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Application of Delon and Mclean Model to Assess the Effectiveness of SIPPISKO: Case Study in the Ministry of Health RI

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ABSTRACT

This research evaluates the effectiveness of the Risk-Based Planning and Monitoring Information System (SIPPISKO) used by all units within the Ministry of Health. Using the Delone and McLean Information Systems Success Model, the study employs PLS-SEM analysis to assess six key dimensions: system quality, information quality, service quality, use, user satisfaction, and net benefits. Data were gathered from auditors and Ministry of Health units through questionnaires. The analysis reveals that system quality significantly impacts user satisfaction but not use, while information and service quality significantly influence both use and user satisfaction. Although use does not substantially affect user satisfaction, system use significantly impacts perceived net benefits. These findings suggest that enhancing the quality of SIPPISKO's system and services could improve user satisfaction and overall system effectiveness. The results offer strategic insights for the Ministry of Health to strengthen its information systems, leading to more effective risk management and oversight.

Keywords: DeLone and McLean Information Systems Success Model, Evaluation of The Effectiveness, Information System, PLS Structural Equation Modeling analysis, SIPPISKO

INTRODUCTION

The Ministry of Health plays a pivotal role in overseeing government functions within the health sector in Indonesia. The Ministry requires effective risk management with substantial responsibilities in formulating, establishing, and implementing health policies/, and managing budgets and work units/, dispersed across the country; the Ministry requires effective risk management. Such risk management is essential to ensure the continuity and success of the health programs administered by the Ministry. However, challenges arise when the large scale of budgets and work units within the Ministry is not proportionate to the number of auditors available in the Inspectorate General, who are tasked with conducting internal oversight of public fund management (Itjen,2019).

The Ministry of Health requires the assessment of integrated risk management at every stage of decision-making, planning, and execution of programs and activities. Therefore, the Inspectorate General must develop a system that can effectively oversee all operations, ensuring that government functions adhere to principles of good governance. In response to this

challenge, the Ministry of Health introduced the Risk-Based Planning and Monitoring Information System (SIPPISKO) in 2019 (Itjen,2019). Implementing SIPPISKO is expected to provide a more accurate depiction of risk factors and profiles within the Ministry of Health of the Republic of Indonesia. It Will serve as a robust foundation for the formulation of the Annual Supervision Work Program (PKPT) by the Inspectorate General of the Ministry of Health.

Although SIPPISKO has been implemented for several years, formal evaluation still needs to be conducted to assess the system's effectiveness. Based on the available data, the utilization rate of SIPPISKO has yet to reach an optimal level. For instance, in 2020, the data entry rate in SIPPISKO was only 23% in some units. Raises concerns about the system's success in supporting the oversight processes at the Ministry of Health, as shown in Figure 1 below.

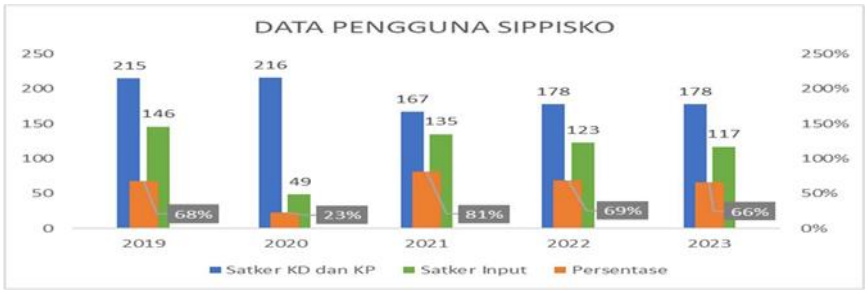

Figure 1. SIPPISKO User Data as of January 2024

In assessing information systems' success, the Information Systems Success Model and the User Satisfaction and Usage Model, as delineated by Delone and McLean (1992), present an approach of critical importance. These models are extensively acknowledged for providing a comprehensive, empirically validated framework that emphasizes the business implications of information system implementation. The application of these models in evaluating the Risk-Based Supervisory Planning Information System (SIPPISKO) facilitates the establishment of more precise metrics for assessing the system's effectiveness. This evaluation seeks to determine the degree to which SIPPISKO fulfills its predefined objectives but also aims to generate insightful feedback that can inform future system enhancements.

