



# Analysis Of The Implementation Of Management Information Systems In Budi Setia Langowan Hospital

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**Abstract.** *The rapid and extensive development and progress of information technology today, so that for an agency / company the information used as a basis for administration and data processing is an application system in various fields that are required to use the information system. Good service quality is the implementation of a reliable, effective and efficient Hospital Management Information System (SIMRS) and upgradeable. The hospital information system has an important role in clinical and administrative services. Hospitals that use a website-based system (SIMRS) are designed to integrate the main functions of the hospital into one integrated system stored in a database center. This study aims to analyze the implementation of a hospital information system using the PIECES method. The type of research used is qualitative.*

**Keywords :** *Information System, SIMRS, hospital, PIECES Method*

## 1. INTRODUCTION

Information system is a systematic management of information at all levels of government in order to provide services to the community. An effective health information system provides information support for the decision-making process at all levels of health administration, especially at Budi Setia Langowan Hospital which is a basic health service unit. The health information system was developed in order to support the achievement of the vision and mission of Indonesian health development, namely Healthy Indonesia 2025. Budi Setia Langowan Hospital is one of the hospitals in North Sulawesi Province that has implemented SIMRS since February 14, 2015. To run SIMRS there are hardware and software that support SIMRS. The hardware used has supported the performance of SIMRS such as; Personal Computer one set with Intel Processor, 2 GB RAM, 80 GB hard disk, 19" monitor screen, Wifi IndiHome 30 Mbps, Switch and Canon MP287 printer. The software used is Windows 10 1 GHz 64-bit.

Then, for the network using Local Area Network, star network topology, and database using MySQL, because SIMRS can only be accessed in the local area of Budi Setia Langowan Hospital. There are several health service units that use SIMRS at Budi Setia Langowan Hospital, including the Registration Section, Pharmacy Section, Medical Records Unit, Polyclinic, Inpatient, Emergency Patient Registration Area (TPPGD), Inpatient Patient Registration Area (TPPRI), and Outpatient Patient Registration Area (TPPRJ), as well as in the IT Room Maintenance Section. Hospital management information systems actually provide

convenience in service operations and can minimize obstacles that can occur in patient services in hospitals (Handiwidjojo, 2013).

However, the reality in the field is the opposite of what is expected regarding the implementation of SIMRS which still has various obstacles in its operation. According to Rexi (2024) system constraints are something that limits the system from achieving its best performance. The problems and constraints of the system can be analyzed using a method, one of which is the PIECES method which can analyze system constraints based on the aspects of Performance, Information, Economics, Control, Efficiency, and Service of the system. Table 1 shows the results of a preliminary study related to implementation constraints.

**Table 1. Study Results at Budi Setia Langowan Hospital using the PIECES method**

NO	PIECES	RESULTS
1.	<i>Performance</i>	<ul style="list-style-type: none"> <li>A. There are still some features that need to be added.</li> <li>B. SIMRS still needs adjustment.</li> <li>C. As for damage, it depends on the user.</li> </ul>
2.	<i>Information</i>	<ul style="list-style-type: none"> <li>A. There are some difficulties in the existing information display format, and it is still in the development process.</li> <li>B. The UIUX can be optimized again, or made more user friendly and in 1 form.</li> </ul>
3.	<i>Economic</i>	<ul style="list-style-type: none"> <li>A. For some units, time efficiency can be felt to be better, for example registration, but some units are still experiencing difficulties because they are still using 2 systems.</li> <li>B. Not yet effective, still lacking human resources</li> </ul>
4.	<i>Control</i>	<ul style="list-style-type: none"> <li>A. For the old SIMRS supervision (still in use), you can track users who carry out activities in SIMRS, and in the new SIMRS, development is still being carried out for the same features. For its own security, each user is given a role according to the needs of the user.</li> <li>B. Each account is equipped with a user and password that is only known to the user, and the network itself is equipped with a firewall to prevent SIMRS from being accessed from outside the hospital.</li> </ul>
5.	<i>Efficiency</i>	<ul style="list-style-type: none"> <li>A. The level of difficulty in operating SIMRS is relatively easy, but it is not friendly to new users or requires training first.</li> <li>B. For errors in input, they can be traced easily, see lots of information that can be displayed in SIMRS and</li> </ul>

		to correct errors depending on the error that occurred
6.	<i>Service</i>	<ul style="list-style-type: none"> <li>A. The implementation of SIMRS has increased over time considering that SIMRS is still in the transition stage from the old SIMRS.</li> <li>B. The system is updated according to existing developments and needs.</li> </ul>

