

# ANALYSIS OF HOSPITAL MANAGEMENT INFORMATION SYSTEMS (HMIS) ON THE EFFECTIVENESS AND EFFICIENCY OF OUTPATIENT SERVICES AND ITS IMPLICATIONS FOR EMPLOYEE PERFORMANCE (A SURVEY STUDY AT RUMAH SEHAT TERPADU DOMPET DUAFANA HOSPITAL, BOGOR CITY)

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## Abstract

This study aims to analyze the effect of the Hospital Management Information System (HMIS) on the effectiveness and efficiency of outpatient services and its implications for employee performance at Rumah Sakit Sehat Terpadu Dompot Dhuafa, Bogor City. The study employed a quantitative approach with a survey method involving employees directly engaged in outpatient services and HMIS utilization. Data were collected through questionnaires and analyzed using descriptive analysis and path analysis with SPSS version 24. The results indicate that HMIS contributes to service effectiveness ( $\beta=0.605$ ;  $R^2=36.6\%$ ), reflected in improved patient data accessibility, recording accuracy, and service speed. HMIS also contributes to service efficiency ( $\beta=0.603$ ;  $R^2=36.4\%$ ), evidenced by reduced patient waiting times and accelerated administrative processes. Service effectiveness and efficiency jointly contribute to employee performance ( $R^2=26.5\%$ ), although only efficiency demonstrates a meaningful partial contribution. HMIS exerts a direct effect on employee performance ( $\beta=0.526$ ) as well as indirect effects through effectiveness (0.126) and efficiency (0.242), yielding a total effect of 0.894. It is concluded that optimal HMIS implementation contributes to improving outpatient service quality and employee performance.

**Keywords:** *Hospital Management Information System (HMIS); service effectiveness; service efficiency; employee performance; outpatient services.*

## INTRODUCTION

Hospitals play a critical role as healthcare service providers that must continuously adapt to advances in medical science, technological development, and the changing socio-economic conditions of society. In the era of digital transformation and rapid development of information technology, hospitals are required to provide healthcare services that are faster, more accurate, and integrated. Digitalization in healthcare services has become an essential strategy to improve service quality and maintain competitiveness in the healthcare sector, particularly in the context of the Industry 4.0 era. In Indonesia, hospitals are also required to implement hospital information systems to support operational activities. According to Law No. 44 of 2009 concerning Hospitals, every hospital must record and report all operational activities through a hospital management information system (Nurfarahin et al., 2025).

One of the technological innovations widely adopted to support hospital service efficiency is the Hospital Management Information System (HMIS). HMIS is an information technology-based system designed to manage hospital service procedures through integrated networks, coordination, reporting mechanisms, and administrative processes to produce accurate information for decision-making. The implementation of HMIS is expected to improve the effectiveness and efficiency of hospital services while reducing administrative errors and improving patient service quality (Ichsan & Sari, 2024). Outpatient services represent one of the busiest service units in hospitals and serve as the primary entry point for patients seeking healthcare services. Therefore, improving the effectiveness and efficiency of outpatient services is an important indicator of hospital service performance. The implementation of HMIS is expected to support faster service processes, improve data accuracy, and streamline administrative

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procedures (Herlina *et al.*, 2022). However, despite these expected benefits, the implementation of HMIS does not always run smoothly due to various challenges such as technological limitations, infrastructure constraints, and human resource readiness. However, preliminary observations conducted at RST Dompot Dhuafa Hospital revealed several challenges in the implementation of HMIS. These challenges include technological issues such as outdated hardware, unstable Local Area Network (LAN) connectivity, and limited server capacity that may affect system performance. In addition, human resource limitations also pose significant challenges. Data indicate that the fulfillment of workforce needs decreased from 41% in 2018 to only 30% in 2021, which is far below the hospital's ideal workforce standard of 75%. Such limitations increase employee workload and may negatively affect employee performance and service delivery. Employee performance plays a crucial role in the successful implementation of information systems in healthcare institutions. The effectiveness of HMIS largely depends on how well employees can utilize the system in their daily work activities. A system that is practical, user-friendly, and well supported by training programs can significantly improve employee productivity and service quality. Conversely, inadequate training, technical problems, and resistance to technological change may reduce the effectiveness of the system and hinder service performance (Pramida & Mulyanti, 2023).

