EVALUATION OF THE USE OF SIMRS USING HUMAN, ORGANIZATION, TECHNOLOGY AND *NET BENEFIT (HOT-FIT) METHODS* AT RSIA ANANDA

Desy Lestari Suardi [1], Irwandy [2], Stang [3], Noer Bahri Noer [4], Syahrir Pasinringi [5] and Fridawaty Rivai [6]

[1,2,4,5,6] Master of Hospital Administration, Faculty of Public Health, Hasanuddin University.
[3] Department of Biostatistics, Faculty of Public Health, Hasanuddin University.
Email: [1]desilestariwebinar@gmail.com, [2]wandy_email@yahoo.co.id,
[3]noerbahrynoor@gmail.com, [4]syahrir65@yahoo.com,
[5]fridarivai@yahoo.com, [6]stangbios@gmail.com

Abstract

Management Information Systems (MIS) are an important foundation in improving the quality of services in hospitals. A SIM that is integrated and tailored to your needs simplifies operational processes and decision making. This research aims to analyze the influence of Human, Organizational and Technological factors on the Net Benefit of using the Hospital Management Information System (SIMRS) at RSIA Ananda. This study adopts the *HOT-fit (Human-Organization-Technology fit)* model as a theoretical framework for evaluating the effectiveness of health information system implementation. The research method used is a quantitative approach with a cross-sectional design. Data was collected through a survey of 151 SIMRS users at RSIA Ananda, including medical, administrative and management staff. Data analysis was carried out using the logistic regression test. The research results show that the three factors Human, Organizational and Technological have a positive and significant influence on the Net Benefit of using SIMRS. Human factors, which include system development, user attitudes and satisfaction, have an influence ($p = 0.000$). Organizational factors, including management support and organizational culture, show an influence of $p = 0.000$. Meanwhile, technology factors, including system quality, information and service quality, also contributed significantly ($p= 0.001$).

Keywords: SIMRS, *HOT-fit model, Net Benefit,* Health Information System, RSIA Ananda.

INTRODUCTION

Management Information Systems (MIS) are an important foundation in improving the quality of services in hospitals. A SIM that is integrated and tailored to your needs simplifies operational processes and decision making. In developing a Hospital SIM (SIMRS), patient needs must be considered, including speed, comfort and quality of service. Hospitals need to provide fast and efficient services; such as doctor registration via SMS or website. Speed, convenience, and accuracy of documented data are important to patients. SIMRS allows the focus of medical care on medical personnel, while the billing function is handled by the finance department and the decision to grant deductions is the authority of the board of directors. Medical personnel do not need to consider the patient's financial condition and do not discriminate in services. This pattern improves the performance of medical personnel and the overall quality of service in hospitals.

According to Yusof et al. (2006), SIMRS viz gathering that process implemented to help improve the efficiency and effectiveness of health organizations in carrying out their functions and achieving their goals. This aims to improve the quality of health services in hospitals. The private hospital RSIA Ananda which provides special health services for mothers and children in Makassar City, has implemented a Hospital Management Information System (SIMRS) carried out by the management of PT.

Ananda Idy since 1995. Although RSIA Ananda has become the main choice in the region, SIMRS implementation faces several obstacles involving users, systems and organizational support.

The results of a preliminary study on December 21 2023, based on observations and interviews with several nurses at RSIA Ananda, found that the Hospital Management Information System (SIMRS) has been actively used since 2021. However, it should be noted that in the implementation of SIMRS, there is no Clear and defined Standard Operating Procedures (SOP). SIMRS is used in various units, including Outpatient Registration Places (TPPRJ), Emergency Patient Registration Places (TPPGD), Outpatient Clinics, Inpatient Units, and Medical Records Units. Its function is to simplify operations and is expected to overcome potential obstacles to patient service in hospitals.

From the researcher's preliminary study, the implementation of SIMRS at RSIA Ananda has never been measured in terms of successful implementation. Previous research results, as expressed by Larinse (2015), emphasize that the success of SIMRS depends on human factors, organizational support, and the technological capabilities of SIMRS itself. Therefore, SIMRS evaluation at RSIA Ananda can be carried out using the Human, Organization, and Technology (HOT) Fit model.

