



## INTRODUCTION

Digital transformation in Indonesia's health sector is a priority for the government in order to improve technology-based services.<sup>1</sup> Community health centers (Puskesmas) play a strategic role in primary health care, so the government is promoting the implementation of the Community Health Center Management Information System (SIMPUS) to improve service quality and operational effectiveness.

SIMPUS integrates various functions such as patient data management, electronic medical records, drug control, and epidemiological reporting. Cloud-based features simplify administration and improve the accuracy of healthcare data.<sup>2</sup> Integration with hospital referral systems enables real-time patient data management, speeds up referrals, and ensures patients receive timely treatment.<sup>3</sup>

The success of SIMPUS and referral systems depends on human resource readiness. The WHO reports that a lack of human resource readiness impacts service effectiveness, with more than 40% of developing countries facing training and technology adaptation challenges.<sup>4</sup> Developed countries such as Germany and Singapore show that human resource readiness can increase service efficiency by up to 30% and reduce administrative errors by up to 25%.<sup>5</sup>

In Indonesia, human resource readiness in the implementation of SIMPUS remains a challenge. Data from the Ministry of Health shows that only 34% of primary health facilities have human resources with adequate information technology competencies. Central Java province recorded

SIMPUS human resource readiness at only 42.7%, reflecting the need to increase human resource capacity to support the integration of health information systems.<sup>6</sup>

In addition to human resources, infrastructure constraints also affect implementation. Many community health centers in remote areas face limited internet access and hardware.<sup>7</sup> The issue of SIMPUS interoperability with hospital referral systems is also a major obstacle due to inconsistent data standards.<sup>3</sup>

The Health Sector Digital Transformation policy targets more efficient and data-driven services. However, the lack of monitoring and evaluation hinders optimal implementation in the field.<sup>2</sup> Infrastructure and budget gaps in several regions also impact the sustainability of training and information system maintenance.<sup>1</sup>

Urban and rural disparities reinforce the urgency of increasing human resource capacity and technological infrastructure in disadvantaged areas. Research by Sari et al. notes that 80% of health centers in urban areas have adopted digital information systems, while in rural areas the figure is only 40%.<sup>8</sup> The implementation of SISROUTE in 500 health facilities is also not yet optimal, with only 35% of referral patient data being processed in real time.<sup>3</sup>

The Malaka Community Health Center in Soppeng Regency faces similar challenges. The number of referrals increased from 1,215 (2022) to 1,432 (2023), with an average of 120 referrals per month until October 2024.<sup>9</sup> However, human resource readiness remains a major obstacle in the operation of SIMPUS and the referral system.



Based on these issues, this study aims to analyze the readiness of human resources in implementing SIMPUS and SISROUTE in order to provide strategic recommendations to improve system effectiveness and patient satisfaction.

## MATERIALS AND METHODS

The design used in this study is a cross-sectional study in which data is collected at a single point in time to measure the relationship between independent and dependent variables without direct intervention. This study will be conducted at the Malaka Community Health Center in Soppeng Regency. It will begin in January–February 2025. The population in this study consists of all health center staff who have used and operated the SIMPUS and SISROUTE Community Health Center Management Information Systems at the Malaka Community Health Center in Soppeng Regency, with a total population of 39 staff members. Total sampling was used.

This study uses a manual questionnaire for respondents who do not carry an Android phone and a Google form for respondents who carry an Android phone and have a quota that is shared via a link when collecting data. First, a questionnaire validity test is carried out, followed by a reliability and data normality test. Univariate analysis was used to describe the frequency and percentage of each variable, showing the frequency and percentage of respondent characteristics such as gender, age group, highest level of education, position, length of service, previous training in the use of SIMPUS and SISROUTE, frequency of use of SIMPUS and SISROUTE at work, technical

competence and skills, training and capacity building, attitudes and perceptions, mental and psychological readiness, performance and productivity, and HR readiness in the implementation of SIMPUS and SISROUTE. Bivariate analysis was also conducted using ordinal regression testing (Ordinal Logistic Regression). To analyze the influence of technical competence and skills, training and capacity building, attitudes and perceptions, mental and psychological readiness, performance and productivity on human resource readiness in the implementation of SIMPUS and SISROUTE.

