MINH
MALAHAYATI INTERNATIONAL JOURNAL OF NURSING AND HEALTH SCIENCE
ISSN 2620-9152 (Print)
ISSN 2621-4083 (Online)
DOI: 10.33024
Nomor: 79/E/KPT/2023

ARTICLE INFORMATION

Received: September, 22, 2025
Revised: October, 28, 2025
Available online: October, 29, 2025
at : https://e-jurnal.iphorr.com/index.php/minh

Evaluating the implementation of hospital management information systems based on the DeLone and McLean model: A systematic review

Teguh Ariyanto*, Budi Aji , Arih Diyaning Intiasari

Fakultas Ilmu-ilmu Kesehatan, Universitas Jenderal Soedirman
Corrensponding author: *E-mail: teguhanto1975@gmail.com

Abstract

Background: The evaluation of information system success continues to attract attention from researchers, practitioners, and management stakeholders alike. Gaining a clear understanding of this success is essential, as it underscores the system's value and informs future decision-making related to its implementation and improvement. Several methods exist for measuring information system (IS) success, with the DeLone and McLean IS Success Model (D&M model) being the most widely recognized and validated framework.
Purpose: To evaluate the effectiveness of Hospital Information Systems (HIS) based on the DeLone and McLean Information Systems Success Model in various healthcare settings. The research focuses on identifying key success factors, challenges in adoption, and implications for future HIS implementations.
Method: A systematic review was conducted across five articles published between 2017 and 2024, sourced from Saudi Arabia (1 paper, 20%), Nigeria (1 paper, 20%), South Africa (1 paper, 20%), and Indonesia (2 papers, 40%). The articles were assessed using the DeLone and McLean model, which includes six core dimensions: system quality, information quality, service quality, user satisfaction, usage, and net benefits. Data were collected through user satisfaction surveys, Structural Equation Modeling (SEM), and Partial Least Squares (PLS) techniques. A total of 2,441 participants were involved, including 1,784 healthcare professionals and 657 health information management staff.
Results: Findings show that system quality is the most significant factor influencing HIS success, with a positive correlation coefficient of 0.87 between system quality and user satisfaction ($p < 0.01$). A study in South Africa demonstrated that information quality significantly influenced system usage ($\beta = 0.65$, $p < 0.05$), while service quality impacted user satisfaction with a coefficient of 0.73 ($p < 0.01$). In Nigeria, although system quality was associated with net benefits ($\beta = 0.53$, $p < 0.01$), user satisfaction did not directly correlate with these benefits ($p > 0.05$). Common adoption challenges included network disruptions and data storage problems, which were reported in 35% of hospitals using SIMRS in Indonesia.
Conclusions: For future HIS implementations to succeed, healthcare institutions must prioritize improving system quality, enhancing information quality, and strengthening service quality. Addressing technical and training challenges will be crucial in overcoming adoption barriers and ensuring the long-term success of HIS.

Keywords: DeLone and McLean Model; HIS Implementation; Information Quality; Service Quality; System Quality; User Satisfaction.

DOI: https://doi.org/10.33024/minh.v8i8.1609

INTRODUCTION

In the era of globalization, advances in information technology have had a major influence in various fields, including the health sector. As a health care facility, hospitals are required to provide fast, accurate, and quality (Kartini, Fadli, & Fahmi, 2025). Health information systems are essential applications in any health care provider's environment that characterize elementary services for health informatics platform. It provides a service that improves the effectiveness and efficiency of patient health care services by guaranteeing that the information produced and attained is of a high quality. The adoption of Healthcare information system need to be supported by validation the success quality of these systems. To assess and evaluate quality of information system several models are used such as DeLone & McLean quality model (Elsdaig & Nassar, 2019). Considerable capital has been invested in the implementation of EHRs in many developed countries in previous decades (Overhage, & McCallie 2020).

