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Employee Engagement as a Mediator of Servant Leadership, ICT Implementation, and Psychological Capital on Nursing Service Quality

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Abstract: This study aims to analyze the influence of Servant Leadership, the Application of Information and Communication Technology (ICT), and Psychological Capital on the Service Quality of Civil Servant Nurses, with Employee Engagement as a mediating variable. This study used a quantitative approach with a survey method of 155 D3 civil servant nurses at Tangerang City Hospital. Data were analyzed using path analysis to test the direct and indirect effects between variables. The results showed that Servant Leadership, the Application of Information and Communication Technology (ICT), Psychological Capital, and Employee Engagement had a direct positive and significant effect on Service Quality. Servant Leadership, the Application of ICT, and Psychological Capital also had a direct positive and significant effect on Employee Engagement. The mediation test revealed that Employee Engagement partially mediated the effect of Servant Leadership and the Application of ICT on Service Quality, with the direct effects of these two variables being more dominant than their indirect effects through Employee Engagement. The findings of this study confirm that improving the Service Quality of Nurses in government hospitals requires an integrated approach through strengthening service-oriented leadership, optimizing the use of ICT, and developing nurses' psychological capital and work engagement. This research provides theoretical contributions in the development of a human resource-based Service Quality model and practical implications for regional hospital management in designing policies for improving sustainable health Service Quality.

Keywords: Employee Engagement, Servant Leadership, Implementation of Information and Communication Technology, Psychological Capital, Quality of Nursing Services

INTRODUCTION

Healthcare service quality is a critical indicator of the effectiveness of public service delivery in the health sector, particularly in government hospitals that function as the primary providers of healthcare services to the community (Endeshaw 2021). In the current era of public service reform, hospitals are expected not only to deliver safe and effective clinical services but

also to provide services that are responsive, empathetic, and patient-centered (Chen et al. 2024). Consequently, patient-perceived service quality has become an essential benchmark for evaluating the accountability, performance, and sustainability of healthcare institutions in the public sector (Darzi et al. 2023; Limbong and Tarigan 2024). Improving healthcare service quality is therefore a strategic priority for hospital management, particularly in strengthening the performance and professionalism of healthcare workers.

Within the hospital system, nurses play a strategic role in shaping service quality because they have the most frequent and direct interactions with patients compared to other healthcare professionals (Kwame and Petrucka 2020; Peršolja 2024). These continuous interactions position nurses as key actors who significantly influence patients' perceptions of healthcare services (Adam et al. 2025). As a result, efforts to improve hospital service quality cannot be separated from the effective management of organizational and human resource factors that influence nurses' attitudes, motivation, and work behavior in delivering care.

From a theoretical perspective, service quality in healthcare organizations is influenced not only by technical competence and the availability of infrastructure but also by organizational leadership, technological support, and employees' psychological resources (Jiony et al. 2021; Nugraha et al. 2022; Sitanggang et al. 2022). Servant leadership, for example, emphasizes empathy, empowerment, and a service-oriented leadership approach that aligns closely with the values of nursing practice (Purwanti et al. 2023; Demeke et al. 2024). In addition, the implementation of Information and Communication Technology (ICT) has become a strategic tool for improving the efficiency, accuracy, and responsiveness of healthcare services while supporting more effective clinical and administrative decision-making (Tortorella et al. 2020; Addo and Agyepong 2024). Furthermore, Psychological Capital—consisting of hope, self-efficacy, resilience, and optimism—represents an important psychological resource that can enhance healthcare workers' motivation, adaptability, and performance in providing high-quality services (Ali et al. 2022; Liu et al. 2022).

Despite the increasing number of studies examining determinants of service quality in healthcare organizations, several limitations remain in the existing literature. First, many previous studies tend to examine these factors independently or partially, focusing only on leadership, technological adoption, or psychological aspects separately. Such fragmented approaches limit the understanding of how multiple organizational and psychological factors interact simultaneously in influencing nursing service quality. Second, most studies emphasize direct relationships between variables, while the psychological mechanisms that explain how these factors translate into improved service quality have received relatively limited attention. In particular, the role of employee engagement as a mediating mechanism connecting leadership, technological support, and psychological capital with service quality outcomes has not been widely explored.

Another limitation concerns the context of public healthcare institutions. Empirical evidence examining the interaction between leadership, ICT implementation, psychological capital, and employee engagement in shaping nursing service quality within government hospitals remains relatively limited. Public hospitals operate within a bureaucratic environment with specific organizational characteristics that may influence leadership practices, technology adoption, and employee psychological conditions differently compared to private healthcare institutions. Therefore, research that integrates these variables within a comprehensive analytical framework in the context of public hospitals is still needed.