## RESULTS

In this study, univariate analysis results were used to describe the frequency and percentage of each variable. These variables include gender, age group, highest level of education, job title, length of service, whether they have received training in the use of SIMPUS and SISROUTE, how often they use SIMPUS and SISROUTE in their work, technical competencies and skills, training and capacity building, attitudes and perceptions, mental and psychological readiness, performance and productivity, and HR readiness in the implementation of SIMPUS and SISROUTE. The results of the univariate analysis are tabulated as Table 1.

This study involved 39 respondents, consisting of 1 male (3%) and 38 females (97%). The majority of respondents were aged 25–35 years (59%), followed by the 36–45 age group (28%), >45 years (10%), and <25 years (3%). In terms of education, most respondents had a Diploma 3 background



(52%), while the other 48% had a Bachelor's degree (S1).

**Table 1. Frequency Distribution of Respondent Characteristics at the Malacca Health Center**

Gender	(n)	(%)
Male	1	3
Women	38	97
<b>Age Group</b>		
<25 years old	1	3
25-35 years old	23	59
36-45 years old	11	28
>45 years old	4	10
<b>Final Education</b>		
D3	20	52
Bachelor/S1	19	48
<b>Departments</b>		
Medical/Paramedic Personnel	32	82
Administrative Personnel	4	10
Puskesmas Management	3	8
<b>Length of Work</b>		
< 1 year	2	5
1-3 years	3	8
4-6 years	6	15
> 6 years old	28	72
<b>Have Received Training on the Use of SIMPUS and SISRUTE</b>		
Ya	13	33
No	26	67
<b>How Often to Use SIMPUS and SISRUTE at Work</b>		
Every day	14	36
3-5 times a week	2	5
1-2 times a week	5	13
Rare	18	46
<b>Technical Competencies and Skills</b>		
Less (Score <60)	30	77
Fair (Score 60-79)	8	20
Good (Score 80-100)	1	3
<b>Training and Capacity Building</b>		
Less (Score <60)	35	90
Fair (Score 60-79)	2	5
Good (Score 80-100)	2	5
<b>Attitudes and Perceptions</b>		
Less (Score <60)	30	77
Fair (Score 60-79)	9	23
<b>Mental and Psychological Readiness</b>		
Less (Score <60)	34	87
Fair (Score 60-79)	4	10
Good (Score 80-100)	1	3
<b>Performance and Productivity</b>		
Less (Score <60)	30	77
Fair (Score 60-79)	7	18
Good (Score 80-100)	2	5

Gender	(n)	(%)
<b>Human Resources Readiness and Implementation of SIMPUS and SISRUTE</b>		
Less (Score <60)	31	80
Fair (Score 60-79)	8	20
<b>Quantity</b>	<b>39</b>	<b>100</b>

Source: Primary Data, 2025

Based on job category, the majority of respondents were Medical Personnel (82%), followed by Administrative Personnel (10%) and Community Health Center Management (8%). In terms of length of service, most had worked for more than 6 years (72%), while the rest had 4–6 years (15%), 1–3 years (8%), and <1 year (5%) of work experience. A total of 67% of respondents had never received training in the use of SIMPUS and SISRUTE, while only 33% had participated in training. In terms of usage, the majority of respondents rarely use this system (46%), and only 5% use it 3–5 times a week. The technical competence of health workers in using this system is still low, with 77% of respondents admitting that they are not skilled, and only 3% having good competence.

The level of training and capacity building is also relatively low, with 90% of respondents rating this category as “Poor.” Perceptions of the system are considered adequate by 77% of respondents, while 23% consider it poor. Mental and psychological readiness in the implementation of SIMPUS and SISRUTE is also low, with 87% of respondents in the “Poor” category.

In terms of performance and productivity, the majority of respondents (77%) rated it as poor, with only 5% having high productivity. The readiness of human resources in implementing the system was



also rated as poor by 80% of respondents, while 20% considered it adequate.