Previous studies have shown that the implementation of hospital information systems can significantly improve service efficiency, reduce administrative workload, and enhance staff productivity. HMIS can improve hospital performance through the development of business process management systems, automation of service workflows, human resource development, and technological improvement (Nurwito, 2024). Other studies also indicate that HMIS implementation improves healthcare service quality by facilitating hospital management activities (Pane *et al.*, 2023). Furthermore, the implementation of HMIS can enhance staff work efficiency by reducing processing time, facilitating data entry, and minimizing manual administrative tasks (Ernikowati & Fitriyani, 2024). However, the success of HMIS implementation is strongly influenced by technological readiness, infrastructure support, and the competence of human resources operating the system (Rambe *et al.*, 2025). Based on these considerations, it is important to analyze how the implementation of HMIS influences the effectiveness and efficiency of outpatient services and how these factors subsequently impact employee performance. Therefore, this study aims to analyze the effectiveness and efficiency of outpatient service management through HMIS and its implications for employee performance at Rumah Sehat Terpadu Dompot Dhuafa Hospital in Bogor.

## LITERATURE REVIEW

### Hospital Management Information System (HMIS)

The development of information and communication technology has significantly influenced the progress of various organizations, including hospitals. Many hospitals are currently attempting to improve healthcare management quality by implementing computer-based Hospital Management Information Systems (HMIS) to support organizational transformation and improvement in various aspects such as infrastructure, financial management, equipment management, and human resources (Herlina *et al.*, 2022). In general, a system can be defined as an integrated set of components that are interconnected and interact with one another to achieve predetermined objectives (Kartikasari, 2020).

The Hospital Management Information System (HMIS) is formally regulated in Indonesia through the Regulation of the Minister of Health of the Republic of Indonesia Number 82 of 2013. This regulation defines HMIS as an information and communication technology system that processes and integrates all hospital service processes through coordinated networks, reporting mechanisms, and administrative procedures to produce accurate and timely information. HMIS also constitutes an integral component of the broader national health information system (Sarayar *et al.*, 2022). In practice, HMIS integrates all hospital service processes into a coordinated digital network connecting various departments, enabling effective data management, reporting, and administrative procedures to ensure the availability of accurate information for decision-making (Wijayanti & Nurhayati, 2024).

Hospital data management is inherently complex because it involves large volumes of both medical and administrative data. When data management is conducted manually without the support of HMIS, several problems may arise. This situation can cause inconsistencies in information across departments. In addition, manual data processing may produce outdated information because reporting processes require time-consuming manual recapitulation. Human error is another potential issue, as manual data processing increases the likelihood of mistakes due to fatigue, lack of accuracy, and work overload, particularly when dealing with large volumes of data (Kartikasari, 2020).

### Employee Performance

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Human resources (HR) play a crucial role in organizational success. HR is considered a key determinant in achieving organizational goals because employees directly contribute to the execution of daily organizational activities. Effective human resource management cannot be separated from the role of employees who are expected to demonstrate optimal performance to support the achievement of organizational objectives. Employee performance therefore has a significant impact on the overall success of an organization, including healthcare institutions such as hospitals (Hasnah & Asyari, 2022). In general, performance refers to the level of success achieved by an individual in carrying out assigned tasks or responsibilities. Organizations continuously strive to improve employee performance to ensure that organizational goals can be achieved effectively. To support this objective, organizations usually establish behavioral and performance standards that must be followed by employees. These standards may be written or unwritten and serve both as guidelines for employee behavior and as evaluation criteria for assessing performance. In the hospital environment, improving employee performance is particularly important because it directly influences the quality of healthcare services delivered to patients (Hasnah & Asyari, 2022).

