

Optimizing the Success of Hospital Management Information Systems in the Digitalization Era

Rizkiyatul Amalia^{1*}, Sri Lestari²

^{1,2}Department of Medical Records and Health Information, Ministry of Health, Poltekkes Kemenkes Semarang, Semarang, Indonesia

Rizkiyatulamaliahasbi.rmik@gmail.com

Abstract— Digitalization has changed aspects, one of which is in the Healthcare sector. Digitalization will help organizations overcome the problem of limited resources. Hospital management information systems (HMIS) are becoming increasingly important in operational, clinical, and administrative management. Although many hospitals have adopted HMIS, not all systems have successfully achieved their goals. Some common problems include data integration difficulties, user resistance, and lack of management support. Accurate and complete data is key to the success of HMIS. However, hospitals still face challenges in managing data quality. HMIS can provide valuable data to support strategic and operational decision-making. However, existing data has not been optimally utilized. The study aims to analyze how system quality affects HMIS Implementation. This study used an analytic observational method conducted at Dr. Gondo Suwarno Hospital. The sample consisted of 65 HMIS users. Data analysis in this study used SEM (Structural Equation Modeling) analysis techniques. The application used is Smart Partial Least Square (SmartPLS). The results showed that the quality of the system on the implementation of HMIS through System Use and Organizational Structure provides a negative value. The path coefficient values obtained are -0.005 and -0.048 and the P-value is 0.722 and 0.256. The implication of this result is that system quality should be able to increase system usage, in the context of this study, the quality of the existing system is not enough to encourage users to be more active in using HMIS. This may be due to other factors such as lack of adequate training or technical support for users. system quality did not contribute significantly to the organizational structure that supports the implementation of HMIS. Although the existing system has certain qualities, the existing organizational structure may not be supportive enough to facilitate effective implementation.

Keywords— HMIS Implementation, HOT-Fit, System Quality, System Users

I. BACKGROUND

Digitalization has changed aspects, one of which is in the health sector. Digitalization will help organizations overcome the problem of limited resources (Hardiyani et al., 2023). Healthcare is a constantly changing and dynamic sector, currently at the crossroads between technological advancements and the need to improve management efficiency. Health Information Technology promises to be a major change in healthcare management, which will streamline and improve the quality of patient care (Odunayo Josephine Akindote et al., 2024). One of the health information technologies that cannot be ignored and is an important tool in hospital management today is the Hospital Management Information System. This system facilitates communication and information technology systems that process and combine all service activities in hospitals using reporting mechanisms, administrative procedures, and coordination networks. Conventional management without HMIS has several impacts including data redundancy, data that is not integrated, information that is not up-to-date, and human error. These things can cause inefficiencies and material losses for hospitals (Anwar et al., 2023).

The digital transformation of healthcare increasingly relies on the optimization of Hospital Management Information Systems (HMIS) to improve the efficiency and effectiveness of healthcare delivery. As described by (Gopal et al., 2019) The future of information technology in healthcare requires a fully integrated platform that drives optimized data management. This shift to a digital-first approach is critical for hospitals looking to streamline their processes and improve patient service. (Barbieri et al., 2023) Highlights that modern health information systems must be able to support various functions such as care management, therefore emphasizing the need for a comprehensive framework that integrates various clinical management systems. This system is critical to ensuring that healthcare providers can manage patient information smoothly while maintaining a high standard of care.

