Assessing System Quality and Change Readiness in Enterprise Risk Management Application Adoption in Power Plants

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Abstract **-** Real-time and accurate risk management data is critical in making informed corporate decision-making. An Enterprise Risk Management (ERM) application enhances data access speed and accuracy, supporting strategic actions. Developed with an integrated risk and technology management approach, this application aids in effective risk management in operational power plants facing complex, high-risk challenges. It offers a structured framework for identifying, assessing, and managing risks, ultimately enhancing operational efficiency, effectiveness, and safety. This research examined the impact of system quality and readiness to change on the perceived usefulness, perceived ease of use, and behavioral intentions toward ERM applications. Data were gathered from 300 risk management professionals through purposive sampling. Then, the data were analyzed with PLS-SEM using a quantitative survey-based approach. The finding reveals that system quality and readiness to change significantly influence perceived usefulness and ease of use, which subsequently affect behavioral intentions. Interestingly, perceived usefulness does not directly impact behavioral intentions, emphasizing the critical roles of system quality and user readiness in ERM adoption. These finding underscores organizations' need to enhance the technical aspects of ERM applications and implement effective change management strategies to improve user engagement and adoption rates. The originality of this research resides in its integrated approach, merging system quality and readiness to change within the Technology, Acceptance, Model (TAM) framework, offering a deeper understanding of the factors driving ERM application acceptance. This research provides valuable insights for standardized frameworks, financial incentives, and tailored training programs to boost technology adoption.

Keywords: enterprise risk management, technology acceptance model, system quality, readiness to change, behavioral intention

I. INTRODUCTION

Information and communication technology is an important strategy to achieve the goals and success of an organization (Nurherwening et al., 2021). The condition is in line with the success of PT. PLN Nusantara Power (PLN NP), an Indonesian company engaged in power plant that won the champion title at the ASEAN Risk Award 2021 in the Risk Innovation category and runner-up in the ERM Technology Risk category. In the power plant, the effective management of risks is vital due to the complex and high-risk nature

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of operations. ERM systems offer a systematic method for identifying, evaluating, and mitigating risks, which improves operational efficiency and safety. Despite the potential benefits, adopting ERM systems faces challenges, including resistance to change and concern about system usability and reliability (Sugianto et al., 2019; Susilo et al., 2021).

Increasing positive contributions to organizational needs can be done by everyone in the organization. Behavioral attitude is the positive or negative evaluation of behavior. It also predicts and understands the influence of motivation on behavior that every individual does not control, and identifies how to target strategies for changing one's behavior (Jiar et al., 2022). The more robust the confidence of individuals in using their capabilities to execute a behavior, the greater they use resources and opportunities to carry out that behavior. Thus, the perceived confidence in the behavior can be controlled higher (Alajmi et al., 2021).

There is a need for external variables and suggestions that TAM be integrated with models with a broader range of variables related to people and organizations. Tackling this issue involves assessing the ease of technology implementation and perceptions of use and enhances understanding of information systems usage and behaviors related to accepting these systems. Although previous research has emphasized the significance of technology and organizational change, a notable gap exists in understanding how individual readiness and information system quality influence technology acceptance. Moreover, the previous study emphasizes that individual readiness and system quality are often studied separately but rarely analysed in a dynamic industry context such as energy generation (Silva et al., 2022; Wahyuni et al., 2021). Furthermore, there is a great variation in technology acceptance outcomes based on these differences, indicating the need for a more integrated and in-depth understanding (Zakaria & Ismail, 2021; Diwanti et al., 2021).

Besides adaptability to technological advancements, the quality of the technology system is crucial. If the system quality is inadequate, technology cannot be considered simple and beneficial. System quality directly influences an individual's intention to use the technology. Moreover, system quality significantly influences an individual's intention to use technology, reinforcing and logically extending TAM. Optimism and inventiveness are two components of technology readiness. Optimism is evaluated from the user's perspective, while innovation is evaluated based on the user's opinion about system quality (Rafique et al., 2020). Factors influencing the acceptance of information technology include technology, users, and user context (Ambarwati et al., 2020; Harja et al., 2021; Sagnier et al., 2020). With the emergence of complex information technology system adoption, research related to TAM in more complex information technology settings is needed (Kabukye et al., 2020). TAM is a complex model that can explain behavior towards information systems. However, TAM has shortcomings such as its inability to explain external variables that influence perceived usefulness and perceived ease of use (Alfadda & Mahdi, 2021; Rafique et al., 2020; Susilo et al., 2021).