## The Role of Hospital Management Information Systems (HMIS) in Service Effectiveness and Efficiency

An integrated information system allows hospitals to minimize time and cost inefficiencies, increase staff productivity, and provide faster and more accurate services to patients (Rambe *et al.*, 2025). Effectiveness and efficiency are two fundamental concepts in hospital service management. Effectiveness refers to the degree to which an organization successfully achieves its predetermined goals. A service is considered effective when it reaches the intended target, produces outcomes that meet established standards, and fulfills the needs of service users (Mishbahuddin, 2020). Koontz and O'Donnell describe effectiveness as "doing the right things," meaning that organizational activities are directed toward achieving the desired objectives (Latuconsina *et al.*, 2023). In the context of hospital services, effectiveness can be reflected in the speed of service delivery, accuracy of diagnosis, accuracy of medical record documentation, and the quality of interactions between healthcare staff and patients (Hasnah & Asyari, 2022).

Efficiency, on the other hand, refers to the ability of an organization to utilize available resources in the most optimal way to produce maximum output. Koontz and O'Donnell define efficiency as "doing things right," meaning that activities are carried out using the most economical combination of time, cost, and effort (Latuconsina *et al.*, 2023). In hospital services, efficiency can be observed through reduced patient waiting times, faster administrative procedures, and the use of information technology such as HMIS to reduce manual workloads (Herlina *et al.*, 2022; Rambe *et al.*, 2025). Several studies have highlighted the important role of HMIS in improving both service effectiveness and efficiency. Nurwito (2024) stated that the implementation of HMIS significantly enhances service effectiveness by accelerating medical services and improves efficiency by reducing data processing time and minimizing administrative errors. Similarly, Ernikowati and Fitriyani (2024) found that HMIS simplifies patient data recording and facilitates faster access to medical information, thereby positively influencing hospital service effectiveness and efficiency. Based on these perspectives, this study measures service effectiveness through indicators such as service speed, accuracy of service delivery, and quality of outpatient care. Meanwhile, service efficiency is measured through indicators such as patient waiting time, speed of administrative processes, and the optimization of time, cost, and labor resources in healthcare service delivery (Fathoni *et al.*, 2024; Pramida & Mulyanti, 2023).

## METHOD

This study employed a quantitative research approach using a descriptive survey design. The survey method was used to collect information from respondents by distributing structured questionnaires and compiling their responses for analysis. This approach aims to describe and analyze the relationship between the implementation of the Hospital Management Information System (HMIS), the effectiveness and efficiency of outpatient services, and employee performance. The descriptive survey design allows researchers to obtain systematic information regarding respondents' perceptions and experiences related to the use of HMIS in hospital service management (Rifly, 2022). The data used in this study were primary data, obtained directly from respondents through questionnaires distributed to employees working in the outpatient unit of Rumah Sehat Terpadu (RST) Dompot Dhuafa Hospital in Bogor. Primary data refer to data collected directly from the original source by the researcher for specific research purposes (Syahmi, 2023). The questionnaire was designed to measure respondents' perceptions regarding the implementation of HMIS, the effectiveness and efficiency of services, and employee performance.

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The population of this study consisted of all employees working in the outpatient unit of Rumah Sehat Terpadu (RST) Dompot Dhuafa Hospital in Bogor, totaling 65 employees. A population refers to a generalization area consisting of subjects or objects with certain characteristics determined by the researcher to be studied and from which conclusions are drawn (Syahmi, 2023). The sampling technique used in this study was total sampling, where all members of the population were included as research respondents. This technique was selected because the total population was relatively small, consisting of fewer than 100 individuals. Therefore, the entire population of 65 employees was used as the sample in this study to obtain comprehensive information regarding the implementation of HMIS and its impact on service effectiveness, efficiency, and employee performance (Salsabillah *et al.*, 2022).