**Table 2. Results of Ordinal Regression Test of Variables on the Influence of Competencies and Technical Skills on Human Resource Readiness and the Implementation of SIMPUS and SISRUTE**

Human Resources Readiness and Implementation of SIMPUS and SISRUTE	Technical Competencies and Skills
<b>Model Fitting Information</b>	<b>-2 Log Likelihood</b>
Intercept Only	6.368
Final Model	5.413
Chi square	.955
df	2
Sig.	0.02
<b>Goodness-of-Fit</b>	<b>Chi-Square</b>
Pearson	0.000
Deviance	0.000
<b>Pseudo R-Square</b>	
Cox and Snell	0.024
Nagelkerke	0.038
McFadden	0.024
<b>Parameter Estimates Threshold</b>	<b>Estimate</b>
[Human Resources Readiness and Implementation of SIMPUS and SISRUTE = 1]	18.725
<b>Location</b>	
Technical Competencies and Skills= 1]	17.536
[Technical Competencies and Skills = 2]	16.779
[Technical Competencies and Skills = 3]	0a
<b>-2 Log Likelihood</b>	
Null Hypothesis	5.413
General Model	5.413
Chi-Square	0.000
df	0
Sig	.
<b>Link Function</b>	<b>Logit</b>

Source: Primary Data, 2025

The results of ordinal regression analysis show that technical competence and skills have a significant effect on HR readiness and the implementation of SIMPUS and SISRUTE ( $p < 0.05$ ). The model with predictor variables is better

than the model without predictors, as indicated by a decrease in the -2 Log Likelihood value from 6.368 to 5.413.

The model fit test shows results that are consistent with the data (Pearson Chi-Square = 0.000, Deviance Chi-Square = 0.000). However, the low Pseudo R-Square values (Cox and Snell  $R^2 = 0.024$ , Nagelkerke  $R^2 = 0.038$ ) indicate that these factors only explain 2.4% – 3.8% of the variation in HR readiness, suggesting that other factors are more dominant.

The parameter estimation results show that the higher the Competence and Technical Skills, the greater the HR readiness in implementing the system. However, because its influence is still limited, other stronger variables are needed to improve HR readiness and the success of SIMPUS and SISRUTE implementation.

The results of the ordinal regression analysis in Table 3 show that training and capacity building have a significant effect on HR readiness and the implementation of SIMPUS and SISRUTE ( $p < 0.05$ ). The model with predictor variables is better than the model without predictors, as indicated by a decrease in the -2 Log Likelihood value from 6.751 to 4.972.

The model fit test shows results that are consistent with the data (Pearson Chi-Square = 0.000, Deviance Chi-Square = 0.000). However, the low Pseudo R-Square values (Cox and Snell  $R^2 = 0.045$ , Nagelkerke  $R^2 = 0.070$ ) indicate that these factors only explain 4.5%–7.0% of the variation in HR readiness, suggesting that other factors are more dominant.

The parameter estimation results show that the



higher the level of Training and Capacity Building, the greater the HR readiness in implementing the system. Therefore, more intensive and sustainable training programs are needed to improve HR readiness in the effective use of SIMPUS and SISRUITE.

**Table 3. Results of Ordinal Regression Test of Service Quality Variables on Patient Perception**

Human Resources Readiness and Implementation of SIMPUS and SISRUITE	Training and Capacity Building
<b>Model Fitting Information</b>	<b>-2 Log Likelihood</b>
Intercept Only	6.751
Final Model	4.972
Chi square	1.779
df	2
Sig.	0.03
<b>Goodness-of-Fit</b>	<b>Chi-Square</b>
Pearson	0.000
Deviance	0.000
<b>Pseudo R-Square</b>	
Cox and Snell	0.045
Nagelkerke	0.070
McFadden	0.045
<b>Parameter Estimates Threshold</b>	<b>Estimate</b>
[Human Resources Readiness and Implementation of SIMPUS and SISRUITE = 1]	20.725
<b>Location</b>	
Training and Capacity Development = 1]	19.339
[Training and Capacity Development = 2]	20.725
[Training and Capacity Development = 3]	0a
<b>-2 Log Likelihood</b>	
Null Hypothesis	4.972
General Model	4.972
Chi-Square	0.000
df	0
Sig.	.
<b>Link Function</b>	<b>Logit</b>

Source: Primary Data, 2025

The results of the ordinal regression test in Table 4 show that Attitude and Perception have a significant effect on HR readiness and the implementation of SIMPUS and SISRUITE ( $p <$

0.05). The model with predictor variables is better than the model without predictors, as indicated by a decrease in the -2 Log Likelihood value from 9.470 to 5.816.