**Source: SIMRS service unit, Budi Setia Langowan Hospital, August 2024**

Based on the preliminary study results table, it can be said that the implementation of SIMRS is still not optimal because there are still various problems in its implementation. Based on the observation results, SIMRS problem data was obtained, such as various problems or obstacles in human resources, and there are several features that are lacking, so they need to be added and optimized. Based on the description of the problem, the author is interested in conducting a study entitled "Analysis of the Implementation of Hospital Management Information Systems at Budi Setia Langowan Hospital". The purpose of this study is to analyze the implementation of a hospital management information system with the PIECES method at Budi Setia Langowan Hospital. The results of the study are expected to be able to provide results in the form of recommendations for efforts to develop and improve SIMRS, so that it can provide quality service information to the community and can realize the goals of Budi Setia Langowan Hospital.

## 2. METHOD

This study uses a qualitative method. This method is used to compile recommendations for improving and developing SIMRS at Budi Setia Langowan Hospital. The study was conducted in August-September 2024 at Budi Setia Langowan Hospital.

### Method of collecting data

In this study, the subjects of the study were 8 SIMRS users divided into 7 units that use SIMRS, namely pharmacy, medical records, polyclinics, Emergency Patient Registration Center (TPPGD) and IT Room, Inpatient Registration Center (TPPRI), and Outpatient Registration Center (TPPRJ). The data collection method used in this study was using a questionnaire by visiting one by one SIMRS users in each unit that uses it, as many as 8 SIMRS users who became the main informants. The triangulation carried out was technical triangulation, namely by conducting three different data collection techniques on the main informants, namely, starting from interviews, observations, to documentation. In addition, this study also conducted observations by conducting direct observations of the interview results to

ensure the truth of the data. Observations were carried out to prove the truth of what the informant said and documentation was taken to strengthen the research data. To understand the performance of the existing system, data collection was carried out through interviews, observations, and documentation (Deharja & Permatasari, 2016).

### **Data Analysis Methods**

The data analysis process aims to obtain information related to the implementation of SIMRS at Budi Setia Langowan Hospital based on the aspects of Performance, Information, Economic, Control, Efficiency, and Service.