From the results of identification with outpatient registration, medical records, IT and inpatient registration counter staff who operate SIMRS using the HOT Fit method. As a result, there are problems in the human aspect, where the required data processing functionality is not fully covered in SIMRS. Users often use a manual approach in reporting because the reporting feature often errors, causing the resulting data to be inaccurate.

From an organizational perspective, SIMRS implementation often lacks discipline and experiences duplication of tasks. For example, in the IT department, database backups are often forgotten, causing the risk of data loss when a server failure occurs. There is a tendency for officers to carry out duties outside their positions, such as eliminating visits from patients who have entered the wrong clinic. The lack of written SOPs makes officers forget and carry out tasks outside of schedule.

From a technological aspect, SIMRS is difficult to upgrade and does not produce reports that support decision making. Limited edit features make it difficult to change data, while network disruptions and programming issues cast doubt on data accuracy. In conclusion, the quality of SIMRS still does not meet the expectations of hospital users.

This research will focus on evaluating the overall use of the Hospital Management Information System (SIMRS) at RSIA Ananda. Analysis of this utilization will involve human, organizational and technological aspects. This approach was chosen because in an information system, the components include human resources, where assessments are carried out by users of the information system, specifically focusing on human resources in hospitals. Next, an important component is organization, where evaluation is carried out on existing work procedures. The third component is technology, with the aim of analyzing the quality of information systems that are already running.

The adoption of information technology by hospitals is generally driven by three main reasons, namely increasing efficiency, effectiveness and quality of service. The

implementation of various functional applications such as billing systems, medical record information systems, pharmacy systems, and other functional modules is expected to achieve this goal.

Andanda Mother and Child Hospital (RSIA), which has the status of a class C hospital in Makassar, has the responsibility to provide maternal and child health services with high quality standards. In line with this commitment, RSIA Ananda is expected to be able to develop itself into an institution that can compete in the health service sector. To achieve this, comprehensive planning and development needs to be carried out. From the results of the problems found, this research aims to find out how to evaluate the use of SIMRS using human, organizational, technological and *net benefit* (HOT-Fit) methods at RSIA Ananda.

LITERATURE REVIEW

Hospital Management Information System

An information system is a system created using computer devices, both *software* and *hardware* , that can be collected, stored and processed to provide *output* to users so that useful for users .

An information system is a collection of components that collect, process, store and provide *output* from any information needed in business processes and applications used through software, *databases* and even related manual processes. Thus it can be concluded that an information system is an organized combination of modules originating from components related to *hardware, software, people* and *networks* based on a set of computers and produces information to achieve goals. Management is a strategy for managing other people to do things activities in achieving predetermined goals (Appley et al., 2010). In line with opinion Athoillah (2010), Management is a process consisting of planning, organizing, directing and monitoring through resources and other sources effectively and efficiently to achieve certain goals.

Evaluation of the Success of Information Systems

Evaluation is research that involves collecting, analyzing and presenting information related to the research object. The next process involves assessing the information by comparing it with evaluation indicators. The results of this evaluation are then used to make decisions regarding the evaluation object. Hadi (2011) defines evaluation as steps in collecting information regarding research objects, assessment, and comparison with evaluation criteria, standards and indicators. Evaluation is a systematic process to determine the extent to which certain goals have been achieved. Thus, evaluation can be interpreted simply as an assessment stage aimed at the evaluation object. The purpose of this evaluation is to understand the condition of an object using certain instruments, and the results are described in the form of information

Human, Organization and Technology Fit Model

The Human, Organization, and Technology Fit (HOT-Fit) model is a combination of the Delone and McLean *IS Success Model* and *the IT-Organization Fit Model,* as proposed by Yusof et al. (2006). The Delone and McLean IS Success Model was used to identify evaluation categories, including relevant factors, dimensions, and measures. Meanwhile, the IT-Organization Fit Model focuses on identifying concepts

and relationships between human, organizational and technological evaluation factors. These three factors are considered key components in Information Systems (IS), and the impact of the system is measured through overall net benefits. The integration of these two models produces a framework that emphasizes the importance of relationships and compatibility between humans, organizations and technology.