The application of information technology in the health sector that is becoming a global trend is Electronic Medical Records (RME). RME is very important for management to manage health problems because it provides integrity and accuracy, and can also be a solution to improve cost efficiency, improve access and quality of services in hospitals. Information technology (IT) does offer many advantages compared to the use of paper for patient data storage and retrieval. The implementation of RME is met with several challenges, including infrastructure and structural problems, information

technology problems, lack of need assessment, cultural problems, high costs of software, hardware, and data exchange standards. All Health Service Facilities must hold Electronic Medical Records in accordance with the provisions of this Ministerial Regulation no later than December 31, 2023 (Regulation of the Minister of Health of the Republic of Indonesia Number 24 of 2022 concerning Medical Records., 2022). The Directorate of Referral Health Services of the Ministry of Health of the Republic of Indonesia in the 2021 Government Agency Performance Accountability Report (LAKIP) detailed hospitals that realized the implementation of RME as many as 21% (123 hospitals) out of the targeted 40%. The implementation of RME is one of the indicators of the strategic plan target (renstra) which has been realized by 50%. The data shows that the implementation of EMR in Indonesia is not optimal, so it is necessary to conduct an assessment to determine the readiness condition of the implementation of HMIS towards EMR.

Although many hospitals have adopted HMIS, not all systems have successfully achieved their goals. Some common issues include data integration difficulties, user resistance, and lack of management support. Accurate and complete data is the key to the success of HMIS. However, many hospitals still face challenges in managing data quality. HMIS can provide valuable data to support strategic and operational decision-making. However, many hospitals have not utilized the data optimally. Various challenges and problems, especially in terms of big data, data security, regulations, and human resources, are obstacles in realizing a quality digital transformation system (Darwis et al., 2023; Herwati et al., 2022).

dr. Gondo Suwarno Regional General Hospital has used but is limited to traction and desktop-based. There are several problems in the implementation of the information system, one of which is that each system has not been integrated between units.

Based on this background, the author is interested in evaluating the implementation of hospital management information systems based on human, organizational, and *technology* factors and the suitability of relationships, including as determining factors for the success of the implementation of an information system. In the human aspect, the use of the system will be reviewed, the technology will review the quality of the system and the organizational aspect related to the organizational structure

II. METHOD

The survey data was collected from 65 respondents who used the hospital management information system. This type of quantitative research with sampling techniques uses probability sampling. Inclusion criteria have worked in a hospital and the employment status is not in the probationary period. The questionnaire used has gone through a validity and reliability test with the results of the validity test producing a $>$ calculation value of 0.3 so that the questionnaire can be declared valid. The results of the instrument reliability test showed that the Cronbach Alpha value $>$ 0.7.

The hypotheses used in this study are:

- a. There is an indirect influence of technology (system quality) on the implementation of HMIS through human factors (system use)
- b. There is an indirect influence of technology (system quality) on the implementation of HMIS through organizational factors (organizational structure)

The data analysis in this study uses SEM (Structural Equation Modeling) analysis techniques. The application used is Smart Partial Least Square (SmartPLS)

III. RESULTS AND DISCUSSION

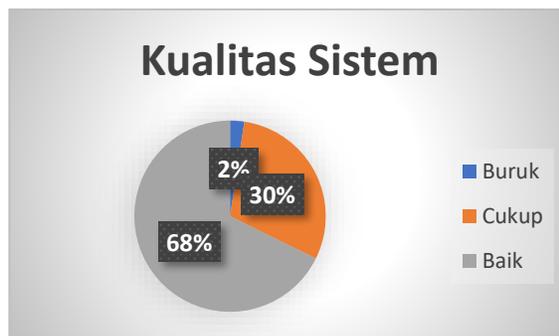
Result

1. Identification of human factors (system use), technology, organization and system implementation

The results of the descriptive analysis obtained an assessment of each variable as follows:



The results of the descriptive analysis in the table above, it is informed that the most HMIS users in RSGS are 71% of employees think that the use of the system is in the good category and 29% of employees think that the use of the system is in the sufficient category. The average use of the system for HMIS users was 16, indicating that the use of the system by HMIS users was in the good category.



The results of the descriptive analysis in the table above, at most 67.7% of employees think that the quality of the system is in the good category. Then 29.9% of employees think that the quality of the system is in the sufficient category, and 24.4% of employees think that the quality of the system is in the poor category. The average system quality is 63.3 and is in the good category.