The primary goal of the research is to explore the factors that influence the acceptance and the use of ERM applications in the power plant, emphasizing system quality and readiness to change (see Figure 1). Adopting ERM systems is crucial for enhancing organizational resilience, improving risk management practices, and ensuring compliance with regulatory requirements. However, these systems' successful implementation and utilization depend on various factors, including technical attributes and user readiness. TAM posits that perceived usefulness and perceived ease of use are primary determinants of technology acceptance. By integrating system quality and readiness to change into the TAM framework,

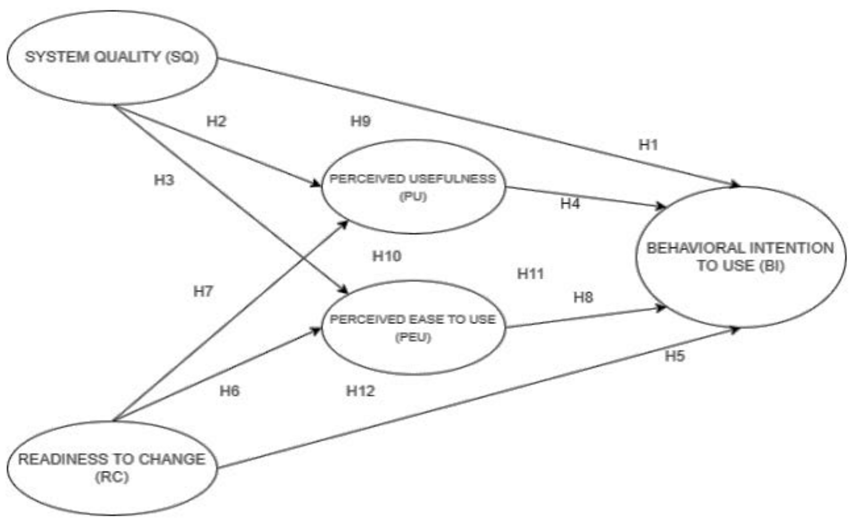

Figure 1 Research Framework

the research provides a nuanced understanding of the factors driving ERM system acceptance. Moreover, understanding these factors can help organizations develop strategies to enhance ERM system adoption, improving risk management outcomes and organizational performance.

Previous research underscores the significance of system quality in shaping behavioral intentions, usability, and ease of use of ERM applications. The previous research also emphasizes the importance of various factors on system quality (Alvin & Susanto, 2022). The importance of internal practices such as training and education in improving the quality of work life suggests a gap in the literature regarding the influence of system quality, particularly in terms of training and learning opportunities, on user perceptions and intentions within the context of ERM applications (Massoud et al., 2020). The importance of quality in operations provides a basis for understanding how system quality can affect the usability and ease of use of ERM applications on Industry 4.0 principles in the manufacturing sector (Machado et al., 2020). Another previous research focuses on the influence of corporate governance and investment opportunity sets on firm value and also highlights the importance of quality variables in affecting outcomes (Al-Gamrh et al., 2020; Weni et al., 2021). Meanwhile, other research shows that system quality is a significant factor affecting user satisfaction and intention to use, supporting the need to explore this relationship further within ERM applications (Sipahutar et al., 2019). The causal relationship between knowledge management processes, system quality, and service quality asserts the importance of system quality in influencing user satisfaction and emphasizing the significance of system quality variables in enhancing the effectiveness of ERM applications (De Freitas et al., 2020; Rahayu et al., 2019). The following hypotheses are suggested.

H1: System Quality significantly affects behavioral intention to use ERM applications.

H2: System Quality significantly affects the perceived usefulness of ERM applications.

H3: System Quality significantly affects the perceived ease of use of ERM applications.