HOT-Fit serves as a comprehensive evaluation tool for various Hospital Management Information Systems (SIMRS), according to Yusof et al. (2006). This model includes nine interrelated dimensions, including system quality (information processing quality), information quality (IS results), service quality (technical and service support), system development, system use, user satisfaction, organizational structure (related to management, strategy, organizational plans), organizational environment (related to political, financial, inter-organizational systems), and net benefits (the overall impact of IS).

The fit between technology, people, and organizations in the HOT-Fit framework is considered a complex, subjective, and abstract concept. This model is not only used to evaluate the performance, efficiency and impact of SIMRS, but also as a guide for systematic error evaluation according to the process phase and level of these three factors. HOT-Fit can be applied to carry out systematic and rigorous evaluations in each system development life cycle, in line with further research conducted by Yusof et al. (2008), Yusof et al. (2011), and Yusof & Yusuff (2013).

Conceptual framework
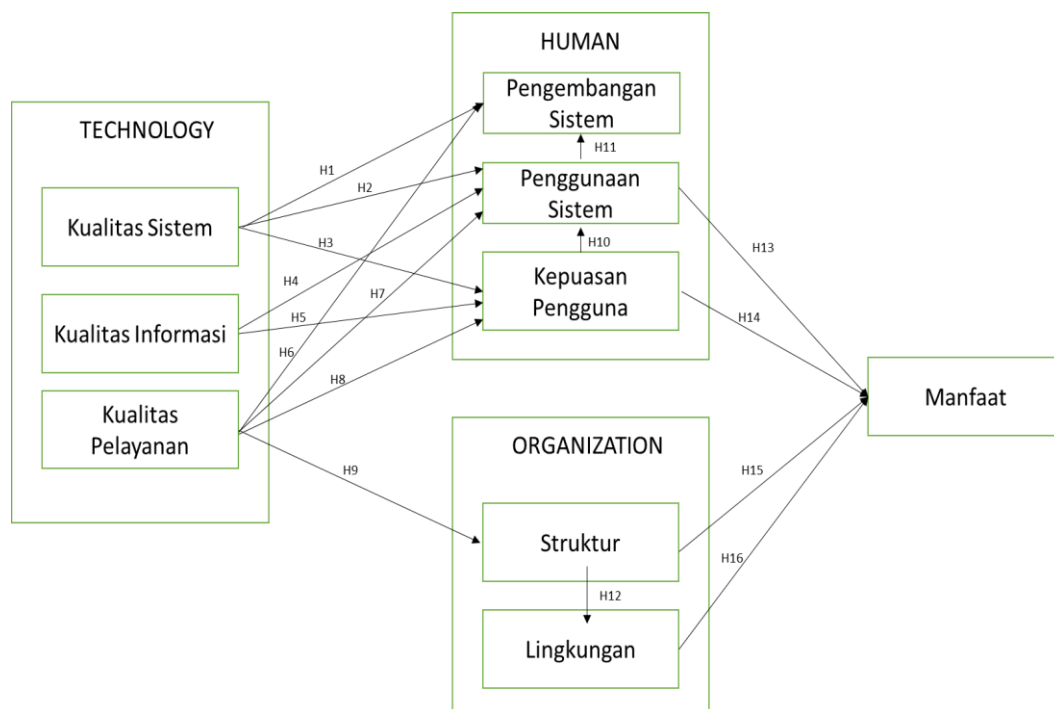
MATERIALS METHODS

Research design

This research is an analytical observational study, with a *cross-sectional* study approach, namely that the research variables are measured or collected at one time.

These variables are measured usually with research instruments so that data consisting of numbers can be analyzed based on statistical procedures.

Location and Research Plans

research location, this research aims to find out how to evaluate the use of SIMRS using Human, Organizational, Technology and *Net Benefit* (HOT-Fit) methods at RSIA Ananda

Populations and Samples

The population in this study were all employees at RSIA Ananda . The sampling technique used is *total sampling* using certain predetermined criteria.