To address these gaps, this study proposes an integrated conceptual model that simultaneously examines the influence of servant leadership, ICT implementation, and psychological capital on nursing service quality, while positioning employee engagement as a mediating variable. The novelty of this research lies in integrating organizational leadership, technological support, and psychological resources into a single explanatory model that explains how these factors collectively influence service quality through employee engagement.

By applying path analysis to civil servant nurses at Tangerang City Hospital, this study contributes to the development of a human resource–based service quality model in the public healthcare sector.

Therefore, the purpose of this study is to analyze the direct and indirect effects of servant leadership, ICT implementation, and psychological capital on the quality of nursing services, with employee engagement acting as a mediating variable among civil servant nurses at Tangerang City Hospital. The findings of this research are expected to provide both theoretical contributions to the literature on healthcare service quality and practical implications for hospital management in designing strategies to improve sustainable service quality.

METHOD

This study employed a mixed-methods approach with an explanatory sequential design. This study began with quantitative data collection and analysis, followed by qualitative data analysis to deepen and explain the quantitative findings. The quantitative approach was used to test causal relationships between research variables, while the qualitative approach provided contextual understanding of the statistical analysis results. The study was conducted at the Tangerang City Regional General Hospital (RSUD), a regional government-owned hospital that plays a crucial role in public health services.

The study population consisted of all Civil Service (ASN) nurses with a Diploma III (D3) in Nursing who work at the Tangerang City RSUD. Sampling was determined using the Slovin formula with a 5% margin of error, resulting in a sample size of 155 respondents. The sampling technique used proportional random sampling, which is a random sampling method adjusted to the proportion of nurses in each hospital service unit. This technique was chosen to ensure that each member of the population has an equal chance of becoming a respondent and that the sample obtained represents the study population proportionally.

The respondent criteria for this study included: (1) nurses with active civil servant status at Tangerang City Hospital, (2) a minimum educational background of a Diploma III in Nursing, (3) working in a service unit that interacts directly with patients, such as inpatient care, outpatient care, and the emergency department, and (4) having a minimum of one year of service experience. These criteria were established to ensure respondents had adequate work experience and a direct understanding of the patient care process.

Quantitative data collection was conducted using a questionnaire with a five-point Likert scale, which measured respondents' perceptions of the research variables. The variables studied included servant leadership, implementation of information and communication technology (ICT), psychological capital, employee engagement, and quality of nursing care. Operationally, servant leadership was measured through the dimensions of service, empowerment, and development of subordinates by nursing leaders. ICT implementation was measured through respondents' perceptions of system ease of use, information quality, and technological support in the service process. Psychological capital reflects nurses' positive psychological state, encompassing hope, self-efficacy, resilience, and optimism. Employee engagement reflects the level of nurses' emotional, cognitive, and behavioral attachment to their work and organization. Meanwhile, the quality of nursing services was measured based on superiors' perceptions of nurses' service behavior, which reflects the dimensions of responsiveness, empathy, reliability, and professionalism in providing patient care.

Quantitative data analysis was conducted using path analysis to examine the direct and indirect influences between research variables, specifically the role of employee engagement as a mediating variable in the relationship between servant leadership, ICT implementation, and psychological capital on the quality of nursing services. The analysis included instrument validity and reliability testing, descriptive statistical analysis, classical assumption testing, and testing of the relationship model between variables. Next, qualitative data obtained through in-depth interviews and focus group discussions were analyzed using thematic analysis to identify

key themes that explain the quantitative findings. The integration of these two approaches aims to produce a more comprehensive understanding of the factors influencing the quality of nursing services in government hospitals.The conceptual framework of the research hypothesis can be seen in Figure 1.