The results of the descriptive analysis above, it was informed that 68.9% of employees thought that the structure was in the good category. Then 29.9% of employees think that the structure in the category is adequate, and 1.2% of employees think that the structure in the category is bad. The average value of this variable is 39.0 and is included in the good category.



The results of the descriptive analysis showed that 83.2% of employees thought that the implementation of HMIS was in the good category. Then 16.8% of employees think that the implementation of HMIS is in the sufficient category. The average implementation of HMIS is 28.3. This shows that the implementation of HMIS is in the good category.

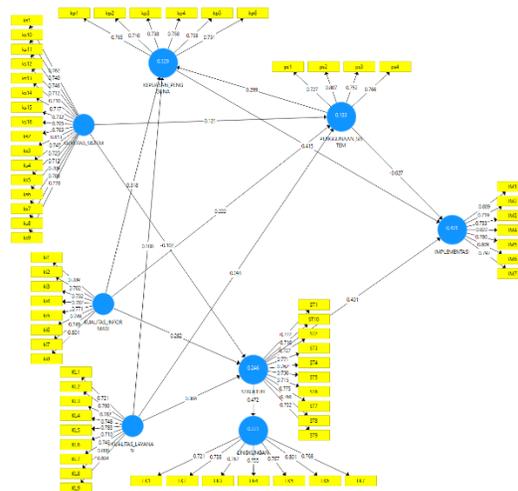


Fig. 1 Measurement Model Output

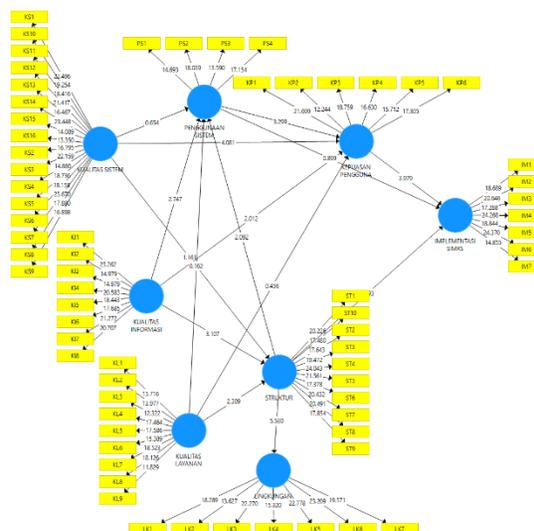


Fig. 2 (Inner Model) Model Struktural

The goodness of fit model in PLS analysis was carried out using the determination coefficient (R-Square). The results of the Goodness of fit Model have been summarized in the following table.

	R Square	R Square Adjusted
System Usage	0,169	0,149
User Satisfaction	0,397	0,382
Organizational Structure	0,226	0,211
Milieu	0,222	0,218
HMIS Implementation	0,404	0,393

Hypothesis Testing

Exogenous	Intervining	Endogen	Path Coefficient	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values	Information
System quality	System Usage	HMIS Implementation	-0,005	-0,006	0,014	0,356	0,722	Insignificant
System quality	Organizational Structure	HMIS Implementation	-0,048	-0,050	0,043	1,137	0,256	Insignificant

Discussion

1. Indirect influence of technology (system quality) on the implementation of HMIS through human factors (system use)

The results of the analysis of the indirect influence of system quality on the implementation of HMIS through the use of the system show that there is no significant influence. This means that the use is not able to make a good contribution to the implementation of HMIS. This means that the quality of the system is poorly understood by users because users do not receive training so that their understanding of the system is limited, causing the implementation of HMIS to be ineffective and efficient.