Criteria for Research Respondents

A. Inclusion Criteria

1) Doctors, administrative staff, pharmacists, nurses and midwives with active status

2) Doctors, administrative staff, pharmacists, nurses and midwives who work in inpatient installations

3) Doctors, administrative staff, pharmacists, nurses and midwives are conscious and able to communicate

4) Willing to be a respondent by answering the questions in the questionnaire.

B. Exclusion Criteria

1) Doctors, administrative staff, pharmacists, nurses and midwives who were not willing to be respondents.

2) Doctors, administrative staff, pharmacists, nurses and midwives who are on leave

3) Not filling out the questionnaire completely

Data Collection Methods

Data collection was carried out using a questionnaire created by researchers referring to the conceptual framework and variables to be studied for respondents. Researchers will provide a questionnaire in the form of a Google Form questionnaire which will be filled in by RSIA Ananda employees which will then be analyzed using the SPSS application.

Data Analysis Methods

When analyzing research data, there are three types of analysis that are generally used. First, univariate analysis is used to get a general picture by describing each research variable through a frequency table. Second, bivariate analysis was carried out to see the relationship between two variables, namely the independent variable and the dependent variable, using the Chi Square test. Finally, multivariate analysis aims to find out which independent variable has a greater influence on the dependent variable, using the logistic regression test method

RESULT

General Characteristics of Respondents

Table 5.1: Distribution Frequency Characteristics Respondent RSIA Ananda

Respondent Characteristics	n	%
Gender		
Man	8	5.3
Woman	143	94.7
Age		
20-29 years old	42	27.8
30-39 years old	53	35.1
40-49 years old	38	25.2
> 50 years	18	11.9
Level of education		
SMA/SMK	25	16.6
D3	31	20.5
D4	12	7.9
S1	58	38.4
Profession	15	9.9
S2	10	6.6
Years of service		
1-5 years	67	44.4
> 5 years	84	55.6
Total	151	100

Source: Primary Data, 2024

This research involved 151 respondents with various demographic characteristics. The majority of respondents were female (94.7%), indicating gender dominance in the research sample. In terms of age, the majority of respondents were in the productive age group, with the highest concentration in the 30-39-year range (35.1%), followed by the 20-29 year and 40-49 year groups. The educational level of respondents tends to be high, with Bachelor's degree graduates as the largest group (38.4%), followed by D3 and SMA/SMK graduates. This indicates that the research sample has a fairly good educational background. In terms of work experience, more than half of the respondents (55.6%) had more than 5 years of service, indicating a significant level of experience in their work.

Table 5.2: Frequency Distribution of Research Variables at RSIA Ananda Makassar

No	Research variable	N	%
A	**Technology**		
1	System Quality		
	Not good	31	20.5
	Good	120	79.5
2	Information Quality		
	Not good	25	16.6
	Good	126	83.4
3	Service quality		
	Not good	28	18.5
	Good	123	81.5
B	**Man**		
1	System development		
	Not good	35	23.2
	Good	116	76.8

No	Research variable	N	%
2	System usage		
	Not good	22	14.6
	Good	129	85.4
3	User satisfaction		
	Not good	19	12.6
	Good	132	87.4
C	**Organization**		
1	Structure		
	Not good	33	21.9
	Good	118	78.1
2	Environment		
	Not good	29	19.2
	Good	122	80.8
D	**System Benefits**		
	Not good	27	17.9
	Good	124	82.1

Source: Primary Data, 2024

Overall, the evaluated system received positive assessments from the majority of respondents in various aspects. System quality, information quality and service were each assessed as good by more than 79% of respondents, indicating a high level of satisfaction with the technical and operational aspects of the system.

In terms of human aspects, system development and use also received a positive response, with a user satisfaction level reaching 87.4%. This indicates that the system is user-friendly and meets the needs of its users.

Organizational aspects, including structure and environment, were also rated as good by the majority of respondents, although there is room for improvement, especially in the organizational structure. The benefits of the system were assessed positively by 82.1% of respondents, indicating that the system provides significant added value for its users.

