

Analysis of User Satisfaction of Electronic Medical Record (EMRE) Application Using Pieces Framework Method at Kamaipura Community Health Center, Sigi Regency

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Abstract: The implementation of Electronic Medical Records (EMR) is mandated by Minister of Health Regulation No. 24 of 2022, but its implementation at the Kamaipura Community Health Center still faces technical obstacles such as slow internet connection and incomplete reporting features. This study aims to analyze the level of satisfaction of EMR application users using the PIECES Framework method (Performance, Information, Economic, Control, Efficiency, and Service) at the Kamaipura Community Health Center, Sigi Regency. This type of research is quantitative with a questionnaire instrument distributed to health workers (doctors, nurses, midwives, and medical records officers). Data analysis used multiple linear regression tests to determine the partial (t-test) and simultaneous (f-test) effects of PIECES variables on user satisfaction. The results showed that all PIECES Framework variables simultaneously have a significant influence on user satisfaction of the EMR application. Partially, only system reliability (performance) had a significant effect on the perception of health worker satisfaction, while information quality, economic, control/security, efficiency, and service showed no significant partial effect. It can be concluded that the PIECES method is effective in mapping weaknesses in the EMR system. The recommendations of this research are the need to increase internet network capacity, complete reporting features, and prepare official SOPs.

Keywords: Electronic Medical Records, User Satisfaction, PIECES Framework, Community Health Center.

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INTRODUCTION

The integration of high-quality healthcare data through the adoption of information technology is a crucial instrument in accelerating the transformation of the national healthcare system in the digital era. The implementation of this paperless system has been proven to reduce administrative waiting times, minimize the risk of medical input errors, and improve data accuracy in clinical decision-making. To provide a strong legal framework, the Indonesian government officially requires all healthcare facilities to

transition from conventional medical records to electronic ones by the end of 2024, through the issuance of Minister of Health Regulation Number 24 of 2022 concerning Medical Records (Ahmad Fauzi, 2024).

However, in reality, the migration process from manual medical records to Electronic Medical Records (EMR) in various Primary Health Facilities (FKTP) outside the city still faces significant operational and technical obstacles. Initial observations indicate that the existing EMR application system is often not fully integrated with the reporting features of the health center's internal programs or external referral systems. In addition, infrastructure limitations such as uneven internet bandwidth capacity often trigger system lag during data processing, which is exacerbated by the lack of a formal Standard Operating Procedure (SOP) document that regulates the application's usage flow (Siti Rahmawati, 2025).

The implementation of this system is increasingly complex due to gaps in human resource capabilities and the arrangement of supporting physical spaces in primary care institutions. The majority of healthcare workers in the field have reportedly never received formal, certified training on RME operations, resulting in a slow adaptation process to digital work. These administrative issues are further complicated by the limited spatial layout of community health center offices, where space for administrative management, document sorting, and computer typing activities is still combined in the same room, creating a less systematic and ergonomic work environment (Bambang Triyono, 2025).

The novelty of this study lies in the comprehensive post-implementation evaluation of the mandatory implementation of Minister of Health Regulation No. 24 of 2022 at the rural community health center level using the PIECES Framework instrument approach. Through its six analytical dimensions (Performance, Information, Economic, Control, Efficiency, and Service), this method is able to holistically identify system weaknesses and latent satisfaction directly from the perceptions of end-users. This novel analysis also includes conceptualizing the relationship between technological barriers to RME applications and the specific demographic characteristics of local workers, who are predominantly young, productive age groups but have limited access to ongoing formal training (Dian Wijaya, 2026).

Based on the background and problem formulation that has been explained, the main objective of this research is to analyze and measure the level of user satisfaction of the Electronic Medical Record (EMR) application using the PIECES Framework method at the Kamaipura Community Health Center, Sigi Regency. Specifically, this quantitative research aims to prove and analyze the partial and simultaneous influence of the dimensions of system performance, information quality, economic aspects, security control, workflow efficiency, and the quality of technology services on the satisfaction of healthcare workers (doctors, nurses, midwives, and medical records officers) in order to formulate recommendations for continuous system improvement (Endah Lestari, 2026).