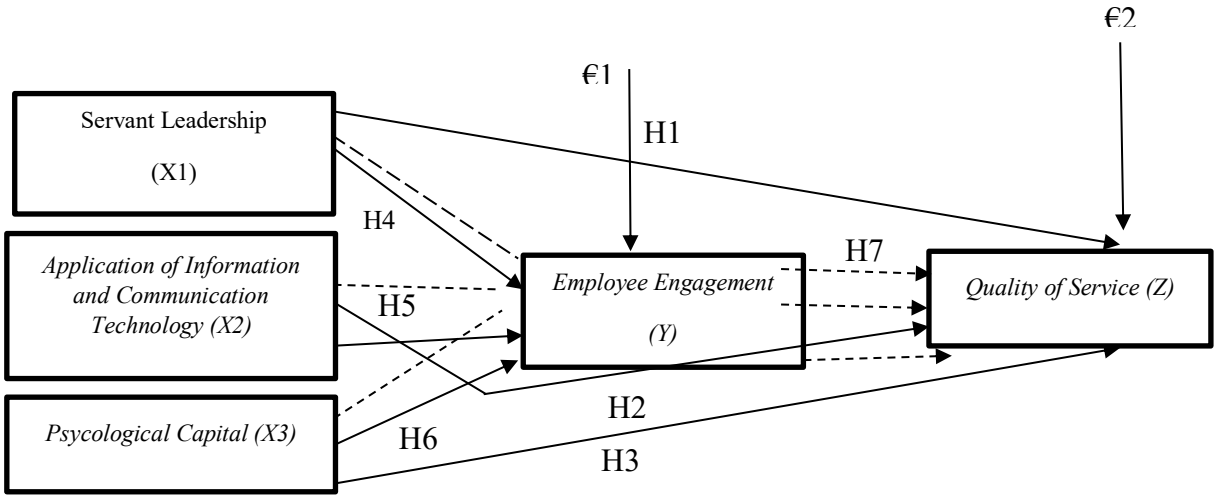

Figure 1. Conceptual Framework

RESULTS AND DISCUSSION

The first stage of quantitative analysis involves testing the analysis requirements or classical assumptions, including normality testing, homogeneity testing, and linearity testing. Normality testing is used to determine whether information is distributed regularly. If information is distributed regularly, parametric measurement testing can be used. Then, homogeneity testing can be performed to determine whether the sample items (at least three) under consideration exhibit similar differences. If the items under review do not exhibit similar fluctuations, a two-way variance analysis (ANOVA) is not applied. Linearity testing aims to determine whether the dependent and independent variables have a linear relationship.

In this study, there are five main variables analyzed descriptively, namely Service Quality (Z) as the dependent variable; Servant Leadership (X_1), ICT Implementation (X2), and Psychological Capital (X3) as independent variables; and Employee Engagement (Y) as an intervening variable. The following presents the results of the descriptive analysis for each variable, which can be seen in Table 1.

Table 1. Summary of Statistical Description of Research Variables

Statistical Measures	Service Quality (Z)	*Employee Engagement* (Y)	Servant Leadership (X_1)	ICT Implementation (X_2)	*Psychological Capital* (X_3)
Count	155	155	155	155	155
Mean	117,05	125,49	161,24	153,40	149,10
Median	111,50	123	156	152	144
Mode	138	121	117	159	108
Std. Deviation	16,58	16,62	24,23	21,77	21,88
Varians	274,94	276,32	587,05	473,77	478,65
Range	57	60	78	76	72

Minimum	83	93	117	114	108
Maximum	140	153	195	190	180
Sum	18142	19451	24992	23777	23111

Source: Research data

Table 1 presents the descriptive statistical results of the research variables based on responses from 155 nurse respondents. The statistical measures include the mean, median, mode, standard deviation, variance, and score distribution for each variable. The service quality variable shows a mean score of 117.05, with a median of 111.50 and a standard deviation of 16.58. Based on the distribution of scores ranging from 83 to 140, the average value indicates that the perceived quality of nursing services falls within the high category. This finding suggests that nurses generally demonstrate good performance in delivering healthcare services, particularly in terms of responsiveness, reliability, empathy, and professional conduct when interacting with patients. The employee engagement variable has a mean score of 125.49 with a standard deviation of 16.62, and scores ranging between 93 and 153. The relatively high mean value indicates that the level of employee engagement among nurses can be categorized as high, reflecting strong emotional attachment, dedication, and involvement in their work roles. High engagement suggests that nurses tend to demonstrate enthusiasm and commitment toward organizational goals and service delivery. The servant leadership variable records the highest average score among all variables, with a mean value of 161.24 and a standard deviation of 24.23. The score range of 117 to 195 indicates that respondents generally perceive leadership practices in the hospital as strongly reflecting servant leadership principles, such as empathy, empowerment, and a service-oriented leadership style. This condition suggests that leaders tend to prioritize the development and well-being of their staff in carrying out organizational responsibilities. Similarly, the ICT implementation variable shows a mean value of 153.40 with a standard deviation of 21.77, indicating that the implementation of information and communication technology within the hospital environment is perceived to be in the high category. This suggests that technological systems are generally considered supportive of administrative and clinical processes, enabling faster access to information and improving efficiency in healthcare service delivery. Meanwhile, the psychological capital variable has a mean score of 149.10 with a standard deviation of 21.88. The distribution of scores ranging from 108 to 180 indicates that the psychological capital of nurses—comprising hope, self-efficacy, resilience, and optimism—is also in the high category. This reflects the presence of strong positive psychological resources among nurses in facing job demands and challenges in the healthcare environment.