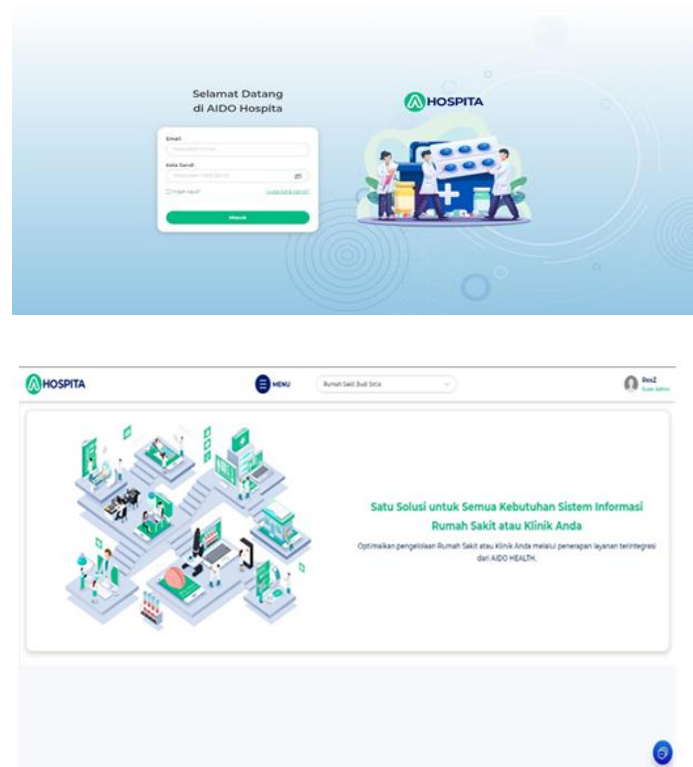
## **3. RESULTS**

### **General description of SIMRS Budi Setia Hospital Tomohon**

Budi Setia Langowan Hospital has been implementing SIMRS for approximately 1 year since June 2023. The utilization and implementation of SIMRS is carried out in collaboration with third parties in creating the SIMRS application. To run the SIMRS application, there is hardware and software that supports the operation of the SIMRS. In terms of minimum specifications, the hardware used has supported the performance of SIMRS such as; Personal Computer one set with Intel® Core™ i3 Processor, 2 GB RAM, 80 GB hard disk, 19” monitor screen, Wifi IndiHome 30 Mbps, Switch and Canon G2020 printer. The software used is Windows 10 1 GHz 64-bit.

SIMRS at Budi Setia Langowan Hospital uses a network topology, namely Star topology. In the SIMRS network at Budi Setia Langowan Hospital, there is one server and network switch. The network server is in the server room / IT room and the switches are in each building / unit of Budi Setia Langowan Hospital including the pharmacy unit, medical records unit, polyclinic unit, Emergency Patient Registration Place (TPPGD), Inpatient Registration Place (TPPRI), and Outpatient Registration Place (TPPRJ). The reason for using the Star Network Topology in SIMRS at Budi Setia Langowan Hospital is that it is easy to install, the computer is connected to only one central hub / switch, if one computer is damaged it will not affect the other computers, it is easy to detect if an error / damage occurs, and it is easy to add or reduce the number of connected computers.

**Figure 1. SIMRS Main View**



## 4. DISCUSSION

### a. SIMRS Performance Analysis Based on Performance Aspects

SIMRS performance analysis based on Performance aspects is an analysis related to the performance of the information system which is assessed from throughput, response time, audibility, communication frequency, completeness, and error tolerance. Based on the results of interviews, observations, and documentation related to SIMRS performance analysis based on performance aspects, the following information was obtained:

- a. Based on the throughput indicator (results), SIMRS can produce the output needed by users. Although, in one service unit there are some that cannot produce output. This can be influenced by software and hardware that support the implementation of information system performance.

Observation results on service units that can produce output, the software used is Windows 10. Then, from the computer hardware used, the PC has a 19-inch screen and there is a printer. Meanwhile, in service units that cannot produce output, the software used is Windows 7. Then, from the computer hardware used, the PC has a small screen size and there is no printer because it cannot print output in the form of reports.

- b. Based on the response time indicator, it can be interpreted as the time needed to start SIMRS or operate SIMRS during the service process. Based on the questionnaire results, SIMRS can be accessed quickly in the patient service process, for an access time range of less than 1 minute according to observation results. However, some units sometimes cannot meet the needs related to fast response time
- c. Based on the audibility indicator (data conformity) is the conformity between the data inputted by the officer with the information generated by the system. This means that what is inputted is in accordance with what is displayed and does not change. The results of the questionnaire, observation, and documentation show that SIMRS can produce information that is in accordance with the inputted data, if there is a data mismatch, it can be caused by human error or incorrect data input.
- d. Based on the communication habit indicator is the ease of the interface or SIMRS display for users. This interface aims to make the information system easy to use by system users. Based on the results of the questionnaire, observation, and documentation shows that SIMRS has an easy-to-understand display, however, the SIMRS display is sometimes boring. This is because there has never been a change in the SIMRS design display during its implementation.
- e. Based on the completeness indicator, it is the level at which the full implementation of the functions of the SIMRS. Starting from the function of whether the program can be run, then the menus on the SIMRS can function optimally so that they can help users in completing their work. Based on the results of interviews through filling out questionnaires, observations, and documentation, it shows that the menus in the SIMRS have run according to their functions and there are no menus that are not functioning, it is only slow which is felt by one of the SIMRS users in the medical records unit. This can be influenced by software and hardware. According to the results of observations, in the service unit that can be accessed quickly, the software used is Windows 10 with the computer hardware used is a 19-inch PC screen.