However, it should be noted that each aspect still has a percentage of respondents who rate it as unfavorable, ranging from 12.6% to 23.2%. This indicates that there is room for improvement and further development, especially in aspects of system development and organizational structure which received a relatively higher percentage of unfavorable ratings.

Bivariate Analysis

Table 5.3: The Influence of Research Variables at RSIA Ananda Makassar

No	Variable	Variable	Mark p
1	Quality System	--- > Development System	,000
2	Quality System	--- > Usage System	,001
3	Quality System	--- > Satisfaction User	,000
4	Quality Information	--- > Usage System	,000
5	Quality Information	--- > Satisfaction User	,000
6	Quality Service	--- > Development System	,000
7	Quality Service	--- > Usage System	,000
8	Quality Service	--- > Satisfaction User	,000
9	Quality Service	--- > Structure	,002
10	Use System	--- > Satisfaction User	,000
11	Use System	--- > Development System	,000

No	Variable	Variable	Mark p
12	Structure	--- > Environment	,000
13	Use System	--- > Benefits	,000
14	Satisfaction User	--- > Benefits	,000
15	Structure	--- > Benefits	,000
16	Environment	--- > Benefits	,000

Source: Primary Data, 2024

Based on the results of the regression analysis presented, it can be concluded that:

Technological factors show that there is a complex and interrelated relationship between various variables in the system studied. System quality, information quality, and service quality have a significant influence on system development, system use, and user satisfaction. This shows that the technical and operational aspects of the system greatly influence how the system is received and utilized by users.

Human factors show that user satisfaction and system use also influence each other, where user satisfaction has a significant impact on system use, and vice versa, system use contributes to system development. This shows the existence of a positive feedback cycle between satisfaction, use, and system development.

Organizational factors, such as organizational structure and environment, play an important role in determining the benefits obtained from the system. This confirms that the success of system implementation does not only depend on technical aspects, but also on the organizational context in which the system is implemented.

All variables studied, including system development, system use, user satisfaction, structure, and organizational environment, contribute significantly to the perceived benefits of the system. This suggests that system effectiveness and benefits are the result of complex interactions between various technical, human, and organizational aspects.

Multivariate Analysis

Table 5.4: The Influence of Simultaneous Research Variables at RSIA Ananda Makassar

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3,331	2,073		1,607	,110
	Man	,294	,058	,495	5.102	,000
	Organization	,470	,076	,539	6,163	,000
	Technology	- .112	.033	- .311	-3,393	,001

Source: Primary Data, 2024

Based on the results of the regression analysis, it shows that Human and Organizational factors have a significant positive influence on system benefits, while Technology has a significant negative influence. The Human variable has a significant positive coefficient (B = 0.294, Beta = 0.495, p < .001), indicating that changes in human factors are positively related to changes in system benefits. Meanwhile, Organizational factors also made a stronger positive contribution to the model (B = 0.470, Beta = 0.539, p < .001), indicating that improvements in organizational factors have the potential to significantly increase system benefits.

Meanwhile, the Technology variable has a significant negative coefficient (B = -0.112, Beta = -0.311, p = .001), indicating that improvements in technological aspects are negatively correlated with the system benefits observed in this model.

In conclusion, while human and organizational factors make significant positive contributions to system benefits, technology implementation needs to be managed carefully so as not to reduce the quality of the desired results

DISCUSSION

1. Technological Factors

The research results show that system quality, information quality, and service quality have a significant influence on system development, system use, and user satisfaction (p < 0.05 for all relationships) at RSIA Ananda Makassar. These findings are in line with the DeLone and McLean model of information systems success which has long been a reference in information systems research... These findings confirm the continued relevance of DeLone and McLean's Information Systems Success Model in the modern healthcare context. However, it is important to understand that the significance of these factors may vary depending on the specific context of system implementation. In the hospital context, Handayani et al. (2019) found that system and information quality does have a significant influence on the use of hospital information systems in Indonesia, but organizational and environmental factors also play an important role. These findings confirm the continued relevance of DeLone and McLean's Information Systems Success Model in the modern healthcare context. However, it is important to understand that the significance of these factors may vary depending on the specific context of system implementation.