**Table 4. Results of Ordinal Regression Test of Variables Influence of Attitude and Perception on Human Resource Readiness and Implementation of SIMPUS and SISRUITE**

Human Resources Readiness and Implementation of SIMPUS and SISRUITE	Attitudes and Perceptions
<b>Model Fitting Information</b>	<b>-2 Log Likelihood</b>
Intercept Only	9.470
Final Model	5.816
Chi square	3.654
df	1
Sig.	0.045
<b>Goodness-of-Fit</b>	<b>Chi-Square</b>
Pearson	0.152
Deviance	0.287
<b>Pseudo R-Square</b>	
Cox and Snell	0.089
Nagelkerke	0.140
McFadden	0.092
<b>Parameter Estimates Threshold</b>	<b>Estimate</b>
[Human Resources Readiness and Implementation of SIMPUS and SISRUITE = 1]	0.223
<b>Location</b>	
Attitudes and Perceptions= 1]	-1.649
[Attitudes and Perceptions = 2]	0a
<b>-2 Log Likelihood</b>	
Null Hypothesis	5.816
General Model	5.816
Chi-Square	0.000
df	0
Sig.	.
<b>Link Function</b>	<b>Logit</b>

Source: Primary Data, 2025

Model fit tests show a fairly good level of suitability (Pearson Chi-Square = 0.152, Deviance Chi-Square = 0.287). The Pseudo R-Square values (Cox and Snell  $R^2 = 0.089$ , Nagelkerke  $R^2 = 0.140$ ) indicate that these variables explain 8.9%–14.0% of the variation in HR readiness, suggesting that other factors are more dominant.



The parameter estimation results show that individuals with more positive attitudes and perceptions toward the system have higher readiness in implementing SIMPUS and SISRUITE. Therefore, efforts are needed to improve positive attitudes and perceptions through socialization, training, and mentoring in system implementation.

The results of the ordinal regression test in Table 5 show that mental and psychological readiness have a significant effect on HR readiness and the implementation of SIMPUS and SISRUITE ( $p < 0.05$ ). The model with predictor variables is better than the model without predictors, as indicated by a decrease in the -2 Log Likelihood value from 6.150 to 3.671.

Model fit tests show good fit with the data (Pearson Chi-Square = 0.613, Deviance Chi-Square = 0.881). The Pseudo R-Square values (Cox and Snell  $R^2 = 0.062$ , Nagelkerke  $R^2 = 0.097$ ) indicate that these variables explain 6.2%–9.7% of the variation in HR readiness, suggesting that other factors are more dominant.

The parameter estimation results show that individuals with lower mental and psychological readiness have a lower probability of HR readiness in implementing the system. Therefore, mental and psychological strengthening programs, such as stress management training, motivation enhancement, and psychological counseling, are needed to support individuals' readiness in facing technological system changes in the work environment.

The results of the ordinal regression test in Table 6 show that performance and productivity have a significant effect on HR readiness in the

implementation of SIMPUS and SISRUITE ( $p < 0.05$ ). The model with predictor variables is better than the model without predictors, as indicated by a decrease in the -2 Log Likelihood value from 8.370 to 6.972.

**Table 5. Results of Ordinal Regression Test Variables on the Influence of Mental and Psychological Readiness on Human Resource Readiness and the Application of SIMPUS and SISRUITE**

Human Resources Readiness and Implementation of SIMPUS and SISRUITE	Mental and Psychological Readiness
<b>Model Fitting Information</b>	<b>-2 Log Likelihood</b>
Intercept Only	6.150
Final Model	3.671
Chi square	2.479
df	2
Sig.	0.029
<b>Goodness-of-Fit</b>	<b>Chi-Square</b>
Pearson	0.613
Deviance	0.881
<b>Pseudo R-Square</b>	
Cox and Snell	0.062
Nagelkerke	0.097
McFadden	0.063
<b>Parameter Estimates Threshold</b>	<b>Estimate</b>
[Human Resources Readiness and Implementation of SIMPUS and SISRUITE = 1]	18.725
<b>Location</b>	
Mental and Psychological Readiness= 1]	17.547
[Mental and Psychological Readiness = 2]	-2.617
[Mental and Psychological Readiness = 3]	0a
<b>-2 Log Likelihood</b>	
Null Hypothesis	3.671
General Model	3.671
Chi-Square	0.000
df	0
Sig.	.
<b>Link Function</b>	<b>Logit</b>

Source: Primary Data, 2025

The model fit test shows that the model fits the observed data, although the low Pseudo R-Square value (Cox and Snell  $R^2 = 0.035$ , Nagelkerke  $R^2 =$



0.055) indicates that this variable only explains 3.5%–5.5% of the variation in HR readiness, suggesting that other factors also contribute.