In the context of SIPPISKO, several indicators reveal challenges associated with these variables. For instance, the quality of the SIPPISKO system is questioned due to the menu options needing to fully address the current needs of auditors, consequently leading to a low rate of system utilization. Additionally, the lack of guidance and support in data entry adversely affects the quality of the information produced, resulting in outputs that fail to provide an accurate and reliable representation of risk.

From the users' perspective, the satisfaction level with SIPPISKO reveals disappointing outcomes/, attributed to an inadequately structured data entry process and a lack of significant impact on enhancing supervisory performance. Consequently, the net benefits derived from SIPPISKO remain suboptimal, as the system has not yet made a meaningful contribution to the efficiency and effectiveness of oversight within the Ministry of Health.

According to Apriyanto and Putro (2018), 55% of information system projects in Indonesia face challenges, and 18% result in failure, evaluating the current information systems thoroughly. This evaluation will ensure that the systems deliver the anticipated benefits. Consequently, evaluating SIPPISKO using the Delone and McLean model is essential for understanding how this system can support the oversight responsibilities of the

Inspectorate General and identifying the factors influencing the system's success or failure. The outcomes of this evaluation are expected to provide relevant and constructive recommendations for future systems.

MATERIALS & METHODS

This study employs a quantitative research methodology, utilizing primary and secondary data sources. Primary data collection involved conducting interviews with the team responsible for the Risk-Based Planning and Monitoring Information System (SIPPISKO) at the Inspectorate General/, and distributing online questionnaires via Google Forms. These questionnaires utilized a Likert scale ranging from 1 to 5, where (1) strongly disagree, (2) disagree, (3) neutral, (4) agree and (5) strongly agree. The respondents included auditors from the Inspectorate General and staff members from various units within the Ministry of Health. The questionnaire data were processed using descriptive analysis and Partial Least Squares Structural Equation Modeling (PLS-SEM). In addition, secondary data comprised regulations, policies, procedures, research journals, and other relevant literature that supported this study.

The respondents in this study comprise auditors from the Inspectorate General and personnel from various units within the Ministry of Health who actively access and utilize the SIPPISKO application. The sampling method employed in this study is non-probability sampling, specifically purposive sampling techniques. Purposive sampling involves selecting participants based on specific criteria that align with the study's objectives. This approach enables the targeted identification of participants who meet particular qualifications, thereby facilitating the determination of an appropriate sample size for the research (Sugiyono,2018). The sampling approach adopted in this study follows the guidelines provided by Hair *et al*. (2010), which state that a representative sample size should be calculated by multiplying the number of indicators by a factor of 5 to 10. Given that this study includes 27 indicators, this method yields a recommended sample size of 135 and 270 respondents.

This study utilizes six variables to assess the effectiveness of the SIPPISKO application: system quality, information quality, service quality, usage, user satisfaction, and net benefits. Each variable is further detailed into multiple indicators or operational measures for precise evaluation. Following the data collection phase, the next step involves processing the data to ensure it effectively addresses the research objectives and resolves the issues under investigation.

This research framework begins with the deployment of SIPPISKO across all units of the Ministry of Health, accompanied by a detailed identification of problems encountered during its use. The primary challenge currently faced is work units' suboptimal system utilization by work units, particularly concerning data access and updates. This issue affects the performance of the Inspectorate General in setting subsequent Annual Supervision Work Programs (PKPT). Understanding the characteristics of SIPPISKO users is essential for assessing the effectiveness of its implementation, enabling the identification of factors that influence the system's success. According to the DeLone and McLean (2003) model, the evaluation actions system, information quality, and service quality/, directly impact user satisfaction and net benefits.