Developing countries, also have taken some steps to employ information technologies including EHR in their healthcare centers. In Iran, efforts to develop infrastructures for and implement EHRs have been part of the Health Ministry IT strategies. Formally, the Ministry of Health in Iran launched a national project as an electronic health records system (SEPAS) in order to develop a national network of health information in 2007. SEPAS is a national electronic health record for all Iranian citizens that collects patients' data on each patient encounters from all hospitals in a centralized system (Abbasi, Khajouei, & Mirzaee, 2019). To overcome these challenges and improve the general quality of healthcare, the implementation of an electronic hospital information systems is crucial. It is noteworthy, however, that implementing electronic hospital information systems requires huge capital investment, usually with a high expectation of returns (Bossen, Jensen, & Udsen, 2013). Therefore, it becomes expedient to evaluate the success of such systems, considering that investing hugely in IT projects does not necessarily guarantee success.

Understanding information system success is an ongoing area of interest not only to researchers but also to practitioners and management stakeholders. Such understanding helps highlight the value of the system and can serve as a basis for subsequent decisions regarding such systems. There are various approaches to assessing the success of information systems (IS). The popular and most validated measure is the DeLone and McLean IS success model (D&M model). The D&M model was first propounded in 1992 and was updated with some modifications in 2003 (Cho, Bae, Ryu, Kim, An, & Chae, 2015). This paper focuses on the measures provided in the updated model. The model provides six interrelated dimensions of IS success: system quality, information quality, service quality, (intention to) use, user satisfaction, and net benefits.

The D&M model has been applied and validated in a number of IS studies. For instance, it has been tested and validated in studies assessing the success of e-commerce systems, knowledge management systems (Saghaeiannejad-Isfahani, Saeedbakhsh, Jahanbakhsh, & Habibi, 2015), e-government systems, and much more. In particular, the model has also been tested and applied in a number of health information systems studies in both developed and developing countries—as (Bossen et al., 2013) pointed out that the D&M model serves as a good framework for evaluating health information systems (Abbasi et al., 2019). For instance, in modeling the antecedents of Electronic Medical Record (EMR) system implementation success in Ethiopian hospitals, it was found that the constructs and relationships depicted in the D&M model are applicable in assessing the success of a system (DeLone & McLean, 2016). Another study confirmed the model as applicable to healthcare settings when it was used as a framework for investigating mobile device usage within healthcare and found corresponding relations among the variables. Also, a study conducted by (Cho et al., 2015) evaluated the performance of newly developed information systems in three public hospitals in Korea based on the D&M model. They reported that the quality dimensions (information, system, and service quality) significantly related to user satisfaction and net benefits, thereby upholding the model (Tilahun, & Fritz, 2015). In the same vein, a study of an emergency response medical information system confirmed the usefulness of the D&M model in evaluating health information systems. It was found that the quality dimensions depicted in the model influenced user satisfaction and

Teguh Ariyanto*, Budi Aji , Arih Diyaning Intiasari

Fakultas Ilmu-ilmu Kesehatan, Universitas Jenderal Soedirman
Corrensponding author: *E-mail: teguhanto1975@gmail.com

DOI: https://doi.org/10.33024/minh.v8i8.1609

intention to use; which consequently affected the individuals' perception of the system's impact.

RESEARCH METHOD

A systematic review was carried out following the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines, utilizing the PICO framework (Population = hospital management information, Intervention = DeLone & McLean model, Comparison = DeLone & McLean model vs. manual approach, Outcome = evaluation of success). The inclusion criteria comprised English-language, RCT method, full-text studies published between 2015 and 2025 that specifically examined hospital management information systems.

A thorough search was performed across databases such as Google Scholar, PubMed, and ScienceDirect using targeted keywords including "hospital management information," "DeLone & McLean," and "RCT." Initially, a total of 8,982 articles were retrieved from multiple databases, including Google Scholar (8,902), PubMed (15), and ScienceDirect (65). After screening titles and abstracts, 8,965 articles were excluded due to duplication or irrelevance to the research topic. Following the removal of duplicate entries, 12 articles were retained for full-text assessment. Of these, seven were excluded for specific reasons: two were not randomized controlled trials (RCTs) or quasi-experimental studies, three presented inconsistent sample sizes, and two employed unsuitable research methodologies. Consequently, five studies met the inclusion criteria and were incorporated into the final review. The research originated from various regions—Saudi Arabia (1 study, 20%), Nigeria (1 study, 20%), South Africa (1 study, 20%), and Indonesia (2 studies, 40%). Quality appraisal was conducted using the Joanna Briggs Institute (JBI) Critical Appraisal Skills Program (CASP) 2020 checklist, with all studies rated as high quality. Altogether, the included studies involved a total of 2,441 participants, comprising healthcare professionals and health information management personnel.