**Table 6 Results of Ordinal Regression Test of Performance and Productivity Variables on Human Resource Readiness and Implementation of SIMPUS and SISRUTE**

<b>Human Resources Readiness and Implementation of SIMPUS and SISRUTE</b>	<b>Performance and Productivity</b>
<b>Model Fitting Information</b>	<b>-2 Log Likelihood</b>
Intercept Only	8.370
Final Model	6.972
Chi square	1.398
df	2
Sig.	0.015
<b>Goodness-of-Fit</b>	<b>Chi-Square</b>
Pearson	0.364
Deviance	0.652
<b>Pseudo R-Square</b>	
Cox and Snell	0.035
Nagelkerke	0.055
McFadden	0.035
<b>Parameter Estimates</b>	<b>Estimate</b>
<b>Threshold</b>	
[Human Resources Readiness and Implementation of SIMPUS and SISRUTE = 1]	1.000
<b>Location</b>	
Performance and Productivity = 1]	-1.609
[Performance and Productivity = 2]	-0.916
[Performance and Productivity = 3]	0a
<b>-2 Log Likelihood</b>	
Null Hypothesis	6.972
General Model	6.972
Chi-Square	0.000
df	0
Sig.	.
<b>Link Function</b>	<b>Logit</b>

Source: Primary Data, 2025

The parameter estimation results show that individuals with lower performance and productivity are less likely to be ready for the

implementation of SIMPUS and SISRUTE than those with higher performance and productivity. Therefore, strategies to improve performance and productivity are needed, such as an achievement-based incentive system, increased work efficiency, and training that encourages the optimization of tasks and responsibilities. With increased human resource productivity, readiness in implementing the system can be maximized. This requires continuous training, infrastructure support, and organizational policies that encourage optimal use of technology. This comprehensive approach is expected to improve human resource readiness and the quality of health services in hospitals, which also contributes to human resource readiness in system implementation.

Based on the parameter estimation results, the threshold for human resource readiness and the implementation of SIMPUS and SISRUTE is 1,000, while the estimated value for Performance and Productivity category 1 is -1,609, category 2 is -0.916, and category 3 is used as a reference (0a). The negative values in categories 1 and 2 indicate that individuals with lower performance and productivity have a smaller probability of being ready for the implementation of SIMPUS and SISRUTE compared to those with higher performance and productivity.

Thus, these results indicate that improving the performance and productivity of human resources plays an important role in the readiness to implement SIMPUS and SISRUTE. Therefore, strategies are needed to improve performance and productivity, such as through an achievement-based incentive system, increased work efficiency,



and training that encourages the optimization of tasks and responsibilities. With increased human resource productivity, it is hoped that readiness in implementing the system can be maximized.

## DISCUSSION

The results of the study indicate that technical competencies and skills have a significant effect on the readiness of Human Resources (HR) in the implementation of SIMPUS and SISRUTE ( $p < 0.05$ ). This shows that the “humanware” aspect, namely individual capacity in terms of digital literacy and technical skills, remains an important factor in the adoption of health information systems in primary facilities. These research results are in line with the latest literature that identifies digital competence and training support as important determinants of health workers' readiness for digital technology adoption.<sup>10</sup>

Model fit tests show a suitable relationship between technical competencies and skills and HR readiness, although the low Pseudo R<sup>2</sup>-Square values are low (Cox and Snell R<sup>2</sup> = 0.024, Nagelkerke R<sup>2</sup> = 0.038), indicating that these variables only explain 2.4%–3.8% of the variation in HR readiness, suggesting that other factors are more dominant. This illustrates that individual technical aspects are not the only determinants of readiness for system adoption. The results of this study are in line with the meta-analysis by Abushaikha et al. in low- and middle-income countries, which found that facilitating conditions greatly influence healthcare workers' intention to use digital technology, more so than technical skills.<sup>11</sup>