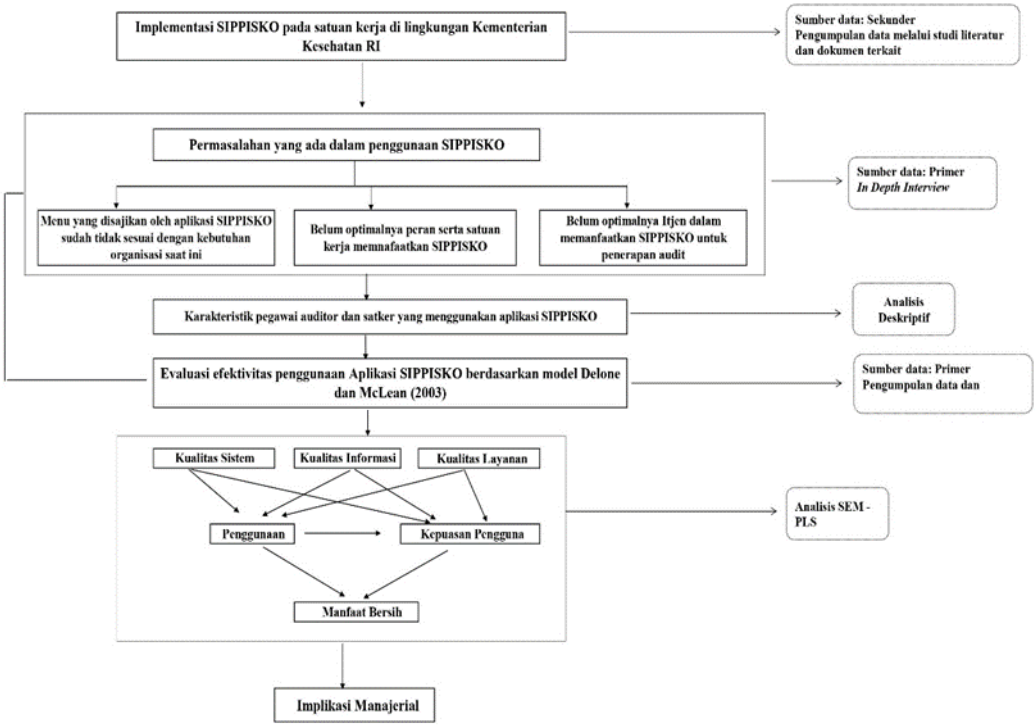

Figure 2. Research Framework

RESULT

Characteristics of the Respondents

The results about the characteristics of the respondents are presented in Table 1 below.

Table 1 Characteristics of SIPPISKO Users

category	Characteristics	Frequency (person)	Persentase
Gender	Male	70	45%
	Female	85	55%
Age	20 to 30 years old	11	8%
	31 to 40 years old	75	48%
	41 to 50 years old	47	30%
	>50 tahun	22	14%
Role	Auditor	103	66%
	Work Unit	52	34%
Work Unit	Inspectorate General of the Ministry of Health	103	66%
	Central office	14	9%
	Regional Office	38	25%
Tenure	1 to 5 years old	19	12%
	6 to 10 years old	48	31%
	11 to 15 years old	47	30%
	16 to 20 years old	16	11%
	> 20 years old	25	16%

Table 1 provides an overview of the respondents' characteristics, indicating that most are female and fall within a productive age range. The respondents are employees from various work units, including the Inspectorate General, Regional Offices, and the Central Office of the Ministry of Health, all utilizing the SIPPISKO application. Most respondents are auditors from the Inspectorate General. While there is variation in work experience, the majority possess significant expertise. These

respondents are crucial in providing insights for creating the SIPPISKO application; particularly those auditors engaged in policy formulation. More experienced respondents are anticipated to offer responses that are particularly pertinent to this research.

Condition of Variable Indicators

A descriptive analysis of the variables was conducted to provide an overview of the responses for each research indicator without drawing definitive conclusions. This questionnaire utilized ordinal data, categorizing and assessing the constructs measured in this study, typically presented in scale form. In this research, the variables were described by measuring each indicator's central tendency (median) for each indicator. Data processing was performed using Microsoft Excel to achieve accuracy.