From an analytical perspective, the descriptive statistics indicate that all independent variables (servant leadership, ICT implementation, and psychological capital) as well as the mediating variable (employee engagement) demonstrate relatively high average scores, which may contribute positively to the level of service quality. The relatively moderate standard deviation values across variables also suggest that the responses are reasonably consistent among respondents. These findings provide an initial indication that organizational factors, technological support, and psychological resources may play an important role in shaping employee engagement and ultimately influencing the quality of nursing services. However, descriptive statistics alone cannot fully explain the causal relationships among variables. Therefore, further analysis using path analysis is conducted to examine the direct and indirect effects between servant leadership, ICT implementation, psychological capital, employee engagement, and service quality within an integrated research model.

Analysis Prerequisite Tests

1. Normality Test

The normality test was conducted using the Chi-Square method by comparing the observed frequencies and the expected frequencies derived from the theoretical normal distribution (Wahyudi et al. 2023). This test was performed using the following formula:

$$X^2 = \sum \frac{(f_o - f_h)^2}{f_h}$$

In this study, six interval classes were used, and the degrees of freedom (dk) were obtained:

$$\text{dk} = k - 1 = 6 - 1 = 5$$

At a significance level $\alpha = 0{,}05$, obtained $X^2_{tab} = 11{,}070$

According to Supardi (2013; p. 138), decision-making in normality testing is based on the following criteria:

H_0 : Data is normally distributed
H_1 : Data is not normally distributed
With the following testing criteria:

1. If $x^2_{hit} < x^2_{tab}$ accept H_0, dan
2. If $x^2_{hit} > x^2_{tab}$ reject H_0

Table 1. Summary of Normality Test Results

Variable	X^2_{hitung}	X^2_{tabel}	Decision (H_0)	Summary
Service Quality (Z)	2,56	11,070	Accept	Normally Distributed
Employee Engagement (Y)	3,39	11,070	Accept	Normally Distributed
Servant Leadership (X_1)	2,63	11,070	Accept	Normally Distributed
TIK Aplication (X_2)	7,11	11,070	Accept	Normally Distributed
Psychological Capital (X_3)	2,52	11,070	Accept	Normally Distributed

Source: Research data

Based on the results of the normality test presented in Table 2, all research variables showed a calculated Chi-Square value that was smaller than the Chi-Square value in the table at the 5% significance level. Thus, it can be concluded that all variable data in this study were normally distributed and met the normality assumptions for path analysis. The normality test was conducted to determine whether the distribution of research data follows a normal distribution, which is an important assumption in parametric statistical analysis, particularly in path analysis. In this study, the normality test was performed using the Chi-Square (χ^2) test at a significance level of $\alpha = 0.05$. Table 2 presents the results of the normality test for all research variables, including service quality (Z), employee engagement (Y), servant leadership (X1), ICT implementation (X2), and psychological capital (X3). The decision criterion states that the data are considered normally distributed if the calculated Chi-Square value (χ^2 count) is smaller than the Chi-Square table value (χ^2 table). The results show that the service quality variable (Z) has a calculated Chi-Square value of 2.56, which is smaller than the Chi-Square table value of

11.070. This indicates that the distribution of service quality data follows a normal distribution. Similarly, the employee engagement variable (Y) has a calculated Chi-Square value of 3.39, which is also lower than the table value, indicating that the data are normally distributed. For the servant leadership variable (X1), the calculated Chi-Square value is 2.63, while the ICT implementation variable (X2) records a value of 7.11, and the psychological capital variable (X3) shows a value of 2.52. All of these values remain below the Chi-Square table value of 11.070, indicating that the data distribution for each variable meets the assumption of normality.

Overall, the results of the normality test indicate that all research variables are normally distributed, as the calculated Chi-Square values are consistently smaller than the critical value at the 5% significance level. Therefore, the null hypothesis (H_0) stating that the data follow a normal distribution is accepted for all variables. The fulfillment of the normality assumption indicates that the dataset is suitable for further analysis using parametric statistical techniques, particularly path analysis, which will be employed to examine the direct and indirect relationships among servant leadership, ICT implementation, psychological capital, employee engagement, and service quality in this study.

2. Homogenity Test

Decision-making in the homogeneity test is conducted using the F-test at a significance level of 5% (Supardi, 2016).

H_0: $\sigma_1^2 = \sigma_2^2$ (variance 1 is equal to variance 2 or homogeneous)

H_1 : $\sigma_1^2 \neq \sigma_2^2$ (variance 1 is not equal to variance 2 or not homogeneous)

$$F_{count} = \frac{Largest\ varians}{smallest\ varians}$$

(Supardi U.S,2026:143)

With the following test criteria:

1. Accept H_0 jika, F-count< F-table; and
2. Reject H_0 jika F-count > F-table

The overall results of the homogeneity test can be seen in Table 3.