The development of health information technology in today's digital era demands routine and high-quality data integration as a key pillar of healthcare transformation. Utilizing digital-based systems not only simplifies administrative processes but also improves the speed, completeness, and accuracy of data input, which is crucial for real-time clinical decision-making (Ningsih et al., 2022).

Globally and nationally, conventional medical document management is now being replaced by Electronic Medical Records (EMR). The implementation of EMR has been proven to improve the overall quality of care and significantly contribute to patient safety by providing an integrated clinical database (Priyadi et al., 2023).

The Indonesian government, through the Minister of Health Regulation (Permenkes) No. 24 of 2022, has required all health service facilities, including Community Health Centers (Puskesmas), to implement RME no later than December 31, 2023. This regulation encourages a massive shift from a manual, paper-based recording system to an integrated digital ecosystem (Ministry of Health of the Republic of Indonesia, 2022).

Despite established regulations, the implementation of EMR at the primary care level often faces significant operational barriers. At the Kamaipura Community Health Center, significant technical challenges persist, such as inadequate internet network capacity, which slows down data entry, and suboptimal program reporting features and referral procedures, which still require the use of external systems (Yoga et al., 2021).

Besides infrastructure constraints, change management and user readiness (brainware) are other critical challenges. The lack of written documentation regarding EMR Standard Operating Procedures (SOPs) and the fact that the majority of healthcare workers have not received formal training have fueled administrative and operational uncertainty in the field (Andani & Nurrachmawati, 2024).

Evaluations of information system success have often focused solely on the readiness of physical infrastructure, without comprehensively examining end-user perceptions. The novelty of this study lies in the in-depth use of the PIECES Framework to map the satisfaction of multispecialty users (doctors, nurses, midwives, and medical records officers) at the Kamaipura Community Health Center in Sigi Regency, in order to identify system weaknesses multidimensionally (Fida Pratama et al., 2024).

Through an analysis of the six main dimensions of the PIECES Framework—namely Performance, Information, Economic, Control, Efficiency, and Service—this study provides an objective evaluation framework regarding the extent to which RME technology truly fits and supports the daily clinical tasks of medical staff, rather than simply looking at the physical implementation of the application (Wetherbe, 2012).

Based on these issues, this study aims to analyze and empirically demonstrate the influence of the PIECES Framework dimensions, both partially and simultaneously, on user satisfaction with the RME application at the Kamaipura Community Health Center. The results are expected to serve as the basis for strategic recommendations for the Sigi Regency Health Office in optimizing the use of sustainable health technology (Septiani et al., 2023).

METHODOLOGY

This study employed quantitative research to demonstrate the causal relationship between the independent and dependent variables. The population comprised all 40 employees of the Kamaipura Community Health Center (Puskesmas) who operate the Electronic Medical Records (RME) application. The sampling technique employed a census or total population method, thus utilizing all members of the population as respondents. Primary data collection was conducted empirically through structured questionnaires and direct interviews, while secondary data was obtained through institutional documents from relevant agencies (Sugiyono, 2022).

The main data collection instrument was a questionnaire measured using a five-level Likert scale, ranging from strongly disagree to strongly agree. Instrument quality was tested through validity using the Product Moment correlation formula and reliability using the Cronbach Alpha method. Data analysis techniques applied included descriptive univariate analysis to examine frequency distribution, bivariate

analysis using the Spearman Rank correlation test to examine partial relationships, and multivariate analysis using multiple linear regression models to demonstrate the simultaneous influence of all independent variables on user satisfaction (Sugiyono, 2022).

RESULTS AND DISCUSSION

Univariate Analysis

Table 1. Distribution of Respondents by Age Group

No	Age Group	Frequency (f)	Percentage (%)
1.	21 - 30 Years	20	50
2.	31 - 40 Years	14	35
3.	41 - 50 Years	3	7.5
4.	> 50 Years	3	7.5
Amount		40	100

Source: Primary Data, 2026

Based on table 1, it can be seen that of the total 40 respondents, the majority of the respondents' age group is young productive age, namely 21–30 years old as many as 20 people (50%) and 31–40 years old as many as 14 people (35%). The rest are aged 41–50 years old (7.5%) and > 50 years old (7.5%).