Recent research by Jiang et al. (2021) in the context of hospital information systems in China found that information quality has the most significant impact on user satisfaction and continued use intention. This shows the importance of ensuring the accuracy, completeness and relevance of the information produced by the system, especially in complex and dynamic hospital environments. Meanwhile, a study by Nguyen et al. (2020) on digital health technology adoption in Vietnam highlights the important role of organizational and environmental factors, such as management support and IT infrastructure, in influencing the success of system implementation. This finding is in line with the results of Handayani et al. (2019) in Indonesia, which emphasizes the importance of considering the organizational context in implementing hospital information systems. Furthermore, Cao et al. (2023) in their research on health information system implementation in the post-COVID-19 era, found that system flexibility and integration capabilities were key factors in determining system success. They emphasized the importance of systems that can adapt quickly to changing health needs and protocols.

Aspects of service quality, which in this study show a significant influence on user satisfaction, have also received attention in recent literature. Sharma et al. (2022) found that responsive technical support and adequate training are critical factors in increasing adoption and user satisfaction of health information systems. These findings have important implications for practice and research in the field of health information systems. For practitioners, these results emphasize the importance of a holistic approach in system implementation, which does not only focus on technical aspects but also considers organizational factors, information quality, and user

support. For researchers, these findings open opportunities for further exploration of how contextual factors such as organizational culture, healthcare regulations, and hospital-specific characteristics influence the success of information systems.

2. Human Factors

The research results show that there is a significant reciprocal relationship between user satisfaction and system use ($p < 0.05$) at RSIA Ananda Makassar. These findings are consistent with DeLone and McLean's Information Systems Success Model, which has long been a major theoretical framework in information systems research. This reciprocal relationship illustrates the complex dynamics between user experience and system usage behavior, where higher satisfaction drives more intensive use, and conversely, more frequent use can increase satisfaction through increased familiarity and efficiency. However, recent developments in health information systems research suggest that this relationship may be more complex than previously understood. Research by Li et al. (2023) on the adoption of health information systems in Chinese hospitals found that the relationship between user satisfaction and system use was moderated by organizational factors, especially management support and innovation culture. They highlight that in an environment that supports innovation, the positive relationship between satisfaction and usage becomes stronger. Suh et al. (2022), in the context of AI-based systems, found that user satisfaction is influenced by the value of the experience and technological features, which in turn influences the intention to continue using the system.

Furthermore, a longitudinal study by Park et al. (2022) on the implementation of a clinical information system in South Korea revealed that the relationship between user satisfaction and system use evolved over time. In the early stages of implementation, system use is driven more by organizational policy than user satisfaction. However, over time, user satisfaction becomes a stronger predictor of continued use. These findings emphasize the importance of considering temporal factors in understanding system adoption dynamics. Another aspect to consider is the role of technology anxiety and user resistance, as highlighted by Dwivedi et al. (2020). In this context, recent research by Ahmed et al. (2024) on the implementation of AI systems in medical diagnosis found that technology anxiety had a significant negative impact on user satisfaction and usage intention, especially among senior practitioners. They suggest that specially designed training programs and responsive technical support can help reduce anxiety and increase acceptance of new technologies. These findings have important implications for the implementation of information systems in the hospital environment. First, it is important to understand that the relationship between user satisfaction and system use is not just linear but dynamic and influenced by various contextual factors. Second, implementation strategies need to consider the different phases of system adoption, with a focus on building organizational support and reducing technology anxiety in the early stages, while continuing to increase user satisfaction to encourage continued use.

3. Organizational Factors

The results of research at RSIA Ananda Makassar show that organizational structure and environment have a significant role in determining the benefits of information systems ($p < 0.05$). These findings underscore the importance of considering organizational context in the implementation of health information systems, an aspect that often receives less attention in approaches that focus too much on technology

alone. Recent research by Chen et al. (2023) on the implementation of health information systems in hospitals in Taiwan provides a deeper perspective on how organizational factors influence implementation success. They found that the flexibility of the organizational structure and the ability of the organization to adapt to change have a significant positive impact on the effectiveness of system implementation. This study emphasizes the importance of creating organizational structures that support innovation and change, especially in the context of new technology adoption.