## RESULTS AND DISCUSSION

### Validity and Reliability Test

The validity and reliability tests were conducted to ensure that the research instruments were appropriate for measuring the variables in this study. The validity test was used to determine whether the questionnaire items were capable of accurately measuring the intended constructs, while the reliability test was conducted to assess the consistency of the measurement instrument. The validity test was performed by examining the correlation between each item score and the total score of the corresponding variable. The results indicated that all questionnaire items had correlation coefficients higher than the critical value (*r*-table), indicating that all items were valid and suitable for measuring the research variables. Furthermore, the reliability test was conducted using Cronbach's Alpha coefficient to evaluate the internal consistency of the questionnaire items. The results showed that all variables had Cronbach's Alpha values greater than 0.70, indicating that the instruments used in this study were reliable and had good internal consistency. Based on the results of the validity and reliability tests, it can be concluded that all measurement instruments used in this study are valid and reliable. Therefore, the questionnaire items are appropriate for further statistical analysis.

### Normality Test

The normality test was conducted to determine whether the residuals in the regression model were normally distributed, which is one of the assumptions required in linear regression analysis. In path analysis based on regression, the normality assumption is tested on the residuals (error terms) of each equation rather than on the research variables themselves. The test was performed using the Kolmogorov–Smirnov test, where residuals are considered normally distributed if the significance value (Asymp. Sig.) is greater than 0.05.

Table 1. Normality Test Result

Test	Value
N	65
Mean	0.000000
Std. Deviation	0.22115473
Kolmogorov–Smirnov Statistic	0.176
Asymp. Sig. (2-tailed)	0.000

Based on the results of the Kolmogorov–Smirnov test on the unstandardized residuals, the Asymp. Sig. (2-tailed) value is 0.000, which is lower than the significance level of 0.05. This result indicates that the residuals are not normally distributed, meaning that the normality assumption in the regression model is not fully satisfied. However, regression analysis can still be applied because the sample size in this study exceeds 30 respondents ( $n = 65$ ). According to the Central Limit Theorem, with a sufficiently large sample size, the sampling distribution tends to approach normality, allowing regression analysis to remain robust despite minor violations of the normality assumption.

### Descriptive Analysis

Descriptive analysis was conducted to describe respondents' perceptions of each research variable based on the mean, minimum, maximum, and standard deviation values. Descriptive statistics are used to summarize and present research data in a meaningful way so that the characteristics of the observed variables can be clearly understood (Uma Sekaran & Roger Bougie, 2016).

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Table 2. Mean Value of Each Variable

Variable	N	Minimum	Maximum	Mean	Std. Deviation
<b>HMIS</b>	65	3.75	5.00	4.5885	0.26213
<b>Service Effectiveness</b>	65	3.80	5.00	4.5354	0.31247
<b>Service Efficiency</b>	65	3.33	5.00	4.6410	0.36471
<b>Employee Performance</b>	65	4.00	5.00	4.6923	0.26798

Based on the overall mean values, all research variables fall into the high category on a Likert scale of 1–5. The HMIS variable obtained a mean value of 4.5885 with a standard deviation of 0.26213, indicating that respondents generally perceived the hospital information system positively. The service effectiveness variable recorded a mean of 4.5354 with a standard deviation of 0.31247, reflecting respondents’ favorable assessment of service delivery quality. Service efficiency showed a mean value of 4.6410 with a standard deviation of 0.36471, indicating that the system contributes to more efficient operational processes. Meanwhile, the employee performance variable recorded the highest mean score of 4.6923 with a standard deviation of 0.26798. The minimum and maximum values indicate that all variables fall within the high perception range ( $\geq 3.33$  to 5.00). This finding suggests that respondents generally perceive the implementation of the Hospital Management Information System (HMIS), service effectiveness, service efficiency, and employee performance in the hospital as very good.