Teguh Ariyanto*, Budi Aji , Arih Diyaning Intiasari

Fakultas Ilmu-ilmu Kesehatan, Universitas Jenderal Soedirman
Corrensponding author: *E-mail: teguhanto1975@gmail.com

DOI: https://doi.org/10.33024/minh.v8i8.1609

RESEARCH RESULTS

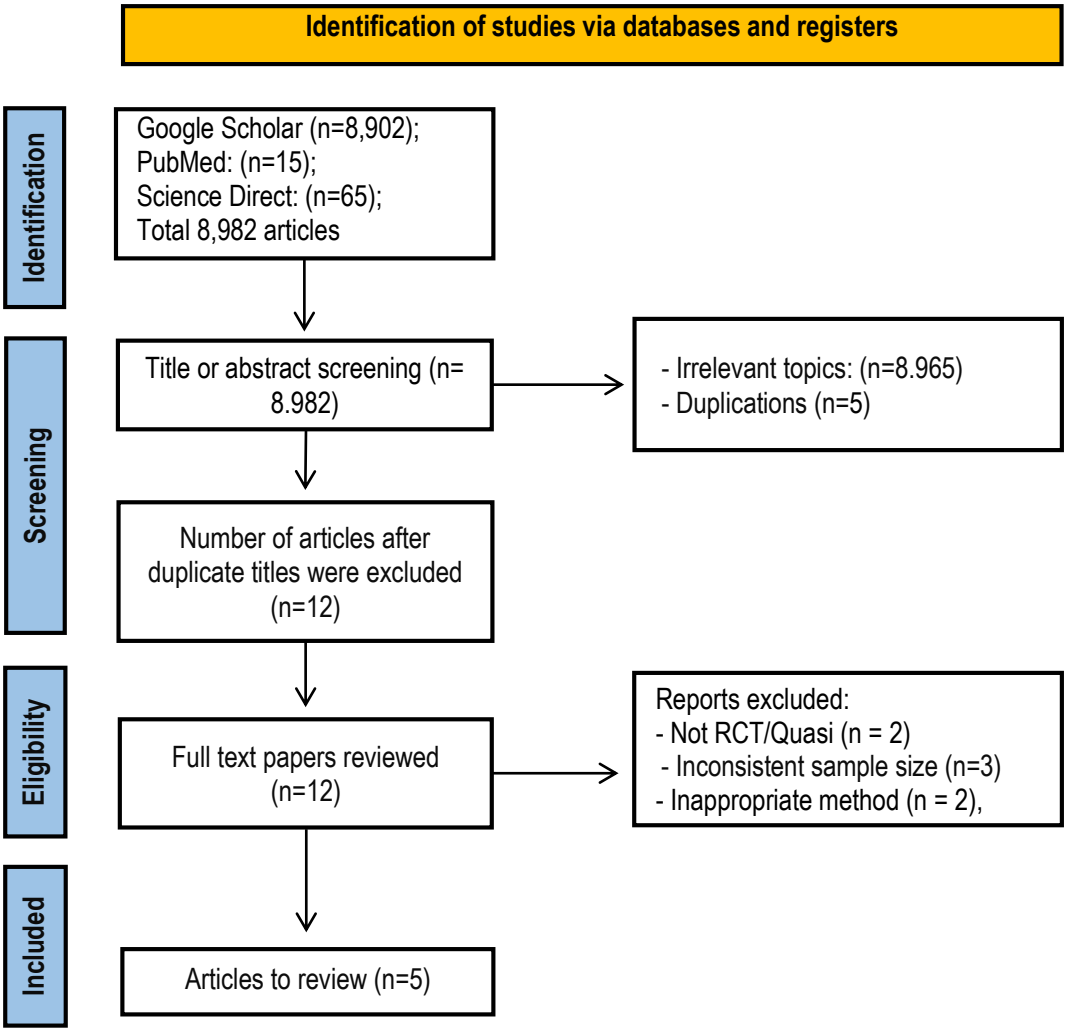


Figure 1 PRISMA diagram

Teguh Ariyanto*, Budi Aji , Arih Diyaning Intiasari

Fakultas Ilmu-ilmu Kesehatan, Universitas Jenderal Soedirman
Corrensponding author: *E-mail: teguhanto1975@gmail.com