Table 3. Summary of Homogeneity Test Results

Variable	F_{count}	F_{table}	Decision (H_0)	Summary
X_1 - Z	2,135	2,430	Accept	Homogen
X_2 - Z	1,723	2,430	Accept	Homogen
X_3 - Z	1,741	2,430	Accept	Homogen
Y - Z	1,005	2,430	Accept	Homogen
X_1 - Y	2,125	2,660	Accept	Homogen
X_2 - Y	1,715	2,660	Accept	Homogen
X_3 - Y	1,732	2,660	Accept	Homogen

Source: Research data

3. Linearity Test

The linearity test aims to determine whether the relationship between the independent and dependent variables is linear. The test criteria are: if the linearity Sig. value is <0.05, the relationship is considered linear. Conversely, if the linearity Sig. value is >0.05, the relationship is nonlinear (Nasar et al. 2024).

The overall results of the linearity test can be seen in Table 4.

Table 4. Summary of Linearity Test Results

Variabel	Sig. Linearity	Level Sig.	Summary
X_1 above Z	0,000		Linear
X_2 above Z	0,000		Linear
X_3 above Z	0,000		Linear
Y above Z	0,000	0,05	Linear
X_1 above Y	0,000		Linear
X_2 above Y	0,000		Linear
X_3 above Y	0,000		Linear

Source: Research data

1. Path Analysis

Path analysis is used to determine the direct and indirect effects of independent variables on the dependent variable, with Employee Engagement as the intervening variable.

Path Relationship Model Between Variables in Substructure 1

The relationship model between variables in substructure 1 consists of one endogenous variable, Service Quality (Z), four exogenous variables, namely Servant Leadership (X1), ICT Implementation (X2), Psychological Capital (X3), and Employee Engagement (Y), along with one residual variable, ε_z. The path model in substructure 1 is as follows:

$$Z = \beta_{Z1}X_1 + \beta_{Z2}X_2 + \beta_{Z2}X_3 + \beta_{Z3}Y + \varepsilon_Z$$

The results of the path coefficient calculations on substructure-1 can be seen in Table 5.

Table 5. Path Coefficient Values in Substructure-1

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	8.987	6.584		1.365	.174
	Kepemimpinan Melayani	.118	.057	.173	2.071	.040
	Penerapan TIK	.275	.059	.361	4.659	.000
	Psychological Capital	.101	.049	.133	2.043	.043
	Employee Engagement	.253	.079	.254	3.211	.002

a. Dependent Variable: Kualitas Layanan

Source: Research data

Table 6. Model Summary Substructure-1

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.810[a]	.656	.646	9.86027

a. Predictors: (Constant), Employee Engagement, Psychological Capital, Penerapan TIK, Kepemimpinan Melayani

Source: Research data

Based on the analysis results presented in Table 5, Servant Leadership is proven to have a positive effect on Service Quality with a β coefficient value of 0.173. The application of Information and Communication Technology (ICT) also shows a positive effect on Service Quality with a β coefficient of 0.361. In addition, Psychological Capital has a positive effect on Service Quality with a β coefficient of 0.133, as well as Employee Engagement which has a positive effect on Service Quality with a β coefficient value of 0.133. The results of this study indicate that servant leadership, ICT implementation, psychological capital, and employee engagement have a positive and significant influence on the quality of nursing services. These findings confirm that improving healthcare service quality is not solely determined by technical competence or infrastructure availability, but is also strongly influenced by leadership practices, technological support, and the psychological resources of healthcare workers. First, the results show that servant leadership has a positive effect on service quality. This finding supports the theoretical perspective that servant leadership emphasizes empathy, empowerment, and a service orientation toward employees, which in turn encourages employees to provide better service to customers or patients. In the healthcare context, servant leadership is particularly relevant because nursing work is inherently service-oriented and requires high levels of compassion and interpersonal interaction. Leaders who prioritize the needs of their staff can create a supportive work environment that encourages nurses to perform their duties more effectively. This finding is consistent with previous studies indicating that servant leadership positively influences employee performance and service outcomes in healthcare organizations (Purwanti et al., 2023; Demeke et al., 2024). Therefore, strengthening servant leadership practices can be considered a strategic approach to improving nursing service quality in public hospitals. Thus, the path model obtained in substructure-1 is as follows:

$$Z = 0{,}173\, X_1 + 0{,}361\, X_2 + 0{,}133\, X_3 + 0{,}343\, Y + 0{,}344$$

Table 6 shows that the R-square output value is 0.656. This means that 65.6% of the Service Quality (Z) variable can be explained by the Servant Leadership (X1), ICT Implementation (X2), Psychological Capital (X3), and Employee Engagement (Y) variables, so the remaining 34.4% or ε_Z = 0.344 is influenced by other variables which are factors not included in this study. The path diagram of Substructure-1 is presented in Figure 2.