Table 3. Mean of HMIS Indicators

Indicator	Mean	Std. Deviation
<b>Easy to search patient data</b>	4.4154	0.49662
<b>Accessible anytime</b>	4.6923	0.52806
<b>Fast data input</b>	4.6154	0.49029
<b>More efficient patient registration</b>	4.6308	0.48635
<b>Easy-to-understand interface</b>	4.5077	0.58957
<b>Comfortable to use at work</b>	4.6154	0.55035
<b>Complete medical history data</b>	4.6615	0.47687
<b>Minimizes errors</b>	4.5692	0.55816

All HMIS indicators show mean values above 4.40, indicating positive perceptions of the system implementation. The highest mean score was found in the indicator “HMIS can be accessed anytime when needed” (4.6923), followed by “HMIS provides complete patient medical history data” (4.6615). These findings indicate that system accessibility and completeness of information represent the main strengths of the system. The lowest mean score was observed in the indicator “I can easily search patient data through HMIS” (4.4154), although it still falls within the very good category. The relatively small standard deviation values across all indicators indicate that respondents’ perceptions are relatively homogeneous.

**Autocorrelation Test**

Table 4. Mean of Service Effectiveness Indicators

Indicator	Mean	Std. Deviation
<b>Fast service delivery</b>	4.4769	0.50335
<b>Treatment according to patient needs</b>	4.6769	0.47129
<b>Compliance with SOP</b>	4.5538	0.50096
<b>Improves patient satisfaction</b>	4.6000	0.52440
<b>Shorter waiting time</b>	4.3692	0.62673

All indicators of service effectiveness recorded mean values above 4.36. The highest mean value was found in “Treatment according to patient needs” (4.6769), indicating that services are perceived as appropriate and aligned with patient needs. The lowest mean value was observed in “Patient waiting time becomes shorter” (4.3692). Although still categorized as good, this finding indicates that time efficiency remains an area that can be further improved. Overall, outpatient service effectiveness is perceived to be very good by respondents.

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Table 5. Mean of Service Efficiency Indicators

Indicator	Mean	Std. Deviation
Administrative processes become simpler	4.6769	0.47129
Reduces operational costs	4.6769	0.53349
Reduces workload	4.5692	0.55816

The indicators “Administrative processes become simpler” and “Reducing operational costs” recorded the highest mean value (4.6769). These results indicate that the implementation of HMIS contributes significantly to simplifying administrative processes and improving operational cost efficiency in hospital services. The indicator “Workload becomes lighter” obtained a mean value of 4.5692, which still falls within the very good category. The relatively small standard deviation values indicate consistent perceptions among respondents regarding service efficiency improvements.

Table 6. Mean of Employee Performance Indicators

Indicator	Mean	Std. Deviation
Work carefully	4.7231	0.45096
Accurate work results	4.7077	0.45836
Completing tasks according to workload	4.6769	0.47129
Achieving predetermined targets	4.6615	0.47687

All indicators of employee performance recorded mean values above 4.66, indicating a very good level of performance. The highest mean score was found in “Working carefully” (4.7231), followed by “Accurate work results” (4.7077). These results indicate that accuracy and carefulness are the dominant aspects of employee performance in the hospital. The lowest mean score was observed in “Achieving predetermined work targets” (4.6615), although it still falls within the very good category. The low standard deviation values indicate that respondents’ perceptions of employee performance are relatively consistent.