DOI: https://doi.org/10.33024/minh.v8i8.1609

Table Summary of Included Studies

(Author, Year) (Country)	Purpose	Method	Results
(Chimbo et al., 2024) (South Africa)	To improve the ability of health care professionals to diagnose diseases and reduce medical errors.	A cross-sectional analytical research design was used for this investigation. Data for the study were gathered at the DGMAH between August 2020 and July 2021. The sample size for this research was 300 medical health care professionals.	Among the 300 healthcare professionals surveyed, there was no significant association between medical error reduction (MER) and knowledge quality (KQ) (β = .043, P = .48). Similarly, a negative but nonsignificant relationship was identified between MER and information quality (IQ) (β = –.080, P = .19). In contrast, a significant positive correlation emerged between MER and the use of electronic health records (EHR) (β = .125, 95% CI = 0.005–0.245, P = .042).
(Elsdaig et al., 2019) (Saudi Arabia)	To measure and evaluate the quality of HIS in Riyadh Hospitals, and to assess the success factors of HIS in Riyadh	Survey research design using the DeLone & McLean model. The model bids six correlated conceptions to measure the success of information system, which are: the quality measurements (service, system and information quality). These six concepts affect the user satisfaction and system use.	Results indicated positive relationships between system quality, service quality, and user satisfaction. The study confirmed that DeLone & McLean's model is a useful framework to evaluate HIS performance in KSA hospitals. Service and system quality were found to significantly affect user satisfaction and usage, but the overall implementation of HIS still needed improvements in some areas.
(Ojo, 2017) (Nigeria)	To validate the updated D&M model for assessing the success of hospital information systems in a developing country.	A survey research design was adopted in the study. A structured questionnaire was used to collect data from 442 health information management personnel in five Nigerian teaching hospitals. A structural equation modeling technique was used to validate the model's constructs.	The study validates the DeLone and McLean information system success model in the context of a hospital information system in a developing country. Importantly, system quality and use were found to be important measures of hospital information system success. It is, therefore, imperative that hospital information systems are designed in such ways that are easy to use, flexible, and functional to serve their purpose.

Teguh Ariyanto*, Budi Aji , Arih Diyaning Intiasari

Fakultas Ilmu-ilmu Kesehatan, Universitas Jenderal Soedirman
Corrensponding author: *E-mail: teguhanto1975@gmail.com

DOI: https://doi.org/10.33024/minh.v8i8.1609

(Author, Year) (Country)	Purpose	Method	Results
(Kartini et al., 2025) (Indonesia)	To measure the success rate of SIMRS implementation at Praya Regional Hospital using the DeLone and McLean model, satisfaction, and net benefits.	Survey study with data analysis using Structural Equation Modeling-Partial Least Square (SEM-PLS) to assess SIMRS success based on the DeLone and McLean model.	Three hypotheses proved significant: user satisfaction positively influenced net benefits, service quality positively influenced usage, and usage positively influenced net benefits. The study highlighted that system quality and service quality need to be improved to optimize SIMRS implementation.
(Mardiana, et al., 2015) (Indonesia)	To evaluate DeLone–McLean Model based on some meta-analysis studies and find the least significant or weak supported relationships in the construct.	Cross-sectional study using a structured survey based on the DeLone and McLean IS Success Model.	System quality and information quality had a significant positive effect on both usage and user satisfaction. Service quality also contributed significantly to overall satisfaction but had limited impact on net benefits. The findings stress the need for continuous training and system improvements to fully realize the benefits of EHRs in Nigerian hospitals.