#### **b. SIMRS Performance Analysis Based on Information Aspects**

SIMRS performance analysis based on the Information aspect is an analysis of information generated by the system that is assessed from accuracy, information relevance, information presentation, data flexibility, and data prevalence. Assessment of this information aspect is important because it concerns information needed by system users, especially health

information. Based on the results of interviews, observations, and documentation related to SIMRS performance analysis based on the information aspect as follows:

- a. Based on the accuracy indicator, the level of information produced has a high level of accuracy and can also be called accurate information. Based on the results of interviews, observations, and documentation, it shows that SIMRS can provide accurate information with an average accuracy according to users of 90%. This is evidenced by SIMRS providing information needed by users through data that has been inputted according to the patient's identity card, so that the information provided is accurate. This can be influenced by the commitment and human resources that support the implementation of information system performance. This greatly affects the information that will be produced by SIMRS, the commitment of each service unit with different needs must be communicated well with IT so that there is no misunderstanding regarding user needs.
- b. Based on resource indicators, namely the total amount of resources used in the implementation/development of the system, including human resources and economic resources. This includes officers and budgets in efforts to improve or develop the system.

### **c. SIMRS Performance Analysis Based on Control Aspects**

SIMRS performance analysis based on the control aspect is an analysis related to system security from misuse attempts. It aims to assess or improve the level of security and the level of security supervision during the implementation of the information system. Based on the results of interviews, observations, and documentation related to SIMRS performance analysis based on the control aspect as follows:

- a. Based on the integrity indicator, it is the level at which access to software or information systems by unauthorized persons can be controlled. The system can only be accessed by users who have a username and password. Based on the results of interviews, observations, and documentation, it shows that SIMRS users have a username and password to access the SIMRS application. Usernames and passwords are provided by IT, so not everyone can create and use them. There is a menu to change the password but not for the username that has been set by IT so that misuse of SIMRS can be prevented.
- b. Based on security indicators, it is a mechanism that controls or protects programs and data. The system has access restrictions on the division of officer work. Based on the results of interviews, observations, and documentation, it shows that the access rights of each SIMRS user are different, so that SIMRS users cannot access units that are not their responsibility. So far, the implementation of SIMRS has never been attacked by threats,

either viruses or human actions (hackers), but the SIMRS IT team must be vigilant if at any time this can happen.

#### **d. SIMRS Performance Analysis Based on Efficiency Aspects**

SIMRS performance analysis based on the efficiency aspect is an analysis related to the ease of information systems assessed from usability and maintainability. Aims to assess the level of ease of use of information systems. An information system must be easy to use by both beginners and experienced users (Rexi, 2024). Based on the results of interviews, observations, and documentation related to SIMRS performance analysis based on the efficiency aspect as follows:

- a. Based on the usability indicator (effort) is the effort required to learn, operate, prepare input, and interpret the output of a program. SIMRS users can operate the system, both entering data and interpreting the results produced by SIMRS. Based on the results of interviews, observations, and documentation, it shows that SIMRS users can operate the system, both entering data and processing data using the SIMRS application. However, there is no manual related to the operation of SIMRS in the service unit that uses SIMRS. The solution that can be given is for IT and vendors to create a manual related to the operation of SIMRS in each unit that uses SIMRS because the manual is an important thing concerning the steps for implementing a job.
- b. Based on the maintainability indicator (repair) is the effort required to find and correct errors in a system. Based on the results of interviews, observations, and documentation, it shows that the hospital has provided special officers for repairing/developing SIMRS called the IT Team consisting of 7 people with an information technology education background who can overcome obstacles related to information systems, especially SIMRS. They are always there and ready to repair SIMRS if needed by SIMRS users and also carry out system maintenance so that the system continues to run well.