The implementation of the Hospital Management Information System (HMIS) is significantly influenced by the quality of the system and human factors, especially user involvement and organizational structure. Research shows that high system quality directly improves user satisfaction and system utilization, which is crucial for effective HMIS implementation (Alhaq et al., 2023). The quality of the system and its use, which emphasizes that better system features will result in better user engagement. In contrast, human factors such as training and organizational commitment are essential to optimize the use of HMIS. Training improves user capabilities, while a supportive organizational structure facilitates smoother adoption (Amalia & Ferdianto, 2022; Budi et al., 2023). However, some studies reveal that service quality does not directly impact system usage, suggesting that organizational dynamics may play a more important role in the successful implementation of HMIS (Amalia & Ferdianto, 2022). Thus, a balanced focus on the quality of technology and human factors is essential to maximize the benefits of HMIS in healthcare settings (Nisa et al., 2024).

To optimize the success of the Hospital Management Information System (HMIS) in the era of digitalization, it is very important to focus on the quality of the system, its use, and implementation. A high-quality system, characterized by strong data accuracy and user satisfaction, significantly improves healthcare and operational efficiency (Singh & Wanasida, 2023). Effective implementation requires handling infrastructure, network connectivity, and human resource competence, as evidenced by the challenges faced in various hospitals (Darwis et al., 2023). In addition, the customization and accessibility of Electronic Health Records (EHRs) is essential for user engagement and system utilization. Empirical studies show that healthcare professionals' perceptions of the system's usefulness and self-efficacy directly affect their performance and overall effectiveness of HMIS (Sonkusare, 2024). Therefore, fostering a supportive environment through ongoing training and leadership engagement is essential to maximize the benefits of the system and ensure seamless

integration across departments (Dotel et al., 2024; Singh & Wanasida, 2023). By prioritizing these elements, hospitals can improve the functionality and impact of their management information systems in an ever-evolving digital landscape.

Mandatory use for data management is only used as needed so that the quality of the system does not play a role in the user. System quality is vital but not something important when used. (Rahayu et al., 2018). The use of the system is mandatory so users must continue to use HMIS to process data even though they have minimal knowledge about HMIS. However, the implementation of HMIS is still increasing in order to support the work of officers to be more effective and efficient.

2. Indirect influence of technology (system quality) on the implementation of HMIS through organizational factors (organizational structure)

The results of the analysis of the indirect influence of system quality on the implementation of HMIS through organizational structure showed that there was no significant influence. This means that the organizational structure is not able to contribute to the implementation of HMIS. This means that the quality of the system that has been supported by complete features is not able to add to the influence on the implementation of HMIS because the organizational structure does not provide a strategy in the form of training. Research shows that organizational commitment and the ability to manage resistance to change are also very important, as they directly affect the optimization of HMIS implementation.

Challenges such as inadequate facilities and lack of training can hinder the effectiveness of HMIS, demonstrating that while organizational structure is critical, it must be equipped with the right resources and user training to achieve desired outcomes (Salis & Jepisah, 2022; Vantissha & Azizah, 2022)

The quality of the system used in the company is related to the information system that is implemented in accordance with the needs and capabilities of the user so that it can be used to process data into quality and useful information for the user of the information. The quality of the system boils down to improving the performance of the organization for decision-making (Wisdayati, 2018).

Optimizing the success of Hospital Management Information Systems (HMIS) in the era of digitalization requires a multifaceted approach that focuses on system quality, organizational structure, and effective implementation. Research shows that high-quality data, user satisfaction, and service quality are important determinants of HMIS effectiveness (Singh & Wanasida, 2023). The integration of advanced technologies, such as telehealth and data analytics, improves operational efficiency and patient care, underscoring the importance of a strong technological foundation (Ali et al., 2022; Dotel et al., 2024). In addition, organizational structure plays an important role; An effective leadership and management framework is essential to foster a conducive environment for the successful adoption of HMIS (Dotel et al., 2024). However, challenges such as inadequate personnel training and incomplete system integration across departments can hamper implementation efforts (Lumingkewas et al., 2023). Therefore, continuous professional development and a focus on system interoperability are essential to overcome these barriers and ensure that HMIS meets the ever-evolving needs in healthcare delivery (Sonkusare, 2024). Ultimately, the strategic combination of a quality system, strong organizational support, and comprehensive training will optimize HMIS's success in modern healthcare settings.