The parameter estimation results show that the higher the technical competence and skills, the greater the likelihood of HR readiness in implementing SIMPUS and SISRUTE. However, the low Pseudo R<sup>2</sup> value indicates that the effect is still limited, so other variables are also needed to improve HR readiness. These findings are in line with previous studies showing that the technical competence of health workers plays an important role in the effectiveness of health information systems, including improving diagnostic accuracy and reducing administrative errors.<sup>12</sup> In addition, continuous training and infrastructure support have been shown to contribute significantly to HR readiness in adopting digital systems.<sup>13</sup> The findings of this study also support the Technology Acceptance Model (TAM) framework, in which technology acceptance is influenced by perceived ease of use and perceived benefits. In the context of SIMPUS and SISRUTE, organizational factors such as management support, internal policies, and sustainability of training are important factors that strengthen HR readiness and implementation effectiveness. With a comprehensive approach through strengthening technical competencies, improving infrastructure, and supportive organizational policies, human resource readiness in adopting digital systems can be improved and ultimately contribute to improving the quality of health services in service facilities.

The analysis results show that training and capacity building have a significant effect on human resource readiness in the implementation of SIMPUS and SISRUTE ( $p < 0.05$ ). The improvement in model quality, as indicated by a



decrease in the  $-2$  Log Likelihood value from 6.751 to 4.972, shows that training is an important predictor of HR readiness. This finding is in line with previous studies showing that continuous training plays a vital role in improving the competence of health workers, their ability to adapt to technology, and their confidence in using digital information systems.<sup>13</sup>

Model fit tests show that the data fits the model, although the low Pseudo R-Square values (Cox and Snell  $R^2 = 0.045$ , Nagelkerke  $R^2 = 0.070$ ) indicate that these variables only explain 4.5%–7.0% of the variation in HR readiness. This shows that training and capacity building have an effect, but there are other more dominant factors. Parameter estimates show that the higher the level of training and capacity building, the higher the HR readiness in implementing SIMPUS and SISRUTE. Therefore, more intensive and sustainable training programs can be an effective strategy in improving HR readiness.

Previous studies support these findings, showing that ongoing training has been proven to improve healthcare workers' competence in using health information systems by up to 35% through increased technical skills and confidence in operating the system.<sup>12</sup> Organizational approaches to human resource capacity building, including technology-based training and integrated supervision, also contribute significantly to improving the readiness of medical personnel to adopt digital systems.<sup>11</sup> In addition, infrastructure support such as the availability of devices, networks, and support systems has been shown to strengthen the effectiveness of training and the

implementation of health information systems.<sup>14</sup> These findings are consistent with the Technology Acceptance Model (TAM) theory, which emphasizes that perceived ease of use and perceived usefulness are important determinants in technology adoption.

Overall, Training and Capacity Building have a significant influence on HR readiness in the implementation of SIMPUS and SISRUTE. However, the effectiveness of implementation can be improved through a combination of continuous training, technological support, and organizational policies that encourage the development of medical personnel competencies. With this strategy, HR readiness in adopting digital systems can be optimized, thereby positively impacting the quality of health services in hospitals.

The analysis results show that the attitudes and perceptions of health workers have a significant effect on HR readiness in implementing SIMPUS and SISRUTE ( $p < 0.05$ ). The improvement in model quality, as indicated by a decrease in the  $-2$  Log Likelihood value from 9.470 to 5.816, shows that attitudes and perceptions are important predictors in determining readiness to adopt the system. This finding is consistent with previous studies that confirm that positive perceptions of the benefits and ease of use of technology have a strong influence on the readiness and intention of health workers to use digital information systems.<sup>16</sup>

The model fit test shows that the model fits the data, with Pseudo R-Square (Cox and Snell  $R^2 = 0.089$ , Nagelkerke  $R^2 = 0.140$ ) indicating that Attitude and Perception can explain 8.9%–14.0% of the variation in HR readiness. Although influential,



there are still other factors that are more dominant in explaining HR readiness. Parameter estimates show that individuals with more positive attitudes and perceptions towards the system are more likely to be ready for the implementation of SIMPUS and SISROUTE. This confirms that positive attitudes and good perceptions can be built through socialization, training, and mentoring during system implementation. Previous studies support these findings, where positive attitudes of health workers toward digital technology have been shown to increase the effectiveness of health information system implementation and strengthen confidence in its use.<sup>15</sup> A favorable perception of the system has also been reported to increase technology adoption rates by up to 35% and reduce resistance to change in the work environment.<sup>11</sup> These findings are consistent with the Technology Acceptance Model (TAM), which emphasizes that perceived ease of use and perceived usefulness are the main determinants of technology adoption.<sup>17</sup> In addition, effective organizational communication strategies and managerial support have been shown to play an important role in shaping positive attitudes and increasing the readiness of human resources in the use of digital systems.<sup>18</sup> Therefore, an approach that involves training, communication, and organizational support is key to the successful implementation of SIMPUS and SISROUTE.