#### **e. SIMRS Performance Analysis Based on Service Aspects**

SIMRS performance analysis based on service aspects is an analysis related to services resulting from the implementation of the system that is assessed from accuracy and reliability. It aims to determine the level of service provided by the information system to user and customer satisfaction and the services produced by a system used. Because, along with the development of the era, the development of information systems is also increasing (Deharja &



Permatasari, 2016). Based on the results of interviews, observations, and documentation related to SIMRS performance analysis based on service aspects as follows:

- a. Accuracy and system control. The system can assist officers in the accuracy of input, process and output, data processing and the presence of warnings if there is an error in the system. Based on the results of interviews, observations, and documentation, it shows that SIMRS can assist officers in carrying out work according to their service units, such as registering patients, making reports, and searching for room data.
- b. Based on the reliability indicator is the level at which a program can be trusted to perform the requested function is called reliability. The system can be trusted to perform the functions requested by the user with the aim of work can be easily completed and facilitate the system user. Based on the results of interviews, observations, and documentation shows that SIMRS provides convenience to SIMRS users, such as ease in registering patients, searching for patient data, and making reports.

#### **f. Recommendations for SIMRS Development at Budi Setia Langowan Hospital**

Based on the results of the focus group discussion at Budi Setia Langowan Hospital which aims to compile recommendations for improving/developing SIMRS. The results of the focus group discussion at Budi Setia Langowan Hospital is shown in Table 2.

**Table 2. Focus group discussion results**

No	The problem	Recommendation
1	Human Resources (HR) are still not effective in using SIMRS.	There is a need for additional human resources, especially for those who have been trained to use SIMRS.
2	The information display format still has some difficulties.	Modifications are needed for each display in SIMRS.
3	UIUX is still not optimal.	The UIUX can be optimized again, or made more user friendly and in 1 form.
4	The features in SIMRS, especially in the Pharmacy Lab section, are not yet optimal.	Suggestions for supporting lab results features can be included in the pharmacy section so that they can be easily accessed and collaborated with doctors/nurses so that the drugs given to patients are appropriate and DRPs are minimized.
5	SIMRS display is boring	To the IT team to make periodic changes to the appearance

## **5. CONCLUSION**

Based on the results of this study regarding the Analysis of the Implementation of Hospital Management Information Systems at Budi Setia Hospital, it can be concluded that:

1. The performance of SIMRS at Budi Setia Langowan Hospital based on the Performance aspect is as follows: SIMRS can print reports according to user needs, can be accessed quickly, produces information that is in accordance with what is inputted, has an easy-to-understand display, and has menus that run according to their functions. The performance of SIMRS at Budi Setia Langowan Hospital based on the Information aspect is as follows: SIMRS can provide accurate information quality, according to user needs, and is easy to understand.
2. The performance of SIMRS at Budi Setia Langowan Hospital based on the Economy aspect is as follows: SIMRS has utility value because it is integrated with BPJS Kesehatan, then there is already training for SIMRS users and has officers or a SIMRS improvement and development team. The performance of SIMRS at Budi Setia Langowan Hospital based on the Control aspect is as follows: SIMRS users have a username and password for access rights, in terms of security SIMRS runs well because SIMRS users have different access rights according to their respective authorities.
3. The performance of SIMRS at Budi Setia Langowan Hospital based on the Efficiency aspect is as follows: SIMRS users can easily learn, operate, and process data on SIMRS. Although, there is no manual related to the operation of SIMRS, all of this can be covered by training for SIMRS users. The performance of SIMRS at Budi Setia Langowan Hospital based on the Service aspect is as follows: SIMRS users feel that the existence of SIMRS makes it easier for SIMRS users when carrying out health services such as registering patients, searching for data, and making reports.

Recommendations for the development of SIMRS at Budi Setia Langowan Hospital are for the IT SIMRS to conduct periodic monitoring at least once every 3 days on hardware and software related to SIMRS operations, to procure system maintenance or maintenance on SIMRS and hardware at least once every 6 months, and together with the hospital director to re-procure hardware and software with minimum specifications that can support SIMRS to run well in service units that have problematic SIMRS. Further researchers are expected to have greater ability in exploring and analyzing SIMRS operations in a qualitative approach.

## 6. THANK-YOU NOTE

The author would like to thank the Director of Budi Setia Langowan Hospital and all the staff in the personnel department, especially the staff in the Registration, Pharmacy Unit, Medical Records and IT Room who have given permission to conduct this research and thank the staff who gave the opportunity to be interviewed, who continued to help until this research could run well and finally thank all parties who have provided assistance in this research.

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