The concept of readiness to change is crucial in understanding and facilitating the adoption and effective implementation of ERM applications, as evidenced by a broad spectrum of research (Budhiraja, 2019). The previous research demonstrates the significant influence of readiness on key factors such as acceptability, appropriateness, feasibility, and intent to adopt. These key factors are essential for successfully deploying of ERM systems (Al Moosa et al., 2021; Livet et al., 2022). The insight is relevant when considering the mediation of perceived ease of use and perceived usefulness in shaping behavioral intentions toward ERM applications. The other research offers a deeper dive into how individual characteristics such as self-efficacy, problem-solving skills, and psychological empowerment can influence readiness to change, thereby affecting the adoption and effectiveness of ERM applications (Nisa et al., 2021; Pulungan et al., 2020). Additionally, the role of organizational culture and leadership in strengthening readiness to change is essential for driving acceptance and utility of new systems (Budhiraja, 2019; Rindipati et al., 2021). This corpus of work collectively underscores the complexity of readiness to change, revealing how it interacts with other variables to influence the successful implementation of ERM systems (Diwanti et al., 2021; Sukmadiansyah et al., 2022). The following hypotheses are suggested.

H5: Readiness to change has a significant effect on the behavior of ERM applications.

H6: Readiness to change has a significant effect on perceived ease of use of ERM application.

H7: Readiness to change has a significant effect on perceived usefulness of ERM application.

Perceived usefulness is a pivotal variable in understanding and predicting technology adoption behaviors, as reflected in various research. The previous research emphasizes the mediating role of factors like organizational commitment, demonstrating the broader applicability of variables such as perceived usefulness in shaping behavioral intentions, specifically in ERM applications (Albalawi et al., 2019). Although other research focuses on perceived supplier opportunism in outsourcing, the research noted that the gaps regarding direct applications to ERM provides a fertile ground for future research to explore perceived usefulness in ERM contexts, possibly about different perceptions such as opportunism (Skowronski et al., 2020). Another insight from the research underscores the influence of perceived enjoyment, usefulness, and ease of use on technology adoption among millennials that offer valuable implications for ERM systems by suggesting that enhancing perceived usefulness could significantly foster adoption (Machdar, 2019). Lastly, the previous research highlights the use of quantitative methods and SEM-PLS analysis that provides a methodological blueprint for investigating how perceived usefulness could mediate the relationship between system quality and behavioral intentions in ERM settings (Rahayu et al., 2019). The following hypotheses are suggested.

H4: Perceived usefulness has a significant effect on behavioral intention to use ERM applications.

H9: Perceived usefulness significantly mediates the effect of system quality on behavioral intention in ERM Applications.

H11: Perceived usefulness has medium effects of readiness to change on behavioral intention significantly in ERM Applications.

Perceived Ease of Use (PEU) is a pivotal factor in influencing users' behavioral intentions towards ERM applications, as highlighted across various studies. The previous research underlines the direct and indirect impacts of PEOU on consumer repurchase intentions, illuminating its role in enhancing trust and customer satisfaction, which are directly applicable to ERM settings (Keni, 2020). Similarly, another research reveals how PEOU influences user perceptions and intentions within different digital contexts, providing a broad foundation for understanding its effects on the adoption of ERM application (Machdar, 2019; Octavianty et al., 2023). The critical nature of user-friendly interfaces in boosting user behavior indicates the need for interfaces that users can easily navigate to foster better acceptance and usage (Azhar & Rani, 2020; Deitz et al., 2021). This notion is further supported by research in various application settings, including e-commerce and mobile payments, where PEOU has significantly affected user satisfaction and behavioral intentions (Asmarina et al., 2022). The PEOU not only affects immediate user engagement but also has profound implications for long-term user relationships and loyalty, especially when mediated by factors like perceived usefulness and trust (Asmarina et al., 2022; Mardhiah et al., 2022; Widiar et al., 2023). The cross-applicability of these insights to ERM systems suggests a rich area for developing hypotheses that explore how enhancing PEOU could lead to improved user adoption and effective usage of ERM applications (Aisyah & Eszi, 2020; Fauzi et al., 2022). The following hypotheses are suggested.

H8: Perceived Ease of Use significantly affects behavioral intention to use ERM applications.

H10: Perceived Ease of Use mediates the effect of system quality on behavioral intention significantly in ERM applications.

H12: Perceived Ease to Use mediating the effect of readiness to change on behavioral intention significantly in ERM applications.