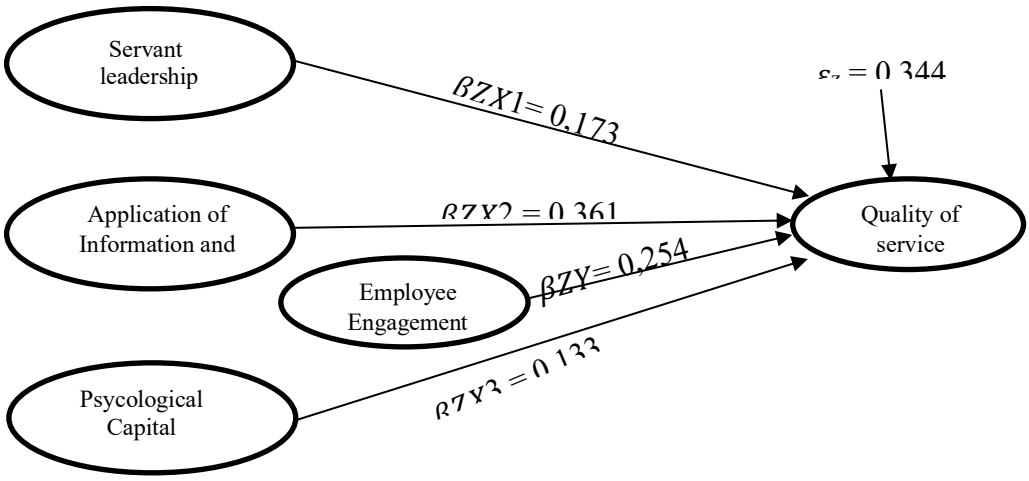

Figure 2. Empirical Causal Relationship Model Between Variables in Substructure-1

2. Path Relationship Model Between Variables in Substructure 2

The path relationship model between variables in substructure 2 consists of one endogenous variable, Employee Engagement (Y), three exogenous variables, namely Servant Leadership (X1), ICT Implementation (X2), Psychological Capital (X3), and one residual variable, ε_Y. Based on these relationships, the path model in substructure 2 is as follows:

$$Y = \beta_{Y1}X_1 + \beta_{Y2}X_2 + \beta_{Y2}X_3 + \varepsilon_2$$

The results of the path coefficient calculations for substructure-1 can be seen in Table 7.

Table 7. Path Coefficient Values for Substructure-2

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	25.718	6.460		3.981	.000
	Kepemimpinan Melayani	.351	.052	.512	6.804	.000
	Penerapan TIK	.156	.059	.204	2.618	.010
	Psychological Capital	.129	.050	.170	2.601	.010

a. Dependent Variable: Employee Engagement

Source: Research data

Table 8. Model Summary Substructure-2

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.796[a]	.633	.626	10.16882

a. Predictors: (Constant), Psychological Capital, Kepemimpinan Melayani, Penerapan TIK

Source: Research data

Based on the analysis results presented in Table 7, Servant Leadership has a positive effect on Employee Engagement with a β coefficient value of 0.512. The application of Information and Communication Technology (ICT) also shows a positive effect on Employee Engagement with a β coefficient of 0.204. In addition, Psychological Capital has a positive effect on Employee Engagement with a β coefficient value of 0.170. The strong influence of servant leadership on employee engagement indicates that leadership behavior plays a crucial role in shaping employees' emotional and psychological attachment to their work. This finding aligns with engagement theory, which suggests that supportive leadership practices can increase employees' motivation, dedication, and involvement in organizational activities. Previous studies have also reported similar findings, indicating that servant leadership positively influences employee engagement in healthcare organizations (Demeke et al., 2024; Ghazawy et al., 2021).

Thus, the path model obtained in substructure-2 is as follows:

$$Y = 0{,}512\,X_1 + 0{,}204\,X_2 + 0{,}170\,X_3 + 0{,}367$$

Table 8 shows that the R-square output value is 0.633. This means that 63.3% of the Employee Engagement (Y) variable can be explained by the Servant Leadership (X1), ICT Implementation (X2), and Psychological Capital (X3) variables, so the remaining 36.7% or ε_Y

= 0.367 is influenced by other variables which are factors not included in this study. The Substructure-2 path diagram is presented in Figure 3.