The results of ordinal regression analysis show that mental and psychological readiness have a significant effect on HR readiness in the implementation of SIMPUS and SISROUTE ( $p < 0.05$ ). The improvement in model quality, as indicated by a decrease in the  $-2$  Log Likelihood

value from 6.150 to 3.671, illustrates that this variable is an important predictor of HR readiness. The model fit test also showed adequate results, where the Pseudo R-Square value (Cox and Snell  $R^2 = 0.062$ ; Nagelkerke  $R^2 = 0.097$ ) indicated that mental and psychological readiness explained approximately 6.2%–9.7% of the variation in HR readiness. However, other factors still play a more dominant role in determining the readiness of health workers.

Parameter estimates show that individuals with low mental and psychological readiness have a lower probability of being ready for system implementation. Therefore, strengthening mental aspects through stress management training, increasing motivation, and psychological support are important strategies to ensure individual readiness in facing digital system changes. Previous studies support these findings, where the mental readiness of health workers has been shown to influence the adoption of health information systems, including adaptability and the reduction of psychological barriers.<sup>19</sup> High stress levels are known to have a negative impact on the use of digital systems, while good psychological readiness increases confidence in operating technology and accelerates the adaptation process.<sup>20</sup> These findings are consistent with the Technology Acceptance Model (TAM) theory, which emphasizes that individual mental readiness and comfort with technology influence the willingness to adopt digital systems.<sup>17</sup> Thus, mental strengthening strategies and a supportive work environment are key to ensuring the successful implementation of SIMPUS and SISROUTE.



Based on the analysis results, performance and productivity significantly influence human resource readiness in the implementation of SIMPUS and SISRUTE ( $p < 0.05$ ). The model with predictor variables also has better feasibility than the model without predictors, as indicated by a decrease in the  $-2$  Log Likelihood value from 8.370 to 6.972. This shows that performance and productivity contribute to improving the model's ability to explain HR readiness. The model fit test shows that the Pseudo R-Square value (Cox and Snell  $R^2 = 0.035$ ; Nagelkerke  $R^2 = 0.055$ ) is in the low category, which means that performance and productivity only explain about 3.5%–5.5% of the variation in HR readiness. Nevertheless, these variables remain statistically significant and practically important because improved performance is proven to be associated with the ability of health workers to adopt digital systems more quickly.<sup>21</sup>

Parameter estimates show that individuals with low levels of performance and productivity are less likely to be ready for the implementation of SIMPUS and SISRUTE. This indicates the importance of efforts to increase productivity through continuous training, performance-based incentives, and workload optimization so that health workers can work more effectively and be ready to face the digitization of services.<sup>22</sup>

Previous studies have shown that health workers with high performance are more adaptable to health information systems, improve the efficiency of recording processes, and improve service quality. Health worker productivity is also influenced by a supportive work environment,

including reduced administrative burdens and the provision of adequate facilities.<sup>23</sup>

## CONCLUSION AND SUGGESTIONS

Based on the results of this study, it can be concluded that various factors have a significant influence on the readiness of human resources in the implementation of SIMPUS and SISRUTE at the Malaka Community Health Center, Soppeng Regency. Technical competence and skills, training and capacity building, attitudes and perceptions, mental and psychological readiness, as well as performance and productivity were statistically proven to contribute to improving the readiness of health workers in adopting digital systems. With optimal HR readiness, the implementation of SIMPUS and SISRUTE is expected to run more effectively, thereby supporting the efficiency and quality of health services at the health center.

As a recommendation, the Malaka Community Health Center needs to develop strategies to improve human resource readiness through continuous training programs, mental and psychological strengthening of health workers, and optimization of performance-based incentive systems. In addition, periodic evaluations of the effectiveness of system implementation need to be carried out to ensure that the system can run according to needs. Further research is recommended to use a broader approach, including analysis of external factors that may influence human resource readiness in the application of digital systems in the health sector.



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## CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this article.

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