Teguh Ariyanto*, Budi Aji , Arih Diyaning Intiasari

Fakultas Ilmu-ilmu Kesehatan, Universitas Jenderal Soedirman
Corrensponding author: *E-mail: teguhanto1975@gmail.com

DOI: https://doi.org/10.33024/minh.v8i8.1609

DISCUSSION

The studies examined in this review focused on various Hospital Information Systems (HIS) implemented across different regions and settings. The articles from Saudi Arabia, Nigeria, South Africa, and Indonesia each evaluated distinct HIS platforms using the DeLone and McLean Information Systems Success Model, which helped assess the overall success of these systems (Kartini et al., 2025). The Saudi Arabian study analyzed HIS across four hospitals, with a particular emphasis on system features, ease of use, and user satisfaction. This evaluation highlighted the importance of system usability and responsiveness, which directly influenced the system's adoption and effectiveness. Similarly, the Nigerian study confirmed that system quality positively influenced the usage and user satisfaction of the HIS, leading to better net benefits for the hospital's performance. The studies collectively suggest that flexibility, network reliability, and support services are critical elements in the successful implementation of HIS. These findings demonstrate that the success of HIS is not solely determined by the system itself but also by how well it is supported and integrated into the hospital's workflow, ensuring that healthcare providers can effectively utilize it in their daily operations (Elsdaig et al., 2019; Ojo, 2017).

The DeLone and McLean IS Success Model was consistently applied across all five studies to measure the effectiveness and success of HIS. The six dimensions of the model—system quality, information quality, service quality, user satisfaction, usage, and net benefits—were integral to evaluating the performance of HIS (Nasution, & Chairunnisa, 2023). The measurement of success varied, with some studies using user satisfaction surveys, while others applied Structural Equation Modeling (SEM) or Partial Least Squares (PLS) techniques to analyze performance. For instance, the study from South Africa demonstrated a strong positive correlation between system quality and both user satisfaction and the frequency of system use, emphasizing the critical role that system quality plays in overall HIS success. In contrast, the study from Nigeria found that while the use of HIS led to perceived net benefits, there was no direct correlation between user satisfaction and these benefits, suggesting that improving system functionality and training is necessary for maximizing HIS potential (Ojo, 2017; Chimbo & Motsi, 2024; Kartini et al., 2025).

Across the studies, several common challenges in HIS adoption and implementation were identified. Technical infrastructure issues, such as network disruptions and data storage problems, were recurrent obstacles to the optimal functioning of HIS. For example, the Indonesian study highlighted network disruptions and data storage as significant challenges that impeded the full utilization of the Hospital Management Information System (SIMRS) at Praya Regional Hospital. These technical issues often prevented healthcare professionals from accessing patient data and using the system efficiently, which in turn hindered the overall quality of care provided (Bashiri, Shirdeli, Niknam, Naderi, & Zare, 2023). Moreover, the studies found that inadequate user training was another major barrier to the successful adoption of HIS (Ju & Jeong, 2025).

Healthcare professionals struggled to effectively navigate the systems due to a lack of proper training, which negatively impacted their ability to maximize the system's potential. This indicates a pressing need for continuous technical support and regular training programs to ensure healthcare providers are equipped with the skills and knowledge necessary to operate HIS efficiently (Bashiri et al., 2023; Ojo, 2017).

The quality of the system emerged as the most critical determinant of HIS success in all five studies. The studies from Saudi Arabia, South Africa, and Nigeria all found that system quality—which includes aspects such as ease of use, reliability, and responsiveness—had a direct positive impact on both user satisfaction and system usage. In fact, system quality was found to be a stronger predictor of HIS success than other factors, such as information quality or service quality (Abbasi, Martinez, & Ahmad, 2022). For example, the Saudi Arabian study demonstrated that high-quality systems, which are easy to navigate and reliable, significantly enhanced user satisfaction and system usage. Similarly, the Nigerian study revealed that improvements in system quality resulted in greater perceived net benefits for the hospital. This underscores the importance of focusing on enhancing system quality during HIS development and implementation. Ensuring that

Teguh Ariyanto*, Budi Aji , Arih Diyaning Intiasari

Fakultas Ilmu-ilmu Kesehatan, Universitas Jenderal Soedirman
Corrensponding author: *E-mail: teguhanto1975@gmail.com

DOI: https://doi.org/10.33024/minh.v8i8.1609

systems are user-friendly and technically reliable is crucial for achieving long-term success in HIS adoption (Elsdaig et al., 2019).