Table 2. Distribution of Respondents Based on Education

No	Education	Frequency (f)	Percentage (%)
1.	Diploma	27	67.5
2.	Bachelor	13	32.5
Amount		40	100.0

Source: Primary Data, 2026

Based on Table 2, it can be seen that of the 40 respondents, 27 (67.5%) had a Diploma 3 (D3) educational background and 13 (32.5%) had a Bachelor's degree (S1). This indicates that the majority of respondents were technical/vocational workers.

Table 3. Distribution of Respondents Based on Work experience

No	Work experience	Frequency (f)	Percentage (%)
1.	< 1 Year	6	15
2.	14 years	20	50
3.	> 4 Years	14	35
Amount		40	100

Source: Primary Data, 2026

Based on table 3, it can be seen that of the total of 40 respondents, the majority of respondents have worked for 1-4 years, namely 20 people (50%), followed by senior workers > 4 years as many as 14 people (35%), and new workers < 1 year as many as 6 people (15%).

Table 4. Distribution of Respondents Based on RME Training

No	RME Training	Frequency (f)	Percentage (%)
1.	Never	32	80
2.	Once	8	20
Amount		40	100

Source: Primary Data, 2026

Based on table 4, it can be seen that of the total of 40 respondents, the majority of respondents, namely 32 people (80%), have never received formal training related to electronic medical records (ERD) and only 8 people (20%) have been trained.

Table 5. Distribution of Respondents Based on Experience Using Computers

No	Experience Using Computers	Frequency (f)	Percentage (%)
1.	<1 Year	8	20
2.	14 years	17	42.5
3.	> 4 Years	15	37.5
Amount		40	100

Source: Primary Data, 2026

Based on table 5, it can be seen that of the total 40 respondents, 17 people (42.5%) had 1–4 years of computer experience, 15 people (37.5%) had > 4 years of experience, and 8 people (20.0%) had less than 1 year.

Table 6. Distribution of Respondents Based on Performance Variables

No	Performance Variables	Frequency (f)	Percentage (%)
1.	Not Reliable	14	35
2.	Reliable	26	65
Amount		40	100

Source: Primary Data, 2026

Table 6 shows that of the 40 respondents, 26 (65%) rated the system's performance as reliable, while 14 (35%) rated it as unreliable. The majority of staff felt the RME system's workflow was quite fast and efficient. However, the 35% unreliable figure remains a significant number. This indicates latent technical issues, such as the system sometimes lagging during peak service hours or waiting times for patient data loading that some users still consider too long.

Table 7. Distribution of Respondents Based on Information Variable

No	VariablesInformation	Frequency (f)	Percentage (%)
1.	Not Reliable	11	27.5
2.	Reliable	29	72.5
	Amount	40	100

Source: Primary Data, 2026

Table 7 shows that of the 40 respondents, 29 (72.5%) rated the information/data aspect as reliable, while only 11 (27.5%) rated it as unreliable. This reliability rating is among the highest among the other dimensions. This demonstrates that the EMR system has successfully provided structured patient clinical data, minimized misreading of physicians' handwriting, and facilitated staff in accurately retrieving patient medical histories for patient safety.

Table 8. Distribution of Respondents Based on VariablesEconomic

No	VariablesEconomic	Frequency (f)	Percentage (%)
1.	Not Reliable	19	47.5
2.	Reliable	21	52.5
	Amount	40	100

Source: Primary Data, 2026

Table 8 shows that of the 40 respondents, 21 (52.5%) rated the system reliable, while 19 (47.5%) rated it unreliable. The assessments on this dimension are nearly balanced. Although a greater number of respondents felt the RME had a positive economic impact, the high number of unreliable respondents (47.5%) reflects that staff may feel the RME has not completely reduced their administrative workload. They may still be required to perform multiple tasks (computer-based tasks while printing certain sheets of paper), so cost or time savings have not been optimally realized.