Several research highlights a comprehensive exploration of factors influencing user intentions regarding adopting Enterprise Risk Management (ERM) applications across various contexts and models. The previous study by Syauqie et al. (2023) evaluates the acceptance of SAP implementation using the Theory of Planned Behavior. Then, another research leverages the UTAUT2 model to assess behavioral intentions toward online delivery systems. This research provides foundational insights into technology acceptance that can be extrapolated to ERM applications (Kadir & Ismail, 2022). Furthermore, the research by Mohd-Saleh et al. (2022) emphasizes the critical role of perceived behavioral control in influencing intentions toward ERM effectiveness evaluation among internal auditors in Malaysia, underscoring the impact of organizational and administrative norms. Similarly, the work by Leng et al. (2002) identifies gaps in understanding the maturity levels of ERM implementation in medium-sized companies in Indonesia, highlighting sector-specific advancements and needs. The interconnectedness of user attitudes and behavioral intentions (Farikhah & Nerisafitra, 2021), alongside the influence of performance expectancy and price value on the behavioral intentions in mobile payment applications in Indonesia (Armansyah, 2021), demonstrate the multifaceted nature of factors that drive technology adoption.

Additionally, research that examines the impact of innovation perception and the influence of brand reputation and discount framing on purchase intentions (Ahn et al., 2021) enriches the understanding of user behavior in technological contexts. Notably, the research highlights the significance of readiness and intentions in fostering lean behavior in healthcare management (Abdullah, 2023) and the exploration of technology acceptance model components in influencing mobile app usage (Ikhsan & Sunaryo, 2020) alongside the research about user acceptance of electronic record management systems in the oil and gas sector (Hawash et al., 2021). Those contribute to a nuanced understanding of the dynamics at play in the acceptance and effective utilization of ERM applications. These insights collectively underscore the complexity of user acceptance and the various determinants that can enhance the implementation and effectiveness of ERM systems.

The research addresses the urgent need for effective ERM systems in inherently high-risk power plants, where operational complexities and potential system failures demand robust risk mitigation strategies. The research introduces a novel approach by integrating system quality and readiness to change within the TAM, providing a nuanced understanding of these factors in a specific industry context. This integration is particularly innovative as it combines elements typically studied separately, offering new insights into how technological and organizational readiness influence ERM system acceptance and effectiveness. By focusing on these specific aspects, the research aims to overcome barriers such as resistance to change and usability concerns, thereby enhancing safety, operational efficiency, and the overall implementation of risk management practices within this critical sector. This targeted approach fills a significant gap in the existing literature and delivers practical implications for power plant policymakers, organizational leaders, and technology providers.

II. METHODS

The research applied a survey-based quantitative methodology to explore the complex understanding of technology acceptance levels in ERM applications for power plants. The aim is to examine the effects of various dependent, mediating, and independent variables on these concepts. The independent variable is conceptualized as System Quality model (SQ) and Readiness to Change (RC). System quality (SQ) variable consists of four dimensions: ease of access (SQ1), freedom of online access (SQ2), ease of use of the application (SQ3), and quality of system interface (SQ4) (Kareem & Ulutagay, 2022). The readiness to change (RC) variable has several dimensions, including changes in the work environment (RC1), innovation opportunities (RC2), change support (RC3), opportunity for change (RC4) (Al Moosa et al., 2021; Zakaria & Ismail, 2021; Budhiraja, 2019). Furthermore, Perceived Usefulness (PU) and Perceived Ease of Use (PEU) act as mediating variables, while Behavioral Intention to Use (BI) is the dependent variable. The Perceived Usefulness (PU) variable has several dimensions including accuracy of risk information (PU1), improved performance effectiveness (PU2), application benefits (PU3), relevance information needs (PU4), information quality (PU5) (Mardhiah et al., 2022; Wang, 2023; Wicaksono et al., 2020). The Perceived Ease of Use (PEU) variable has dimensions including easy to learn (PEU1), easy to remember (PEU2), appropriateness of needs (PEU3), and clarity (PEU4) (Mardhiah et al., 2022; Wicaksono et al., 2020; Yuen et al., 2021). The Behavioral Intention to Use (BI) variable has dimensions of intention to use (BI1), always use (BI2), and future use (BI3) (Alajmi et al., 2021; Haji et al., 2022; Mastarida et al., 2021). Thus, this research delineates the relationships among these variables and tests previously established hypotheses. Table 1 thoroughly summarizes all the variables and indicators that generate the latent variable.