Table 2 Condition of Variable Indicator

Latent Variables	Median	Description
System Quality	4,00	Agree
Information Quality	4,00	Agree
Service Quality	4,00	Agree
Use	3,00	Neutral
User Satisfaction	4,00	Agree
Net Benefits	4,00	Agree

Table 2 demonstrates that the results of the descriptive analysis for the variables of system quality, information quality, service quality, user satisfaction, and net benefits yield a median value of 4, reflecting satisfaction and positive evaluations of the system's quality, the accuracy of the information, and the benefits provided. In contrast, the variable of use presents a median value of 3, indicating a neutral stance regarding the frequency and duration of application usage.

Result of SEM-PLS Analysis

SEM-PLS analysis aims to explore the relationships among latent variables/, and between latent variables and their indicators. In developing the SEM-PLS model, the researcher constructs a path diagram from a comprehensive literature review.

Outer Model

The outer model evaluation is conducted to assess the validity and reliability of the measurement model. It involves examining Convergent Validity, Discriminant Validity, and Reliability.

Convergent Validity

Convergent validity is assessed through the loading factor values and the Average Variance Extracted (AVE). A loading factor greater than 0.6 for latent variables and their associated indicators indicates that the validity criteria are met, effectively reflecting more than 60% of the variance in these indicators. No indicators were excluded, as all demonstrated satisfactory loading factors for this study. Additionally, the Average Variance Extracted (AVE) values for each construct were observed to exceed the threshold of 0.5 for all latent variables.

Discriminant Validity

The results of cross-loading analysis require that the correlation between an indicator and its corresponding latent variable be more significant than the correlation between that indicator and other latent variables. In this

study, the cross-loading values indicate that the loading factors of indicators with their corresponding latent variables are higher than those with other latent variables. Indicates that each indicator effectively represents its respective latent variable. The placement of indicators within each dimension or latent variable is appropriate, and there is minimal influence between indicators and other latent variables.

Composite Reliability

A composite reliability value exceeding 0.6 is considered to indicate high reliability. Based on the outer model evaluation, the measurements are valid and reliable. Validity ensures that the measurement accurately assesses the intended construct, while reliability indicates a high level of consistency in the measurement tool.

Table 3 Average Variance Extracted (AVE) and Composite Reliability Value

Latent Variables	AVE	*Composite Reliability*	Description
System Quality	0.678	0.944	Valid
Information Quality	0.724	0.907	Valid
Service Quality	0.734	0.942	Valid
Use	0.861	0.927	Valid
User Satisfaction	0.861	0.947	Valid
Net Benefits	0.826	0.931	Valid

Inner Model

The inner model is employed to assess the quality and validity of the model linking latent variables in the study. This evaluation examines the R-squared (R^2) values and t-statistics/, derived through the bootstrapping process.

R-*Square* (R^2)

The R^2 value reflects the degree to which the model accounts for the variability in the data. A higher R^2 value indicates a more robust model's ability to elucidate the relationships among variables.

Table 4 R-*Square*

Variabel Laten	*R-Square* (R^2)
Use	0.679
User Satisfaction	0.815
Net Benefits	0.861

Path Coefficients

Path coefficients measure the direct effects between latent variables in the model. The bootstrapping process provides values for the original sample, sample mean, standard errors, t-statistics, and p-values. Relationships are considered significant if p-values are less than 0.05 and t-statistics exceed 1.96. It allows for identifying relationship directions and assessing the impact of exogenous variables on endogenous variables.