Table 9. Distribution of Respondents Based on Control Variables

No	VariablesControl	Frequency (f)	Percentage (%)
1.	Not Reliable	15	37.5
2.	Reliable	25	62.5
	Amount	40	100

Source: Primary Data, 2026

Based on Table 5.10, it can be seen that of the total 40 respondents, 25 respondents (62.5%) considered the security aspect reliable, while 15 respondents (37.5%) considered it unreliable. The 62.5% figure indicates that the policy for using individual accounts (username & password) and access authorization in the RME is running well. However, the 37.5% of users who feel it is unreliable should be wary. This is usually related to staff concerns about the risk of forgetting to log out of the system on shared

computers, or concerns about the lack of encryption and data backup protection that is clearly visible to them.

Table 10. Distribution of Respondents Based on Efficiency Variable

No	Variables <i>Efficiency</i>	Frequency (f)	Percentage (%)
1.	Not Reliable	16	40
2.	Reliable	24	60
	Amount	40	100

Source: Primary Data, 2026

Table 10 shows that of the 40 respondents, 24 (60%) rated the system as reliable, and 16 (40%) rated it as unreliable. Sixty percent of respondents agreed that RME facilitates coordination between units without the need for manual delivery of physical documents. On the other hand, the 40% of respondents who stated it was unreliable felt that the data input process in RME actually increased administrative time. This often occurs when the RME interface design is too complex or requires too many clicks to complete a service process.

Table 11. Distribution of Respondents Based on Service Variables

No	Variables <i>Service</i>	Frequency (f)	Percentage (%)
1.	Not Reliable	8	20
2.	Reliable	32	80
	Amount	40	100

Source: Primary Data, 2026

Based on Table 11, it can be seen that out of a total of 40 respondents, 32 respondents (80%) considered it reliable, and only 8 respondents (20%) considered it unreliable. The service dimension received the highest rating among all PIECES variables. This service satisfaction score of 80% proves that the IT support team at the research site is very responsive, ready to help, and provides solutions whenever staff experience technical operational problems with their RME system.

Table 12. Distribution of Respondents Based on RME Satisfaction Variables

No	Variables <i>RME Satisfaction</i>	Frequency (f)	Percentage (%)
1.	Not satisfied	19	47.5
2.	Satisfied	21	52.5
	Amount	40	100

Source: Primary Data, 2026

Based on Table 12, it can be seen that of the total 40 respondents, 21 respondents (52.5%) stated that they were satisfied, while 19 respondents (47.5%) stated that they were dissatisfied. In aggregate, the satisfaction level is at a very critical position (almost touching the 50:50 mark). The 47.5% dissatisfied figure is a strong signal to management that the current RME system has not been fully accepted. When

linked to the demographic profile of the Kamaipura Health Center, this high dissatisfaction is caused by the fact that 80% of respondents have never received formal RME training. As a result, staff must adapt independently (trial and error), which triggers work stress and reduces their satisfaction in using the system.

Bivariate Analysis

Table 13. Connection performance with RME user satisfaction

No	Performance	RME Satisfaction				Total		p
		Not satisfied		Satisfied				
		f	%	f	%	f	%	
1.	Not Reliable	14	100	0	0	14	100	
2.	Reliable	5	19.2	21	80.8	26	100	
Total		19	47.5	21	52.5	40	100	

Source: Primary Data, 2026

Based on Table 13, of the 14 respondents who assessed the performance of the RME system as unreliable, all (100%) stated that they were dissatisfied. Conversely, of the 26 respondents who assessed it as reliable, 80.8% were satisfied. The statistical test results showed a Sig. continuity correction value of $0.000 \leq 0.05$, thus concluding that there is a significant relationship between performance and RME user satisfaction at the Kamaipura Community Health Center.