The investigation involves all employees responsible for risk management in power plants throughout Indonesia and uses a Likert scale to measure agreement with psychological concepts. Primary data are collected through questionnaires by all employees responsible for risk management in power plants. In contrast, secondary data included records, archives, and historical reports from power plants, providing a basis for initial data collection and insights into managerial implications. The population

Table 1 Research Parameters

Variable	Indicator Description (Item Codes)
System Quality (SQ)	Dimension of ease of access • ERM is easily accessible at any time when needed. • Access to ERM can be done quickly. • Easy access to ERM from various devices.
	Dimension of freedom of online access: • Freedom to access this ERM online without many barriers. • This ERM allows flexible online access. • Access all the features needed online through this ERM.
	Dimension of ease of use of the application • This application from ERM is effortless to use. • It is easy to understand how the app works without extensive help. • The user interface of this app is intuitive.
	Dimension of quality of system interface • The interface of ERM is well designed to be easy to navigate. • The visual appearance of the ERM is attractive. • The quality of the ERM interface makes it easy for users to perform various tasks.
Readiness to Change (RC)	Dimension of changes in the work environment • Adaptability to changes in the work environment resulting from implementing PLN I-care. • Openness to accepting different ways of working due to implementing PJB I-care. • Confidence in being able to adjust effectively in a changing work environment.
	Dimension of opportunities for innovation in the work due to the changes that have occurred. • Changes that occur provide opportunities to develop new ideas at work. • Motivation to innovate due to changes.
	Dimension of change support • Sufficient support from superiors and coworkers in dealing with change. • The company provides the necessary resources to adapt to change. • Support in the workplace helps users deal with change.
	Dimension of opportunity for change • This change provides an opportunity to improve the way users work. • The changes that occur open up new opportunities for career development. • Enthusiastic about the opportunities this change offers for the user's future in the company.
Perceived Usefulness (PU)	Dimension of accuracy of risk information: • The information risk provided by ERM is accurate. • The risk information provided by ERM helps users make more accurate decisions. • ERM consistently provides reliable risk information.

Table 1 Research Parameters (Continued)

Variable	Indicator Description (Item Codes)
	Dimension of improved performance effectiveness: • Using ERM enhances work effectiveness. • Users are more productive when using ERM. • ERM helps complete work more efficiently.
	Dimension of application benefits: • ERM provides significant benefits at work. • Using ERM improves the quality of work output. • There is a real added value from using ERM.
	Dimension of relevance information needs: • ERM provides information relevant to the user's needs. • The information presented by ERM is appropriate for the user's work needs. • The information provided by ERM is beneficial.
	Dimension of information quality: • The information provided by ERM is high quality. • The accuracy of the information provided by ERM. • ERM provides detailed information.
Perceived Ease of Use (PEU)	Dimension of easy to learn: • Ease of understanding how to use this ERM. • Users can quickly learn to use this ERM without much help. • This ERM is not complicated to learn.
	Dimension of easy to remember: • Users can easily remember how to use this ERM after not using it for a while. • Users do not often refer to the instructions after first using ERM. • Users do not need to remember many details to use this ERM.
	Dimension of appropriateness of needs: • This ERM meets the users' needs in using technology or services. • The functions and features of this ERM meet what users need. • This ERM provides all the features for the user's tasks.
	Dimension of clarity: • The instructions for using this ERM are clear and easy to understand. • The information presented in this ERM is very clear. • Ease of understanding the terminology or terms used in this ERM.
Behavioral Intention to Use (BI)	Dimension of intention to use: • Intention to continue using this ERM in their activities. • Intention to routinely use this ERM. • Intention to utilize this ERM as part of the user's routine.
	Dimension of Always use: • Always choosing to use this ERM over other available alternatives. • This ERM will be the primary choice. • Always use this ERM when needing the functionalities it offers.
	Dimension of Future use: • Planning to continue using this ERM in the future. • Users have still used this ERM for a long period. • The use of this ERM will remain a part of the user's activities in the future.

