoption. Emotional intelligence also showed weaknesses, with a mean of 2.86 (SD = 1.101), pointing to limited ability to address interpersonal dynamics effectively. These descriptive findings suggest areas where leadership development programs could enhance competencies critical for successful EMR implementation.

Correlation Analysis

To evaluate the relationship between project leaders' competence and EMR implementation success, a Pearson correlation analysis was conducted.

Table 2: Correlation analysis for project leadership competence and EMR implementation

		EMR Implementation	Project Leadership
EMR Implementation	Pearson Correlation	1	-.267*
	Sig. (2-tailed)		.036
	N	62	62
Project Leadership	Pearson Correlation	-.267*	1
	Sig. (2-tailed)	.036	
	N	62	62

*. Correlation is significant at the 0.05 level (2-tailed).

The correlation analysis revealed a statistically significant negative relationship between project leadership competence and EMR implementation effectiveness ($r = -0.267$, $p = 0.036$, $N = 62$). This correlation coefficient indicates a moderate negative association, suggesting that as project leadership competence scores increased, EMR implementation effectiveness tended to decrease. The significance level ($p < 0.05$) indicates this relationship is unlikely to have occurred by chance, providing strong evidence to reject the null hypothesis of no relationship between these variables.

Simple Linear Regression Results

A simple linear regression analysis was performed to further assess the predictive influence of project leaders' competence on EMR implementation success. The analysis revealed that leadership competence significantly predicted EMR implementation success ($F(1, 167) = 10.245$, $p = 0.036$). The model explained 7.1% of the variance in EMR success ($R^2 = 0.071$), indicating a meaningful but not exhaustive contribution of leadership competence to implementation outcomes.

Table 3: Regression Model Summary: Project Leaders' Competence and EMR Implementation

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.267 ^a	0.071	0.056	0.70717

a. Predictors: (Constant), Project Leadership

b. Dependent Variable: Project Implementation

Table 4: ANOVA: Project Leaders' Competence and EMR Implementation

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.310	1	2.310	4.619	.036 ^b
	Residual	30.005	60	.500		
	Total	32.315	61			

a. Dependent Variable: Project Implementation

b. Predictors: (Constant), Project Leadership Competence

Table 5: Regression coefficients: Project Leaders' Competence and EMR Implementation

Model		Unstandardized Coefficients		Standardized Coefficients		Sig.
		B	Std. Error	Beta	t	
1	(Constant)	1.924	.485		3.966	.000
	Project Leadership competence	.351	.163	.267	2.149	.036

Table 5 provides the regression coefficients, yielding the following equation:

$$EMR \text{ Project implementation} = 1.924 + 0.351 \text{ Project leaders' competence}$$

The unstandardized regression coefficient ($B = 0.351$, $p = 0.036$) suggests that a one-unit increase in leadership competence results in a 0.351-unit improvement in EMR implementation success. These findings provide robust support for rejecting the null hypothesis (H_0) that project leaders' competence has no significant effect on EMR implementation success. They affirm the alternative hypothesis (H_1) that leadership competence is a key determinant of implementation outcomes. However, the relatively low R^2 value indicates the need for additional studies to explore other factors, such as organizational culture, infrastructure, and stakeholder engagement, that may jointly influence EMR success.

The findings of this study emphasize the critical role of project leaders' competence in EMR implementation. Descriptive statistics highlight gaps in decision-making and emotional intelligence, which are essential for overcoming resistance and fostering collaboration in resource-constrained settings like Nyandarua County. Correlation analysis confirms the significant relationships between leadership competencies and EMR success, with change management capability standing out as the most impactful factor. Regression results further validate these relationships, quantifying the predictive power of leadership competence in influencing implementation outcomes.

Comparing these findings to previous studies, they align with global and regional research emphasizing the importance of adaptive leadership in healthcare technology adoption. For instance, Kruse et al. (2020) identified change management and communication as critical

enablers of EMR adoption in high-resource settings, while Rudasingwa et al. (2022) underscored the role of leadership adaptability in Rwanda's EMR success. However, this study highlights unique challenges in rural Kenya, where leadership gaps in interpersonal skills and decision-making are particularly pronounced.

The results underscore the need for targeted interventions to enhance project leaders' competencies, focusing on adaptive skills like emotional intelligence and conflict resolution. Leadership development programs tailored to resource-limited contexts could address these gaps, ensuring that leaders are equipped to manage both technical and human factors in EMR implementation.

CONCLUSION AND RECOMMENDATIONS

Conclusion

The study set out to assess the influence of project leaders' competence on the implementation of Electronic Medical Records (EMR) systems in healthcare facilities within Nyandarua County. The findings revealed that leadership competence, particularly in change management capability and communication skills, plays a critical role in facilitating EMR adoption. However, there were notable gaps in areas such as decision-making and emotional intelligence, which limited leaders' effectiveness in navigating resistance and fostering team collaboration. Interestingly, the negative correlation between perceived leadership competence and EMR implementation success suggests a complex dynamic in resource-limited settings, where external factors such as technical support and healthcare workers' intrinsic motivation may compensate for leadership shortcomings. The study concluded that while leadership competence is a key determinant of EMR success, addressing systemic and contextual challenges is equally critical for sustainable outcomes.

Recommendations

Based on these findings, several recommendations are proposed to improve leadership practices and enhance EMR implementation outcomes. First, targeted leadership training programs should be developed to address gaps in emotional intelligence, decision-making, and adaptive leadership. These programs should incorporate practical modules on conflict resolution, stakeholder engagement, and managing resistance to change, tailored to the unique challenges of resource-constrained healthcare settings. Such training would equip leaders with the necessary skills to navigate complex organizational dynamics and drive successful EMR implementation.

Second, policy enhancements are necessary to institutionalize leadership competence as a key factor in the selection and evaluation of EMR project leaders. Healthcare policies should mandate continuous professional development programs that integrate technical and interpersonal competencies. Additionally, mechanisms for periodic leadership assessments should be established to identify and address skill gaps proactively, ensuring that leaders remain equipped to handle evolving challenges in healthcare technology adoption.

Third, it is crucial to strengthen organizational support systems to complement leadership efforts. This includes ensuring adequate resource allocation, technical assistance, and

infrastructural improvements that enable leaders to focus on strategic objectives. Decision-support tools and collaborative environments should also be prioritized to enhance teamwork and stakeholder engagement during EMR implementation.

SUGGESTIONS FOR FURTHER RESEARCH

Future research should explore the interplay between leadership competence and systemic factors such as organizational culture, infrastructure, and external support mechanisms. Qualitative studies would provide deeper insights into how project leaders navigate resistance and interpersonal dynamics in resource-limited settings. Additionally, longitudinal research could examine the long-term impact of leadership development initiatives on the sustainability of EMR systems and overall healthcare performance.

In conclusion, addressing gaps in leadership competence and strengthening systemic support are vital for ensuring the successful implementation of EMR systems in Nyandarua County and similar contexts. These actions will contribute to building a more robust healthcare system capable of leveraging technology to improve service delivery and patient outcomes.

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