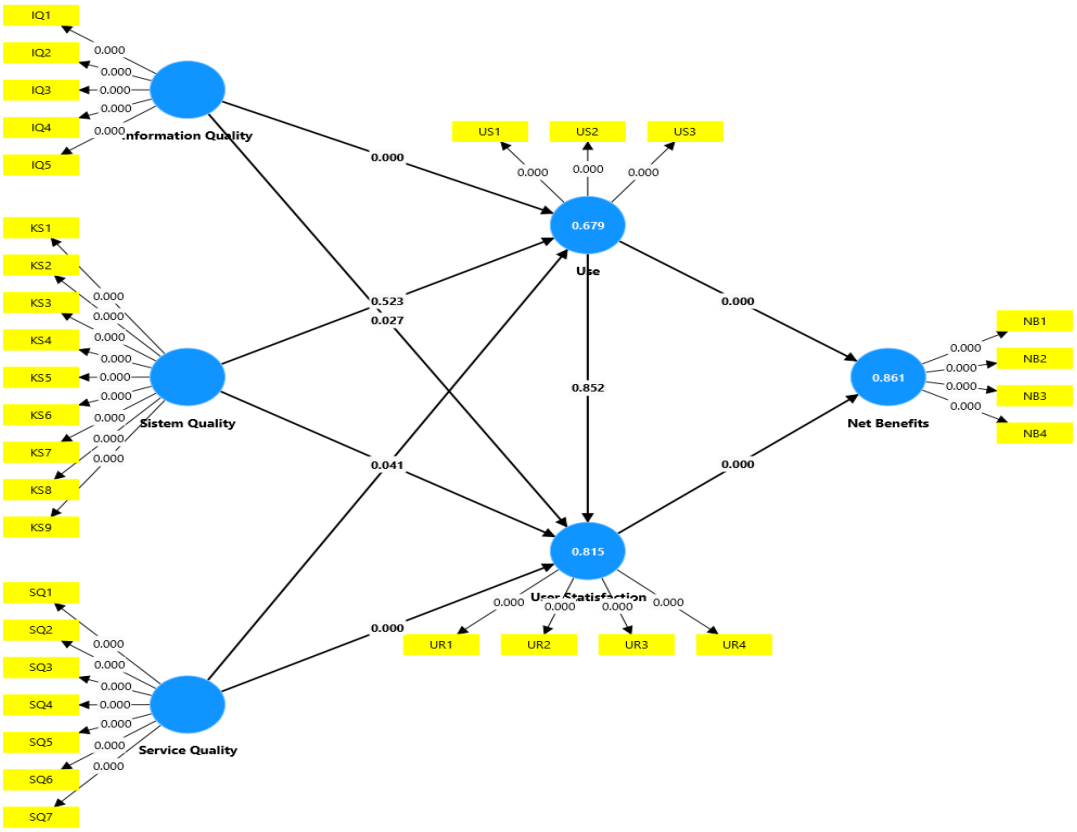

Figure 3 Inner Model

The subsequent testing phase examines hypotheses by analyzing path coefficients, representing the direct effects between latent variables within the model. The bootstrapping process provides estimates, including the original sample values (O), sample means (M), standard errors, t-statistics, and p-values for these path coefficients. The following section presents the results of the Inner Model analysis for this study.

Table 5 Output path coefficient

Variable	*Original Sample* (O)	*Sample Mean* (M)	*Standard Deviation* (STDEV)	T Statistic (|O/STDEV|)	*P-Values*	Model Evaluation
System Quality -> Use	-0.081	-0.082	0.127	0.638	0.523	Not significant
System Quality -> User Satisfaction	0.191	0.195	0.094	2.029	0.043	Significant
Information Quality -> Use	0.700	0.700	0.106	6.632	0.000	Significant

Table 5 Output path coefficient (Continued)

Variable	*Original Sample* (O)	*Sample Mean* (M)	*Standard Deviation* (STDEV)	T Statistic (|O/STDEV|)	*P-Values*	Model Evaluation
Information Quality -> User Satisfaction	0.235	0.235	0.106	2.207	0.027	Significant
Service Quality -> Use	0.219	0.221	0.107	2.045	0.041	Significant
Service Quality -> User Satisfaction	0.501	0.498	0.090	5.572	0.000	Significant
Use -> User Satisfaction	0.012	0.011	0.063	0.186	0.852	Not significant
Use -> Net Benefits	0.196	0.197	0.041	4.753	0.000	Significant
User Satisfaction -> Net Benefits	0.776	0.775	0.038	20.215	0.000	Significance

Path coefficients reveal the influence of latent variables. A positive path coefficient indicates a positive direction of influence, while a negative path coefficient signifies a negative direction. The magnitude of the path coefficient reflects the strength of the effect of the latent variable. The impact of the System Quality variable on the User Satisfaction variable is quantified as 2.029. This value indicates that for each unit increase in the System Quality variable, there is a corresponding increase of 2.029 units in the User Satisfaction variable.