in this research is all employees responsible for risk management in power plants. The data collection process was conducted by the researcher using a saturated sample technique to select all employee respondents responsible for managing and filling the ERM application in the power plant, totalling 300 people, and also considering statistical strength, effect size, number of latent variables, observed variables, and probability of participant response. Data collection involved self-administered questionnaires designed based on previous research and ethical considerations of human subject studies. The initiation of the questionnaire process included obtaining informed consent (IC) and associating the questionnaire with a university research institute to ensure ethical approval. Moreover, the questionnaire included three sections: the initial section gathers informed consent and guaranteed confidentiality; the second section collects demographic information, including name or initials, gender, age, and current job position; the third section comprises statements concerning the independent, mediating, and dependent variables. The collected data, meeting specific criteria, was used to construct a structural model and evaluate the magnitude of latent variables.

The research utilized Partial Least Square -

Structural Equation Modeling (PLS-SEM) supported by Smart-PLS software. The model development process involved several stages: establishing empirical and theoretical models, data entry, verifying model assumptions, starting and refining the modeling phase, evaluating the fit of the final model, performing hypothesis tests, and interpreting the results. Hypotheses are confirmed or rejected based on whether the computed t-statistic value exceeded the critical value from the t-table at a 5% significance level (alpha). The reliability and validity of each latent variable are assessed through confirmatory factor analysis (CFA). It requires a minimum loading of 0.50 and Cronbach's Alpha coefficient set at a threshold of 0.60 to ensure the reliability of the instruments. The research employs the Second Order technique for data analysis, with convergent validity in the first-order analysis determined by an outer loading value threshold of 0.50. This criterion ensures that each indicator meets the convergent validity standard well and is categorized as excellent. As a result, all outer loading values are considered to meet the convergent validity requirements, allowing further reliability and construct validity testing. This comprehensive evaluation underscores the construct robustness of the model and its suitability for further academic presentation and examination.

III. RESULTS AND DISCUSSIONS

The respondents' characteristics in Table 2 offer detailed information regarding the demographics of respondents based on age, gender, and current job position. The research involves 300 respondents who play a role in risk management at power plants in Indonesia. In the age distribution, the largest age group is 26-35, with 207 people covering 69% of the total sample. Regarding job positions, most respondents are staff, with 171 people or 57% of the total respondents. From this data, the research mostly gathers views from individuals at the operational and early managerial layers. This provides valuable perspectives on the acceptance and effectiveness of risk management practices from the standpoint of daily implementation rather than long-term strategy.

The validations of a measurement model in the PLS-SEM framework are conducted by evaluating the outer loadings of each indicator on its respective latent construct. A standard threshold often cited in the literature is a loading that ideally exceeds 0.7 to confirm good convergent validity. This threshold indicates a strong and satisfactory relationship between individual indicators and their respective latent constructs, suggesting effective alignment and relevance within the model. However, it is noted that loadings above 0.6 are also considered acceptable, particularly during the exploratory stages of research. Upon examining the provided Second-Order Outer Loading table (see Table 3), it shows that all indicators substantially surpass the minimum threshold, with the lowest recorded loading being 0.906. Such high loadings suggest a robust and positive relationship between the indicators and their corresponding latent variables. Additionally, the T-statistics for all indicators are well above the conventional cutoff point of 1.96, confirming statistical significance at a 5% significance level. The consistently reported p-values of 0.000 across the board imply an almost negligible probability that these high loadings have occurred by chance. Thus, it solidifies the evidence for the convergent validity of the indicators.

Table 2 Respondents' Characteristics

	Frequency	%
Age		
26 – 35	207	69
36 – 45	60	20
46 – 55	33	11
Gender		
Man	252	84
Woman	48	16
Position		
Staff	171	57
Team Leader	84	28
Assistant Manager	24	8
Manager	15	5
Senior Manager	6	2

The analysis of the construct reliability and validity presented in Table 4 demonstrates testing results for the reliability and convergent validity of various constructs within the PLS-SEM model. The four primary metrics used in this assessment are Cronbach's Alpha, rho_A, Composite Reliability, and Average Variance Extracted (AVE), each with recognized thresholds indicating good reliability and validity. Cronbach's alpha and rho_A measure internal consistency, where values above 0.7 indicate adequate reliability. All constructs show extremely high values for these metrics in the provided data, often approaching or exceeding 0.9. This indicates an exceptionally high level of internal consistency, denoting that the items within each construct consistently measure the same concept, which is a strong indication of excellent reliability. Composite Reliability also provides further evidence of reliability, with all recorded values far exceeding the 0.7 thresholds considered good. Composite Reliability, along with Cronbach's Alpha and rho_A, strengthens confidence in the consistency and reliability of the constructs measured in this study.