In this study, the quality of the existing system is still considered lacking even though it has received the support of *top* management, this is due to the lack of training in the existing organizational structure, rarely conducting periodic evaluations regarding the use of the system and still being constrained by the selection of vendors to be used in the development of HMIS. However, the organizational structure is supportive in terms of the implementation of HMIS so that the results of the implementation of HMIS can still help the work of HMIS users and improve work efficiency. Key factors include leadership support, clear division of tasks, and a supportive work culture, which is crucial for motivating users and ensuring effective system utilization

IV. CONCLUSIONS AND SUGGESTIONS

The results of the study show that the quality of the system for the implementation of HMIS through the use of the system and organizational structure gives a negative value. The implication of these results is that the quality of the system should be able to increase the use of the system, in the context of this study, the quality of the existing system is not enough to encourage users to be more active in using HMIS. This may be due to other factors such as lack of adequate training or technical support for users. system quality does not contribute significantly to the organizational structure that supports the implementation of HMIS. While existing systems have certain qualities, existing organizational structures may not be

supportive enough to facilitate effective implementation. The need for a supportive organizational structure and better training to improve the success of HMIS implementation.

REFERENCES

- [1] Alhaq, M. I., Absah, Y., & Wibowo, R. P. (2023). Evaluation of the Implementation of Hospital Management Information Systems (HMIS) Using the Hot-Fit Method at Al Fuadi General Hospital, Binjai. In W. R. Murhadi, D. Anandya, N. K. Darmasetiawan, J. Dyah Trisnawati, P. A. Mahadwartha, & E. Tandelilin (Eds.), *Proceedings of the 19th International Symposium on Management (INSYMA 2022)* (Vol. 223, pp. 529–538). Atlantis Press International BV. https://doi.org/10.2991/978-94-6463-008-4_67
- [2] Ali, N. A. A., Mutlaq, A. H. T., Lafi, A., Zeben, B., Obaid, R., Abdulrahman, N., & Mahli, N. (2022). Optimizing the Management of Medical Information Technology: Best Practices and Innovations. *International Journal of Bio-Medical Informatics and e-Health*, 10(6), 118–125. <https://doi.org/10.30534/ijbmieh/2022/191062022>
- [3] Amalia, R., & Ferdianto, A. (2022). The Influence of Service Quality on the Implementation of HMIS with the Use of System and Organizational Structure as Intervining Variables. *Journal of Medical Records and Health Information*, 5(2), 110–117. <https://doi.org/10.31983/jrmik.v5i2.9251>
- [4] Anwar, K., Aransyah, M. F., Ibrahim, S. N., Nurlita, F., Sari, A. S., & Marlinda, N. (2023). *Literature review: Assessing the success factors of Hospital Management Information System (HMIS) implementation using the HOT-FIT method in Indonesia*. 6(2), 26–38.
- [5] Barbieri, C., Neri, L., Stuard, S., Mari, F., & Martín-Guerrero, J. D. (2023). From electronic health records to clinical management systems: How the digital transformation can support healthcare services. *Clinical Kidney Journal*, 16(11), 1878–1884. <https://doi.org/10.1093/ckj/sfad168>
- [6] Budi, T. F. A., Nurwijayanti, N., Anam, A. K., & Abiddin, A. H. (2023). Factors Influencing the Implementation of HMIS at Mardi Waluyo Hospital. *Jurnal Ilmiah Kesehatan (JIKA)*, 5(3), 405–413. <https://doi.org/10.36590/jika.v5i3.356>