Furthermore, Greenhalgh et al. (2022) in their research on digital transformation in UK healthcare, identified that an organizational environment that supports learning and experimentation plays a crucial role in the successful implementation of digital health technologies. They highlight the importance of creating "safe spaces" within organizations where staff can experiment with new technologies without fear of negative consequences. These findings expand our understanding of how organizational environments can support or hinder technology adoption.

Another aspect that needs attention is the role of leadership in forming an organizational structure and environment that is conducive to implementing information systems. Research by Kim et al. (2024) on the role of transformational leadership in AI adoption in South Korean hospitals found that a leadership style that supports innovation and employee empowerment significantly increases organizational readiness to adopt new technology. They emphasize the importance of leaders in creating a clear vision, encouraging creativity, and facilitating collaboration across departments. These findings have important implications for health information systems implementation practices. First, it is important to conduct a thorough assessment of the organization's structure and environment before beginning the implementation of a new system. This can help identify potential barriers and enabling factors within the organization. Second, implementation strategies need to be designed taking into account the unique characteristics of the organization's structure and culture, with a focus on creating an environment that supports innovation and learning. Third, developing effective leadership in the context of digital transformation needs to be a priority for health organizations.

4. System Benefits

The results of research at RSIA Ananda Makassar show that all variables studied make a significant contribution to the perceived benefits of information systems ($p < 0.05$). These findings underscore the complexity of measuring and understanding the benefits of health information systems, suggesting that the value generated by such systems is the result of the interaction of multiple, interrelated factors. Recent research by Zhang et al. (2023) on evaluating the benefits of health information systems in Chinese hospitals revealed that the benefits of the system are not only direct, but also have significant indirect effects. They found that the increased operational efficiency generated by information systems not only impacted hospital financial performance, but also indirectly increased patient satisfaction through reduced waiting times and increased accuracy in service. This study emphasizes the importance of a holistic approach in evaluating system benefits, considering chain effects and interactions between various aspects of organizational performance.

Furthermore, Agarwal et al. (2024) in their study of the impact of implementing AI systems in medical diagnosis in US hospitals, identified that the benefits of the system depended largely on the level of integration with existing clinical work processes. They

found that hospitals that successfully integrated AI systems into clinical workflows seamlessly achieved significant improvements in diagnostic accuracy and resource use efficiency, while hospitals that experienced integration difficulties saw more limited benefits. These findings highlight the importance of considering contextual factors and organizational readiness in evaluating and optimizing system benefits.

Another aspect to consider is the evolution of the benefits of health information systems over time. Longitudinal research by Kruse et al. (2022) on the implementation of an electronic health information system in a European hospital network found that the benefits of the system changed and evolved over the period of implementation and use. They identified three main phases: an early phase characterized by increased administrative efficiency, an intermediate phase focused on improving quality of care, and a late phase that demonstrated strategic benefits such as increased research capabilities and clinical innovation. This study emphasizes the importance of a long-term perspective in evaluating system benefits and the need to continually optimize system use to maximize its value.

The implications of these findings for health information systems implementation practice are significant. First, evaluation of system benefits needs to adopt a multidimensional approach that considers not only direct effects but also indirect and long-term effects. Second, implementation strategies must focus on seamless integration between the new system and existing clinical work processes to maximize benefits. Third, organizations need to develop the capability to continually evaluate and optimize system use over time to ensure continued realization of benefits.

CONCLUSION

The research results at RSIA Ananda Makassar are generally consistent with previous research findings and existing theoretical models. However, recent research shows the importance of considering contextual and specific factors in the implementation of health information systems. Factors such as user resistance, technology anxiety, innovation culture, and infrastructure readiness need to be considered in future research. In addition, evaluation of the benefits of information systems needs to be carried out holistically, considering not only technical and economic aspects, but also social impacts and the quality of patient care.

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