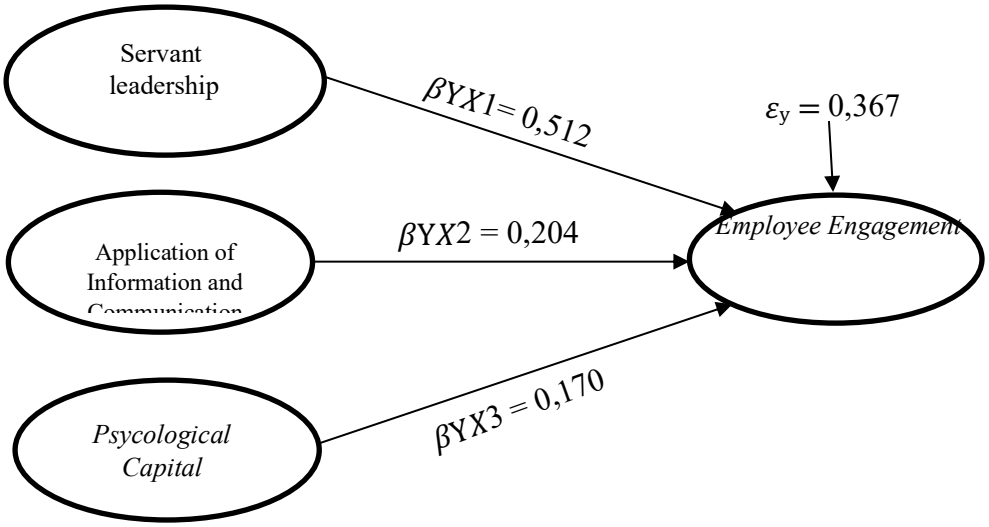

Figure 3. Empirical Causal Relationship Model Between Variables in Substructure-2

3. Indirect Effect Analysis

An indirect effect analysis was conducted to determine the extent to which Employee Engagement mediates the relationship between Servant Leadership, ICT Implementation, and Psychological Capital on Nurse Service Quality. The results of the indirect effect calculation were obtained using the Indirect Effect Calculator for Mediation Models. Furthermore, to confirm whether the mediator variable (Y) significantly influences the independent variable (X_1) on the dependent variable (Z), the Sobel Test Calculator for the Significance of Mediation was used.

Table 9. Results of Indirect Effect Analysis

Variable	Indirect Effect	Sobel Test (Z_{hitung})	Ztabel
$X_1 \rightarrow Y \rightarrow Z$	0,130	3,06	1,96
$X_2 \rightarrow Y \rightarrow Z$	0,052	2,35	1,96
$X_3 \rightarrow Y \rightarrow Z$	0,043	2,34	1,96

Source: Research data

Based on Table 9, it can be seen that the indirect effect of the Servant Leadership variable (X1) on Service Quality (Z) through Employee Engagement (Y) is 0.130, which means there is a positive indirect effect of Servant Leadership on Service Quality through Employee Engagement. The Sobel test or Zcount value is 3.06, which is greater than Ztable 1.96 at a significance level of 0.05. Thus, it can be concluded that the Employee Engagement (Y) variable can be a mediator in bringing the influence of the Servant Leadership variable (X1) on the Service Quality variable (Z). Furthermore, it is known that the indirect effect of the ICT Implementation variable (X2) on Service Quality (Z) through Employee Engagement (Y) is 0.052, which means there is an indirect positive effect of ICT Implementation on Service Quality through Employee Engagement. And the Sobel test or Zcount value is 2.35, which is greater than Ztable 1.96 at a significance level of 0.05. Thus, it can be concluded that the

Employee Engagement (Y) variable can be a mediator in bringing the influence of ICT Implementation (X2). Furthermore, it is known that the indirect influence of the Psychological Capital (X3) variable on Service Quality (Z) through Employee Engagement (Y) is 0.043, which means there is an indirect positive influence of Psychological Capital on Service Quality through Employee Engagement. And the Sobel test or Zcount value is 2.34 which is greater than Ztable 1.96 at a significance level of 0.05. Thus, it can be concluded that the Employee Engagement (Y) variable can be a mediator in bringing the influence of ICT Implementation (X2). The mediation results indicate that employee engagement acts as an important psychological mechanism linking organizational and individual factors to service quality outcomes. This suggests that leadership practices, technological support, and psychological capital may enhance service quality indirectly by strengthening nurses' work engagement. In healthcare organizations, engaged employees tend to demonstrate higher levels of dedication, responsibility, and patient-oriented behavior, which ultimately improves service performance.

4. Analysis of Direct and Indirect Influences

The magnitude of the direct and indirect influences on the Nursing Service Quality variable (Z) is presented in Table 10.