**Path Analysis Model Structure**

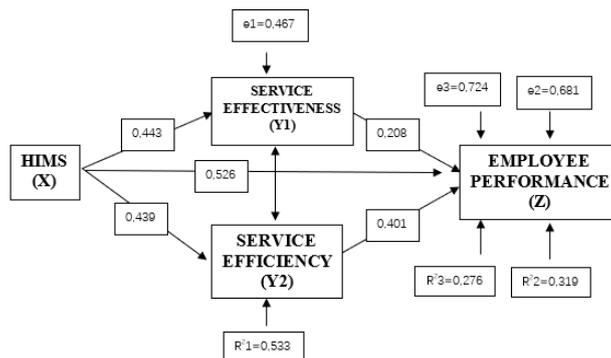


Figure 1. path analysis model

Figure 1 illustrates the path analysis model that describes the causal relationships among HMIS (X), Service Effectiveness (Y1), Service Efficiency (Y2), and Employee Performance (Z). In this model, HMIS functions as an exogenous variable that influences two mediating variables, namely service effectiveness and service efficiency. Subsequently, these variables influence employee performance as the main endogenous variable. The path coefficients displayed on each arrow indicate the magnitude of the direct effect between variables. Based on the results of the path analysis presented in Figure 4.3, several structural relationships can be explained as follows. First, HMIS (X) influences Service Effectiveness (Y1) with a path coefficient value of 0.443, indicating a moderate relationship. This result suggests that better implementation of the hospital management information system contributes to improved service effectiveness in healthcare delivery. Second, HMIS (X) influences Service Efficiency (Y2) with a path coefficient value of 0.439, which also falls within the moderate category. This finding indicates that the implementation of HMIS can enhance service efficiency, particularly in administrative processes, patient data management, and the acceleration of service procedures in the hospital. Third, Service Effectiveness (Y1) influences Employee Performance (Z) with a path coefficient value of 0.208. This value indicates that improvements in service

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effectiveness contribute positively to employee performance, although the influence is relatively smaller compared to other variables in the model. Fourth, Service Efficiency (Y2) influences Employee Performance (Z) with a path coefficient value of 0.401. This result demonstrates that service efficiency has a relatively strong contribution to improving employee performance. Efficient work processes enable employees to complete tasks more effectively and productively. Fifth, HMIS (X) directly influences Employee Performance (Z) with a path coefficient value of 0.526. This value indicates that the direct influence of HMIS on employee performance is stronger compared to the indirect effects through the mediating variables. Thus, the implementation of the hospital information system plays a significant role in improving employee productivity and performance. Sixth, the coefficient of determination for Service Efficiency (Y2) is  $R^2 = 0.533$  (53.3%), indicating that HMIS explains 53.3% of the variance in service efficiency, while the remaining 46.7% is influenced by other variables outside the research model, represented by the error term ( $\epsilon$ ). Seventh, there is a correlational relationship between Service Effectiveness (Y1) and Service Efficiency (Y2) with a correlation value of 0.526, which falls within the moderate category. This relationship indicates that improvements in service effectiveness tend to be associated with improvements in service efficiency within the hospital. Eighth, based on the calculation of indirect effects, the indirect influence of HMIS (X) on Employee Performance (Z) through Service Effectiveness (Y1) is  $0.443 \times 0.208 = 0.092$ . Meanwhile, the indirect effect through Service Efficiency (Y2) is  $0.439 \times 0.401 = 0.176$ . When compared with the direct effect value of 0.526, it can be concluded that the direct effect of HMIS on employee performance is more dominant than the indirect effects through the mediating variables.

## CONCLUSION

This study aimed to examine the influence of the Hospital Management Information System (HMIS) on outpatient service effectiveness, service efficiency, and employee performance. The findings indicate that HMIS plays a significant role in improving both service quality and employee performance within hospital operations. First, the results demonstrate that HMIS has a significant positive effect on outpatient service effectiveness. The better the implementation of the system, the more effective the healthcare services provided to patients. This finding confirms that the integration of information systems can support faster, more accurate, and more reliable service processes in healthcare institutions. Second, HMIS also has a significant positive influence on service efficiency. The system helps streamline administrative procedures, reduce service processing time, and optimize the use of organizational resources. This indicates that the utilization of integrated hospital information systems contributes to operational efficiency in outpatient services. Third, the simultaneous analysis shows that service effectiveness and service efficiency collectively influence employee performance. However, when analyzed individually, only service efficiency has a statistically significant effect on employee performance, while service effectiveness does not show a significant partial influence. This finding suggests that improvements in operational efficiency play a more dominant role in enhancing employee performance compared to effectiveness alone. Fourth, HMIS has a direct and significant influence on employee performance. Therefore, hospital management should continuously improve the quality of HMIS implementation through system development, regular evaluation, and training programs for employees to ensure optimal utilization of the system.

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