Table 4 indicates that not all results positively support the proposed hypotheses. Two variables were non-significant, as their p-values exceed 0.05 and their t-statistics fall below 1.96, specifically regarding the relationships between System Quality and Use/, and Information Quality and Use. These findings align with research conducted by Diah (2023) and Asyifa et al. (2023), which demonstrated that Ease of Use can mediate the relationships between System Quality, Information Quality, Service Quality, and User Satisfaction.

Managerial Implications

The SEM-PLS analysis reveals significant relationships among the variables: System Quality positively impacts User Satisfaction, while Information Quality influences both usage and User Satisfaction. Furthermore, Service Quality is significantly correlated with both usage and User Satisfaction; however, usage does not directly enhance User Satisfaction but positively contributes to Net Benefits. User Satisfaction, in turn, substantially affects Net Benefits.

Each variable in this study exhibits both the highest and lowest values. The highest values indicate that each variable possesses critical aspects that must be maintained and enhanced; for instance, User Satisfaction (UR3) with a value of 0.961 underscores the importance of meeting user needs for system success, while Productivity (NB4) with a value of 0.923 highlights the primary benefits derived from the system. Conversely, the lowest values for each variable serve as a foundation for the Ministry of Health to implement necessary improvements. For example, Assurance (KS6), with a value of 0.740, indicates the need for enhancement through user security training; at the same time, Timeliness (IQ4), at 0.770, reflects delays in information delivery, necessitating the implementation of a real-time monitoring system.

The Ministry of Health must comprehend the needs of auditors and work units to develop a more effective and efficient SIPPISKO application. By involving users in the development process, enhancements to the application's quality should focus on adaptability and performance, particularly in adapting to new policies or regulations that frequently affect the operations of auditors and work units. Research respondents face challenges in adapting to policy changes, impacting their productivity, as the adjustment time for the application is often insufficient.

Moreover, the Ministry of Health should continuously monitor the system's performance, information, and services through periodic reports to ensure user satisfaction and optimal system benefits. Increasing training and technical support is vital, especially regarding responsiveness and timely information delivery. Integrating user feedback is essential to ensure that system development meets their needs.

CONCLUSION

The respondents in this study were predominantly female, representing various units, including the Inspectorate General, regional offices, and the central offices of the Ministry of Health, with the majority serving as auditors within the Inspectorate General. The respondents demonstrated varying levels of work experience, though most had considerable tenure. Descriptive analysis revealed that the median for system quality, information quality, service quality, user satisfaction, and net benefits was 4, indicating satisfaction and a positive assessment of system quality and information accuracy. Conversely, the usage variable had a median of 3, reflecting a neutral stance regarding the frequency and duration of application use.

The results of the study indicate that system quality does not have a significant impact on usage, but it has a positive influence on user satisfaction. Information and service quality significantly impact the usage and user satisfaction of the SIPPISKO application. Underscores the necessity of improving the application system in line with team member development and new policies, which are critical factors in the company's operations.

The use of the application has little impact on user satisfaction. However, it contributes positively to net benefits, while user satisfaction significantly affects them. In other words, the SIPPISKO application must be used more extensively to enhance productivity. Respondents reported satisfaction with transitioning from conventional work methods to the SIPPISKO system, which has considerably boosted productivity for the Ministry of Health.

RECOMMENDATIONS

This study provides recommendations and insights for the Ministry of Health to optimize the development strategy of the SIPPISKO application, aiming to enhance its effectiveness and efficiency. The findings can serve as a reference for refining application features to the needs of employees, including auditors and work units.

Additionally, this study can serve as a foundation for future research to incorporate a larger sample from the Ministry of Health and introduce new variables. The researchers acknowledge that this study needs to capture users' needs thoroughly. Therefore, it is recommended that future research includes variables related to usage decisions and considers methodologies such as the Analytical Hierarchy Process (AHP) to identify the most influential factors for enhancing the performance of the application system. The use of AHP can assist management in formulating more optimal strategies for application development.

Declaration by Authors

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