Table 10. Direct and Indirect Effects on the Quality of Nursing Services

Variable	Effect		Conclusion
	Direct	Indirect Through Y	
Servant Leadership (X_1)	0,173	0,512	Direct effect 0,173) < indirect effect (0,512)
TIK Implementation (X_2)	0,361	0,204	Direct effect (0,361) > indirect effect (0,204)
Psychological Capital (X_3)	0,133	0,170	Direct effect (0,173) < indirect effect (0,512)
Employee Engagement (Y)	0,254	-	

Source: Research data

Table 10 shows that the coefficient for the direct effect of Servant Leadership on Service Quality is 0.173, while the indirect effect through Employee Engagement is 0.254. This comparison demonstrates that the indirect effect is greater than the direct effect. This indicates that Employee Engagement effectively functions as an intervening variable in the relationship between Servant Leadership and Service Quality.

The direct effect of ICT Implementation on Service Quality obtained a β coefficient of 0.361, while the indirect effect through Employee Engagement was 0.204. This indicates that the indirect effect is smaller than the direct effect, so Employee Engagement does not effectively function as an intervening variable in the relationship between ICT Implementation and Service Quality.

Furthermore, the direct effect of Psychological Capital on Service Quality obtained a β coefficient of 0.133, while the indirect effect through Employee Engagement was 0.170. This indicates that the indirect effect is greater than the direct effect, so Employee Engagement effectively functions as an intervening variable in the relationship between Psychological Capital and Service Quality.

5. Hypothesis Test

Based on the results of the hypothesis testing, all research hypotheses were accepted, indicating that Servant Leadership, ICT Implementation, and Psychological Capital have a positive and significant effect on Service Quality, both directly and through Employee Engagement as an intervening variable. Employee Engagement was shown to have the most dominant influence on Service Quality, making it a key factor in improving service quality. Furthermore, Servant Leadership, ICT Implementation, and Psychological Capital also had a positive and significant effect on Employee Engagement. These findings confirm that service quality improvements can be optimally achieved through strengthening servant leadership, optimizing ICT implementation, developing psychological capital, and sustainably developing Employee Engagement. From a theoretical perspective, this study contributes to the literature by integrating leadership, technological, and psychological factors into a single analytical model explaining nursing service quality through employee engagement. Previous studies generally examined these variables separately. By positioning employee engagement as a mediating mechanism, this study provides a more comprehensive explanation of how organizational and psychological factors interact to influence service outcomes in public healthcare institutions.

Recent studies in the international literature have increasingly emphasized the importance of integrating leadership, technological support, and psychological resources in improving healthcare service quality. Servant leadership has been widely recognized as an effective leadership approach in healthcare organizations because it emphasizes empathy, empowerment, and the development of employees, which ultimately contributes to improved service performance and patient satisfaction (Demeke et al., 2024; Meuser & Smallfield, 2023). In addition, the rapid development of information and communication technology (ICT) has transformed healthcare service delivery by enabling more efficient information management, clinical decision-making, and coordination among healthcare professionals (Barchielli et al., 2024; Addo & Agyepong, 2024). Furthermore, psychological capital has been identified as a critical psychological resource that enhances employees' resilience, optimism, and motivation in facing complex work demands in healthcare settings (Ali et al., 2022; Liu et al., 2022). Studies have also highlighted that employee engagement plays a strategic role in linking organizational support and individual psychological resources with service outcomes (Ghazawy et al., 2021; Ariyanto et al., 2025). Therefore, incorporating more recent international literature strengthens the theoretical foundation of this study and situates the findings within the broader global discussion on healthcare service quality improvement.

CONCLUSION

This study examined the influence of servant leadership, ICT implementation, and psychological capital on the quality of nursing services, with employee engagement acting as a mediating variable among civil servant nurses at Tangerang City Regional General Hospital. The results indicate that servant leadership, ICT implementation, psychological capital, and employee engagement have positive and significant effects on nursing service quality. These findings suggest that improving service quality in public hospitals is not determined solely by technological infrastructure or organizational structure, but also by leadership practices and the psychological resources of healthcare workers.

Furthermore, servant leadership, ICT implementation, and psychological capital were found to significantly enhance employee engagement, which in turn contributes to better service performance among nurses. The mediation analysis shows that employee engagement partially mediates the relationship between servant leadership, ICT implementation, and service quality. This indicates that employee engagement functions as an important psychological mechanism that connects organizational support and individual resources with service outcomes.

Overall, this study highlights the importance of adopting an integrated approach to improving healthcare service quality through strengthening service-oriented leadership, optimizing the use of information and communication technology, and developing nurses' psychological capital and work engagement. From a theoretical perspective, this research contributes to the development of a human resource–based service quality model by integrating leadership, technological, and psychological factors within a single analytical framework. From a practical perspective, the findings provide insights for hospital management in designing strategies and policies aimed at enhancing sustainable service quality in public healthcare institutions.

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