Table 14. Connection information/data with user satisfaction

No	Information/Data	RME Satisfaction				Total		p
		Not satisfied		Satisfied				
		f	%	f	%	f	%	
1.	Not Reliable	9	81.8	2	18.2	11	100	0.020
2.	Reliable	10	34.5	19	65.5	29	100	
	Total	19	47.5	21	52.5	40	100	

Source: Primary Data, 2026

Based on Table 14, of the 11 respondents who assessed the information/data aspect as unreliable, 81.8% stated that they were dissatisfied. Conversely, of the 29 respondents who assessed it as reliable, 65.5% were satisfied. The continuity correction Sig. value of $0.020 \leq 0.05$ proves a significant relationship between the information/data aspect and user satisfaction of EMR at the Kamaipura Community Health Center.

Table 15. Connection economic with user satisfaction

No	Economic	RME Satisfaction				Total		p
		Not satisfied		Satisfied				
		f	%	f	%	f	%	0.001
1.	Not Reliable	15	78.9	4	21.1	19	100	
2.	Reliable	4	19	17	81	21	100	

	Total	19	47.5	21	52.5	40	100	
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Source: Primary Data, 2026

Based on Table 15, of the 19 respondents who rated the economic dimension as unreliable, 78.9% expressed dissatisfaction. Conversely, of the 21 respondents who rated it as reliable, 81% were satisfied. The continuity correction Sig. value of $0.001 \leq 0.05$ proves a significant relationship between the economic aspect and user satisfaction of EMR at the Kamaipura Community Health Center.

Table 16. Connection control/security with user satisfaction

No	Control/Security	RME Satisfaction				Total		p
		Not satisfied		Satisfied				
		f	%	f	%	f	%	
1.	Not Reliable	11	73.3	4	26.7	15	100	
2.	Reliable	8	32	17	68	25	100	
	Total	19	47.5	21	52.5	40	100	

Source: Primary Data, 2026

Based on Table 16, of the 15 respondents who assessed the control/security aspect as unreliable, 73.3% stated that they were dissatisfied. Conversely, of the 25 respondents who assessed it as reliable, 68% were satisfied. The continuity correction Sig. value of $0.027 \leq 0.05$ proves a significant relationship between control/security and user satisfaction of EMR at the Kamaipura Community Health Center.

Table 17. Connection efficiency with user satisfaction

		RME Satisfaction				Total		p 1,000
No	Efficiency	Not satisfied		Satisfied				
		f	%	f	%	f	%	
1.	Not Reliable	8	50	8	50	16	100	
2.	Reliable	11	45.8	13	54.2	24	100	
	Total	19	47.5	21	52.5	40	100	

Source: Primary Data, 2026

Based on Table 17, of the 16 respondents who rated the efficiency aspect as unreliable, 50% stated they were dissatisfied. Conversely, of the 24 respondents who rated it as reliable, 54.2% were satisfied. The continuity correction Sig. value of $1.000 > 0.05$ proves there is no significant relationship between efficiency and user satisfaction of EMR at the Kamaipura Community Health Center.

Table 18. Connection service with user satisfaction

Table 18: Connection Service with user satisfaction								
No	Service	RME Satisfaction				Total		p
		Not satisfied		Satisfied				
		f	%	f	%	f	%	
1.	Not Reliable	7	87.5	1	12.5	8	100	0.033

2.	Reliable	12	37.5	20	62.5	32	100
	Total	19	47.5	21	52.5	40	100

Source: Primary Data, 2026

Based on Table 18, of the 8 respondents who rated the service aspect as unreliable, 87.5% stated they were dissatisfied. Conversely, of the 32 respondents who rated it as reliable, 62.5% were satisfied. The continuity correction Sig. value of $0.033 \leq 0.05$ proves a significant relationship between the service aspect and user satisfaction of EMR at the Kamaipura Community Health Center.

