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Evaluation of RME Implementation Based on Digital Maturity Index (DMI) in the Digital Transformation Stages of Healthcare at Muhammadiyah University Malang Hospital

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Abstract. This study aims to evaluate the implementation of Electronic Medical Records (EMR) at the General Hospital of Muhammadiyah University Malang (RSU UMM) based on the Digital Maturity Index (DMI) in the context of healthcare digitalization transformation. This research employs the Hospital Information System Maturity Model (HISMM) to measure the digital maturity level of RSU UMM. The research method utilized includes surveys and observations involving medical, administrative, and managerial staff directly engaged in the use of EMR. The results indicate that the digital maturity level at RSU UMM is at 65.3%, suggesting that while the EMR implementation is progressing well, improvements are still needed in several indicators such as Data Analysis, Strategy, Information Security, and Human Resource Management. Factors influencing the successful implementation of EMR include technological readiness, managerial support, user training, and data security policies. This evaluation is expected to assist RSU UMM in enhancing the efficiency and effectiveness of healthcare services by optimizing the EMR system and accelerating the digital transformation process in the healthcare sector.
Keywords : Electronic Medical Records (EMR), Digital Maturity Index (DMI) , Hospital Information System Maturity Model (HISMM)Digital Transformation

I.BACKGROUND

In the era of technological revolution we are experiencing today, rapid advancements in computer capabilities, the expansion of the internet, and the utilization of knowledge in digital formats have had a significant impact, particularly in the healthcare sector. These changes have transformed the dynamics between patients and healthcare professionals, offering great opportunities for professionals to provide technologically effective healthcare services to their patients and granting easier access to necessary information.However, healthcare systems worldwide are currently facing considerable pressure to reduce ever-increasing operational costs while maintaining or improving the quality of services. Additional factors such as demographic changes, a shortage of qualified healthcare personnel, and the expectations and demands from patients, local administrators, and health insurance companies also. influence the achievement of these goals. The broader adoption of information systems and technology in healthcare is expected to make a significant contribution to addressing these challenges by reducing costs and improving service quality.

Nevertheless, evidence shows that the implementation of information technology without considering the underlying organizational strategy and structure does not necessarily yield the desired results. Although information technology has great potential to improve healthcare systems, some cases have led to disappointment and skepticism. Therefore, it is crucial to find a suitable model to enhance, measure, and evaluate the success of healthcare-related projects.In this context, the Digital Maturity Index (DMI) model serves as a process to measure digital maturity. Digital maturity is defined as an organization's readiness and ability to use digital technology to achieve its goals. These models provide structured information to help organizations address the issues and challenges they face and offer a reference point to assess capabilities and plan improvements. Although various Digital Maturity Index (DMI) models have been proposed over time, there remains a need for new models that better meet the unique requirements in the healthcare field.This research introduces a new Digital Maturity Index (DMI) model called HISMM (Health Information System Maturity Model) and explains its implementation in the context of health information systems. We will discuss the opportunity to develop this new Health Information System Digital Maturity Index (DMI) model and provide justification based on the limitations of existing models. Subsequently, we will explain HISMM and the activities supporting its development. Finally, we will discuss the methodology for applying and implementing this model in the context of digital transformation in healthcare at the General Hospital of Muhammadiyah University Malang (RSU UMM)

II.METHOD

This research was conducted over one month at Universitas Muhammadiyah Malang General Hospital (RSU UMM) from March 1 to March 31, 2024. The study uses a quantitative approach with a case study at RSU UMM. Data were collected through surveys and structured observations. The population in this study includes all parties involved in the implementation of Electronic Medical Records (EMR) at RSU UMM, including medical, administrative, and managerial staff. The sample was purposively selected, including respondents with direct experience with EMR.

The survey instrument was developed based on the dimensions of the Digital Maturity Index (DMI) in accordance with the Hospital Information System Maturity Model (HISMM), which includes Data Analysis, Strategy, People, Electronic Medical Records, Information Strategy, and IT Systems and Infrastructure. This instrument uses binary response options (Yes or No) and has been verified for content validity and reliability. The analysis uses descriptive and inferential statistical techniques. The DMI score is calculated based on the survey questionnaire. The results are then interpreted to evaluate the level of digital maturity at RSU UMM.The Data Analysis indicator scored 67%, fulfilling 4 out of 6 stages. The stages not fully met include Starting the Foundations and Centralized Dictatorship. Specific points of concern were the monitoring of costs and quality through organizational performance dashboards and the availability of valuable data for analysis and exploration. Improvements in these areas are necessary for optimized cost management and data utilization.