Additionally, the Average Variance Extracted (AVE) assesses the amount of variance a construct explains relative to the variance due to measurement error, providing insights into the convergent validity of the constructs. With values of AVE above 0.5 deemed adequate—indicating that the construct explains more than half of the variance of its indicators—nearly all constructs in this study exhibit high AVE values. The result suggests that the constructs measured can account for a substantial portion of the variance in the indicators.

Table 3 Second-Order Outer Loading

	Original Sample	Sample Mean	Standard Deviation	T Statistics	P Values
BI1.1 <- BI	0.902	0.903	0.026	34.839	0.000
BI1.2 <- BI	0.888	0.890	0.028	31.322	0.000
BI1.3 <- BI	0.892	0.892	0.028	31.638	0.000
BI2.1 <- BI	0.863	0.864	0.032	26.825	0.000
BI2.2 <- BI	0.872	0.874	0.033	26.356	0.000
BI2.3 <- BI	0.868	0.870	0.034	25.372	0.000
BI3.1 <- BI	0.902	0.902	0.026	34.295	0.000
BI3.2 <- BI	0.895	0.895	0.034	26.279	0.000
BI3.3 <- BI	0.912	0.912	0.027	34.304	0.000
PEU1.1 <- PEU	0.920	0.918	0.021	43.095	0.000
PEU1.2 <- PEU	0.881	0.879	0.032	27.135	0.000
PEU1.3 <- PEU	0.906	0.905	0.024	37.568	0.000
PEU2.1 <- PEU	0.947	0.946	0.015	64.115	0.000
PEU2.2 <- PEU	0.910	0.911	0.032	28.328	0.000
PEU2.3 <- PEU	0.928	0.928	0.021	44.803	0.000
PEU3.1 <- PEU	0.926	0.925	0.019	50.013	0.000
PEU3.2 <- PEU	0.912	0.911	0.020	45.659	0.000
PEU3.3 <- PEU	0.897	0.896	0.024	37.988	0.000
PEU4.1 <- PEU	0.881	0.879	0.037	23.776	0.000
PEU4.2 <- PEU	0.875	0.872	0.041	21.525	0.000
PEU4.3 <- PEU	0.880	0.877	0.038	22.999	0.000
PU1.1 <- PU	0.881	0.880	0.040	22.229	0.000
PU1.2 <- PU	0.893	0.890	0.034	26.647	0.000
PU1.3 <- PU	0.912	0.908	0.030	30.286	0.000
PU2.1 <- PU	0.930	0.930	0.019	50.072	0.000
PU2.2 <- PU	0.923	0.921	0.025	36.807	0.000
PU2.3 <- PU	0.940	0.938	0.015	63.716	0.000
PU3.1 <- PU	0.937	0.934	0.020	48.003	0.000
PU3.2 <- PU	0.921	0.920	0.030	31.100	0.000
PU3.3 <- PU	0.929	0.927	0.018	50.480	0.000
PU4.1 <- PU	0.933	0.930	0.019	48.568	0.000
PU4.2 <- PU	0.927	0.924	0.019	48.918	0.000
PU4.3 <- PU	0.950	0.948	0.012	78.538	0.000
PU5.1 <- PU	0.868	0.865	0.045	19.096	0.000
PU5.2 <- PU	0.853	0.850	0.050	17.001	0.000
PU5.3 <- PU	0.875	0.873	0.045	19.375	0.000
RC1.1 <- RC	0.762	0.753	0.064	11.982	0.000
RC1.2 <- RC	0.783	0.779	0.058	13.607	0.000
RC1.3 <- RC	0.811	0.805	0.056	14.535	0.000
RC2.1 <- RC	0.820	0.818	0.050	16.271	0.000
RC2.2 <- RC	0.824	0.821	0.052	15.785	0.000
RC2.3 <- RC	0.823	0.820	0.052	15.723	0.000