- [7] Darwis, M., Soraya, S., Nawangwulan, K., Ekawaty, D., Imran, A., & Yusufik, Y. (2023). Hospital Management Information System. *International Journal of Health Sciences*, 1(4), 485–492. <https://doi.org/10.59585/ijhs.v1i4.174>
- [8] Dotel, S., Jha, A., Kumar, H., Rao, N., & Kumar, G. (2024). Hospital Management System Based On Web. *INTERANTIONAL JOURNAL OF SCIENTIFIC RESEARCH IN ENGINEERING AND MANAGEMENT*, 08(05), 1–5. <https://doi.org/10.55041/IJSREM31605>
- [9] Gopal, G., Suter-Crazzolaro, C., Toldo, L., & Eberhardt, W. (2019). Digital transformation in healthcare – architectures of present and future information technologies. *Clinical Chemistry and Laboratory Medicine (CCLM)*, 57(3), 328–335. <https://doi.org/10.1515/cclm-2018-0658>
- [10] Hardiyani, R., Wariyanti, A. S., & Mulyono, S. (2023). Analysis of Strategies in Optimizing Electronic Medical Records in the Outpatient Installation of PKU Muhammadiyah Hospital Surakarta. *APTIRMIKI*.
- [11] Herwati, I., Ayu, J. P., Mustafidah, L., Ningrum, L. R., Aini, I. N., . M., & Kodriyah, L. (2022). Evaluation of the Implementation of Hospital Management Information Systems: Literature Review. *International Journal of Scientific and Research Publications (IJSRP)*, 12(7), 474–482. <https://doi.org/10.29322/IJSRP.12.07.2022.p12754>
- [12] Lumingkewas, P. H., Umboh, A., & Manampiring, A. E. (2023). Analysis of Hospital Management Information System Implementation In Manembo-Nembo General Hospital, Bitung City. *Gema Wiralodra*, 14(2), 832–839. <https://doi.org/10.31943/gw.v14i2.536>
- [13] Nisa, H., Putra, D. H., Fannya, P., & Widjaja, L. (2024). Officers' Behavior Towards Health Information System Innovation at Dharmais Cancer Hospital. *Journal of Computing*, 12(1), 1–10. <https://doi.org/10.23960/komputasi.v12i1.244>
- [14] Odunayo Josephine Akindote, Abimbola Oluwatoyin Adegbite, Adedolapo Omotosho, Anthony Anyanwu, & Chinedu Paschal Maduka. (2024). Evaluating The Effectiveness Of It Project Management In Healthcare Digitalization: A Review. *International Medical Science Research Journal*, 4(1), 37–50. <https://doi.org/10.51594/imsrj.v4i1.698>
- [15] Regulation of the Minister of Health of the Republic of Indonesia Number 24 of 2022 concerning Medical Records., Pub. L. No. 24 (2022).

- [16] Salis, Z., & Jepisah, D. (2022). Management of Hospital Management Information System (SIM) at Dumai City Hospital in 2021. *Scientific Journal of Batanghari University Jambi*, 22(3), 2004. <https://doi.org/10.33087/jiubj.v22i3.2875>
- [17] Singh, B., & Wanasida, A. S. (2023). Determinants of Hospital Information Management System (HIMS) Implementation at Puri Medika Hospital. *Journal of Law and Sustainable Development*, 11(12), e1764. <https://doi.org/10.55908/sdgs.v11i12.1764>
- [18] Sonkusare, M. (2024). HOSPITAL INFORMATION SYSTEM. *Gurukul International Multidisciplinary Research Journal*, 85–97. <https://doi.org/10.69758/GIMRJ2406I8V12P012>
- [19] Vantissha, D., & Azizah, H. (2022). Evaluation of the Implementation of Hospital Management Information System (HMIS) Using the Human Organization and Technology Fit Model (Case Study: lArsani Hospital – Sungailiat, Bangka Regency). *Journal of Computing*, 10(2).
- [20] Wisdayati, M. (2018). *The Influence of Top Management Support and Organizational Structure on the Quality of Accounting Information Systems: A Survey on Universities in the Bandung City Area*. 1–13.