II.RESULTS AND DISCUSSION

The research aimed to evaluate the implementation of Electronic Medical Records (EMR) at Universitas Muhammadiyah Malang General Hospital (RSU UMM) based on the Digital Maturity Index (DMI) using the Hospital Information System Maturity Model (HISMM). Data was collected through surveys and structured observations involving medical, administrative, and managerial staff.The results from the DMI assessment are summarized in Table 3.1:

Indicator	Percentage	Stage Fulfillment
Data Analysis	67%	4 Stage
Strategy	66%	5 Stage
People	69%	6 Stage
Electronic Medical Record	69%	6 Stage
Information Security	53%	3 Stage
System and IT Infrastructure	68%	6 Stage
Average	**65.3%**	

The analysis revealed that while RSU UMM has made significant progress in implementing EMR, certain areas still require improvement. Specifically, the Data Analysis, Strategy, People, and Information Security indicators showed room for development.

Discussion

The HISMM model categorizes the maturity of hospital information systems into six stages: Ad Hocracy, Starting the Foundations, Centralized Dictatorship, Democratic Cooperation, Entrepreneurial Opportunity, and Integrated Relationships. The results indicate varying levels of maturity across different indicators

A. Strategy:

The Strategy indicator scored 66%, meeting 5 out of 6 stages. The stage not fulfilled was Ad Hocracy, indicating a need for a global strategy for IT and formal strategic planning. Points with lower scores included the absence of a global IT/IS strategy, minimal impact of strategic planning on daily operations, and uncoordinated IT governance processes. Enhancements in strategic alignment and formal governance processes are recommended.

B. People:

The People indicator scored 69%, fulfilling all 6 stages. However, areas needing attention included the lack of initial training plans for different user types and the need for standardized and adapted work practices. Continuous training and development programs should be prioritized to ensure effective system usage and skill enhancement.

C. Electronic Medical Record:

The EMR indicator also scored 69%, fulfilling all 6 stages. This high score indicates a well-implemented EMR system at RSU UMM. Continuous monitoring and incremental improvements should be maintained to ensure the system remains effective and efficient.

D. Information Security:

Information Security scored 53%, fulfilling 3 out of 6 stages. Unmet stages included Ad Hocracy, Starting the Foundations, and Integrated Relationships. Key areas for improvement include the development and implementation of comprehensive security policies, proactive security management, and enhanced security awareness among staff. Strengthening these aspects is crucial for safeguarding patient data and maintaining system integrity.

E. System and IT Infrastructure:

This indicator scored 68%, meeting all 6 stages. Despite the positive score, ongoing assessments and improvements are necessary to adapt to evolving technological needs and maintain infrastructure robustness.Overall, the digital maturity level at RSU UMM is progressing well but requires targeted improvements in specific areas to achieve a higher level of digital maturity. Continuous monitoring, evaluation, and enhancement of the EMR implementation will help RSU UMM in achieving efficient and effective healthcare services.

IV.CONCLUSIONS AND SUGGESTIONS

Based on the research conducted on the "Evaluation of RME Implementation Based on Digital Maturity Index (DMI) in the Digital Health Transformation Stages at RSU Universitas Muhammadiyah Malang," the following conclusions can be drawn: Implementation of Electronic Medical Records (EMR): The implementation of EMR at RSU Universitas Muhammadiyah Malang has been conducted satisfactorily based on the evaluations from respondents with expertise in relevant fields. However, several indicators still require improvement. Indicators such as Electronic Medical Record and System and IT Infrastructure have been adequately met, while Data Analysis, Strategy, People, and Information Security indicators still need enhancement.

Digital Maturity Index (DMI) Level: The Digital Maturity Index (DMI) level at RSU UMM in adopting and implementing the EMR system within the digital health transformation process, measured using the Hospital Information System Maturity Model (HISMM), achieved a maturity percentage of 65.3%. This indicates a fairly good implementation of digital health, though some areas still require improvements.Factors Influencing Success: The success factors for the implementation of Electronic Medical Records (EMR) at RSU UMM based on the DMI include Data Analysis, Strategy, People, Electronic Medical Record, Information Security, and System and IT Infrastructure. Each factor plays a crucial role in determining the success of digital transformation.Evaluation and Recommendations: The evaluation of EMR implementation indicates that to enhance the efficiency and effectiveness of healthcare services at RSU UMM, improvements are needed in several aspects. For instance, costs and quality should be monitored via performance dashboards, essential data must be available for analysis and exploration, and a formal strategy for IT systems should be better implemented.Monitoring and Evaluation: Continuous monitoring and evaluation of EMR management according to the HISMM model, which is used internationally, are necessary. This is important to ensure that the implementation of health information systems can run effectively and efficiently.

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