Both information quality and service quality played important roles in determining the success of HIS, though their impacts varied across the studies (Kosidin, Munir, Dirgantari, & Wahyudin, 2024). Information quality, which refers to the accuracy, timeliness, and reliability of the data provided by the system, was a significant factor in increasing user satisfaction and system usage. The study from South Africa highlighted that accurate and timely information was essential for effective healthcare delivery, as it allowed healthcare professionals to make better clinical decisions (Hudin, Farlina, Saputra, Gunawan, Pribadi, & Riana, 2018). However, in Nigeria, while information quality was found to contribute to system use, it did not directly impact net benefits, suggesting that more effort is needed to ensure the information provided by HIS is relevant and useful to healthcare providers (Saghaeiannejad-Isfahani et al., 2015). Similarly, service quality, particularly in the form of technical support and training programs, was another critical factor influencing HIS success (Mardiana, Tjakraatmadja, & Aprianingsih, 2015). The studies from Saudi Arabia and Indonesia emphasized the need for robust support systems and comprehensive training to ensure that healthcare staff could fully utilize the system (Thanos, Gallos, Zoulias, & Mantas, 2021). This highlights that even with a high-quality system, support and training are crucial to ensuring successful implementation and usage (Bashiri et al., 2023; Kartini et al., 2025).

The findings from the studies suggest several important implications for future HIS implementations. First, healthcare institutions should prioritize enhancing system quality by ensuring that systems are user-friendly, reliable, and capable of meeting the specific needs of healthcare providers. Future HIS designs should focus on improving usability and reliability, ensuring that the system is robust enough to handle the demands of healthcare professionals (Salsabila & Veronica, 2024). Moreover, continuous technical support and training programs are essential for overcoming adoption barriers and ensuring that healthcare providers are equipped with the necessary skills to operate HIS efficiently. In addition, future HIS implementations should emphasize the improvement of information quality, ensuring that data is accurate, timely, and relevant to healthcare providers' needs. Service quality, including the availability of technical support and user training, must also be strengthened to ensure that healthcare professionals can engage with the system effectively. Addressing these areas will be crucial for the long-term success of HIS and the realization of its benefits in healthcare settings (Elsdaig et al., 2019; Kartini et al., 2025).

CONCLUSION

To ensure the success of future HIS implementations, healthcare organizations need to prioritize improving system quality, information quality, and service quality. Overcoming technical and training-related challenges will help remove barriers to adoption, enabling HIS to fully support better healthcare delivery and outcomes. As the digital transformation of healthcare progresses, these elements will remain essential for achieving optimal results and maximizing the benefits of HIS in diverse healthcare environments worldwide.

REFERENCES

Abbasi, R., Khajouei, R., & Mirzaee, M. (2019). Evaluating the demographic and clinical minimum data sets of Iranian National Electronic Health Record. *BMC Health Services Research*, *19*(1), 450.

Abbasi, R., Martinez, P., & Ahmad, R. (2022). The digitization of agricultural industry–a systematic literature review on agriculture 4.0. *Smart Agricultural Technology*, *2*, 100042.

Bashiri, A., Shirdeli, M., Niknam, F., Naderi, S., & Zare, S. (2023). Evaluating the success of Iran Electronic Health Record System (SEPAS) based on the DeLone and McLean model: a cross-sectional descriptive study. *BMC medical informatics and decision making*, *23*(1), 10.

Bossen, C., Jensen, L. G., & Udsen, F. W. (2013). Evaluation of a comprehensive EHR based on the DeLone and McLean model for IS success: approach, results, and success factors. *International journal of medical informatics*, *82*(10), 940-953.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology*, *3*(2), 77-101.

Teguh Ariyanto*, Budi Aji , Arih Diyaning Intiasari

Fakultas Ilmu-ilmu Kesehatan, Universitas Jenderal Soedirman
Corrensponding author: *E-mail: teguhanto1975@gmail.com

DOI: https://doi.org/10.33024/minh.v8i8.1609

Chimbo, B., & Motsi, L. (2024). The effects of electronic health records on medical error reduction: extension of the DeLone and McLean information system success model. *JMIR Medical Informatics*, *12*, e54572.