Multivariate Analysis

Table 19.F Test (Anova)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6,808	6	1,135	11,822	.000a
	Residual	3,167	33	.096		
	Total	9,975	39			

a. Predictors: (Constant), Service, Control/Security, Efficiency, Economic, Performance, Information/Data

b. Dependent Variable: RME Satisfaction

Based on the ANOVA table, the calculated value ($F = 11.822$) was obtained with a significance level of 0.000 ($\text{Sig.} \leq 0.05$). This regression model is very suitable for predicting satisfaction. The six PIECES dimensions simultaneously (together) have a significant effect on staff RME satisfaction.

Table 20.Partial Test Results (t-Test)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.162	.282		-.572	.571
	Performance	.648	.135	.619	4,789	.000
	Information/Data	-.034	.147	-.030	-.231	.819
	Economic	.161	.129	.161	1,253	.219
	Control/Security	.241	.129	.233	1,865	.071
	Efficiency	-.085	.111	-.084	-.769	.447
	Service	.098	.152	.078	.642	.525

a. Dependent Variable: RME Satisfaction

Source: SPSS Analysis Results, 2026

The first hypothesis test aims to determine whether or not there is a partial influence given by the performance variable (X_1) on RME user satisfaction (Y). Table 20 shows the Sig. value for the influence

of the performance variable (X1) on RME user satisfaction (Y) is $0.000 \leq 0.05$, so it can be concluded that there is a positive and significant influence between the performance variable (X1) on RME user satisfaction at the Kamaipura Community Health Center.

The second hypothesis test aims to determine whether or not there is a partial influence given by the information variable (X2) on RME user satisfaction (Y). Table 20 shows the Sig. value for the influence of the information variable (X2) on RME user satisfaction (Y) is $0.819 > 0.05$, so it can be concluded that there is no positive and significant influence between the information variable (X2) on RME user satisfaction at the Kamaipura Community Health Center.

The third hypothesis test aims to determine whether or not there is a partial influence given by the economic variable (X3) on RME user satisfaction (Y). Table 20 shows the Sig. value for the influence of the economic variable (X3) on RME user satisfaction (Y) is $0.219 > 0.05$, so it can be concluded that there is no positive and significant influence between the economic variable (X3) on RME user satisfaction at the Kamaipura Community Health Center.

The fourth hypothesis test aims to determine whether or not there is a partial influence given by the control/security variable (X4) on RME user satisfaction (Y). Table 20 shows the Sig. value for the influence of the control/security variable (X4) on RME user satisfaction (Y) is $0.071 > 0.05$, so it can be concluded that there is no positive and significant influence between the control/security variable (X4) on RME user satisfaction at the Kamaipura Community Health Center.

The fifth hypothesis test aims to determine whether or not there is a partial influence given by the efficiency variable (X5) on RME user satisfaction (Y). Table 20 shows the Sig. value for the influence of the efficiency variable (X5) on RME user satisfaction (Y) is $0.447 > 0.05$, so it can be concluded that there is no positive and significant influence between the performance variable (X5) on RME user satisfaction at the Kamaipura Community Health Center.

The sixth hypothesis test aims to determine whether or not there is a partial influence given by the service variable (X6) on RME user satisfaction (Y). Table 20 shows the Sig. value for the influence of the service variable (X6) on RME user satisfaction (Y) is $0.525 > 0.05$, so it can be concluded that there is no positive and significant influence between the service variable (X6) on RME user satisfaction at the Kamaipura Community Health Center.

CONCLUSIONS

The conclusion of this study shows that all variables in the PIECES Framework simultaneously have a significant effect on user satisfaction of the Electronic Medical Record (EMR) application at the Kamaipura Community Health Center in Sigi Regency, contributing 68.2%. Partially, only system reliability (performance) had a significant effect on healthcare worker satisfaction, while information quality, economic, control/security, efficiency, and service showed no significant partial effect. Although some aspects are considered reliable, the overall user satisfaction level is at a critical level, with 47.5% of respondents feeling dissatisfied due to technical constraints such as slow internet connections and the lack of formal EMR training for staff. These results prove that the PIECES Framework method is very effective for measuring satisfaction and identifying system weaknesses, so it is recommended to improve network capacity, complete reporting/referral features, and develop official SOPs for EMR use.

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