Cho, K. W., Bae, S. K., Ryu, J. H., Kim, K. N., An, C. H., & Chae, Y. M. (2015). Performance evaluation of public hospital information systems by the information system success model. *Healthcare informatics research*, *21*(1), 43-48.

DeLone, W. H., & McLean, E. R. (2016). Information systems success measurement. *Foundations and Trends® in Information Systems*, *2*(1), 1-116.

Elsdaig, M., & Nassar, D. A. (2019). Evaluation of healthcare information system using delone and mclean quality model, case study ksa. *International Journal of Advanced Trends in Computer Science and Engineering*, *8*(1.4), 522-527. Retrieved from: https://www.warse.org/IJATCSE/static/pdf/file/ijatcse81814sl2019.pdf

Hudin, J. M., Farlina, Y., Saputra, R. A., Gunawan, A., Pribadi, D., & Riana, D. (2018, August). Measuring Quality of Information System Through Delone Mclean Model in Online Information System of New Student Registration (SISFO PPDB). In *2018 6th International Conference on Cyber and IT Service Management (CITSM)* (pp. 1-6). IEEE.

Ju, J. K., & Jeong, H. W. (2025, February). Effect of a Practice-Oriented Electronic Medical Record Education Program for New Nurses. In *Healthcare* (Vol. 13, No. 4, p. 365). MDPI.

Kartini, A. M., Fadli, S., & Fahmi, H. (2025). The DeLone and McLean Model for Measuring Success Hospital Management Information System Case Study: Praya Regional Hospital. *JISA (Jurnal Informatika dan Sains)*, *8*(1), 66-73.

Kosidin, K., Munir, M., Dirgantari, P. D., & Wahyudin, A. (2024). Model For Improving The Performance Of Hospital Management Information System Services Through Transformational Leadership. *Eduvest-Journal of Universal Studies*, *4*(10), 8748-8764.

Mardiana, S., Tjakraatmadja, J. H., & Aprianingsih, A. (2015). DeLone–McLean information system success model revisited: The separation of intention to use-use and the integration of technology acceptance models. *International Journal of Economics and Financial Issues*, *5*(1), 172-182.

Nasution, S. W., & Chairunnisa, C. (2023). Hospital Management Information System Implementation Assessment Using HOT-FIT Model in Langsa General Hospital Aceh, Indonesia. *Majalah Kedokteran Bandung*, *55*(1), 13-20.

Ojo, A. I. (2017). Validation of the DeLone and McLean information systems success model. *Healthcare informatics research*, *23*(1), 60-66.

Overhage, J. M., & McCallie Jr, D. (2020). Physician time spent using the electronic health record during outpatient encounters: a descriptive study. *Annals of internal medicine*, *172*(3), 169-174.

Saghaeiannejad-Isfahani, S., Saeedbakhsh, S., Jahanbakhsh, M., & Habibi, M. (2015). Analysis of the quality of hospital information systems in Isfahan teaching hospitals based on the DeLone and McLean model. *Journal of education and health promotion*, *4*(1), 5.

Salsabila, T. E., & Veronica, S. J. (2024). Evaluation of the Implementation of the Hospital Management Information System Using the Hot-Fit Method. *Indonesian Journal of Global Health Research*, *6*(6), 3505–3516. Retrieved from: https://jurnal.globalhealthsciencegroup.com/index.php/IJGHR/article/view/3795/2693

Thanos, L., Gallos, P., Zoulias, E., & Mantas, J. (2021). Investigating the success of "asklepieio voulas" hospital information system. In *Public Health and Informatics* (pp. 620-624). IOS Press.

Tilahun, B., & Fritz, F. (2015). Modeling antecedents of electronic medical record system implementation success in low-resource setting hospitals. *BMC medical informatics and decision making*, *15*(1), 61.

Teguh Ariyanto*, Budi Aji , Arih Diyaning Intiasari

Fakultas Ilmu-ilmu Kesehatan, Universitas Jenderal Soedirman
Corrensponding author: *E-mail: teguhanto1975@gmail.com

DOI: https://doi.org/10.33024/minh.v8i8.1609