Table 3 Second-Order Outer Loading (Continued)

	Original Sample	Sample Mean	Standard Deviation	T Statistics	P Values
RC3.1 <- RC	0.860	0.860	0.037	23.507	0.000
RC3.2 <- RC	0.876	0.876	0.032	27.557	0.000
RC3.3 <- RC	0.891	0.888	0.022	41.378	0.000
RC4.1 <- RC	0.860	0.854	0.036	24.078	0.000
RC4.2 <- RC	0.783	0.787	0.065	12.000	0.000
RC4.3 <- RC	0.876	0.872	0.031	28.076	0.000
SQ1.1 <- SQ	0.802	0.796	0.060	13.303	0.000
SQ1.2 <- SQ	0.842	0.836	0.040	20.896	0.000
SQ1.3 <- SQ	0.739	0.735	0.068	10.945	0.000
SQ2.1 <- SQ	0.830	0.828	0.042	19.910	0.000
SQ2.2 <- SQ	0.804	0.802	0.047	17.141	0.000
SQ2.3 <- SQ	0.786	0.782	0.054	14.622	0.000
SQ3.1 <- SQ	0.857	0.853	0.037	23.422	0.000
SQ3.2 <- SQ	0.792	0.789	0.045	17.450	0.000
SQ3.3 <- SQ	0.796	0.794	0.036	21.827	0.000
SQ4.1 <- SQ	0.839	0.839	0.032	26.285	0.000
SQ4.2 <- SQ	0.839	0.838	0.038	22.215	0.000
SQ4.3 <- SQ	0.849	0.848	0.040	21.277	0.000

Source: Author

Table 4 Construct reliability and validity

	Cronbach's Alpha	rho_A	Composite Reliability	AVE
BI	0.967	0.967	0.971	0.789
BI1	0.971	0.971	0.981	0.945
BI2	0.966	0.966	0.978	0.936
BI3	0.988	0.988	0.992	0.976
PEU	0.980	0.980	0.982	0.820
PU	0.985	0.986	0.987	0.831
PEU1	0.977	0.978	0.985	0.956
PEU2	0.978	0.978	0.985	0.957
PEU3	0.980	0.980	0.987	0.962
PEU4	0.960	0.960	0.974	0.926
PU1	0.971	0.971	0.981	0.945
PU2	0.981	0.981	0.988	0.963
PU3	0.967	0.967	0.979	0.938
PU4	0.981	0.981	0.987	0.963
PU5	0.956	0.957	0.972	0.920
RC1	0.970	0.971	0.980	0.944
RC2	0.985	0.985	0.990	0.970
RC3	0.980	0.980	0.987	0.961
RC4	0.953	0.958	0.970	0.915
RC	0.959	0.960	0.964	0.691
SQ1	0.937	0.942	0.960	0.889
SQ2	0.964	0.965	0.977	0.933
SQ3	0.953	0.955	0.970	0.915
SQ4	0.966	0.966	0.978	0.937
SQ	0.954	0.955	0.960	0.665

Source: Author

Cross-loadings are declared to fail in showing the lack of discriminant validity when two constructs are perfectly correlated, making the model ineffective in the empirical calculation (Henseler et al., 2014). Cross-loadings for this research indicate that the model meets validity criteria. So, the analysis can proceed.

The analysis of discriminant validity in the PLS-SEM model is conducted using two key metrics: the Fornell-Larcker Criterion and the Heterotrait-Monotrait (HTMT) ratio. These metrics are crucial for confirming that the constructs in the model are empirically distinct, which is vital for ensuring the integrity of the model's findings. The Fornell-Larcker criterion stipulates that the square root of AVE for each construct must be greater than the correlations between the construct and any other constructs in the model. According to the analysis, the square roots of the AVEs for all constructs exceed their respective highest correlations with other constructs (e.g., BI's square root of AVE is 0.888, which is higher than its greatest correlation with another construct at 0.727). This pattern holds across all constructs, demonstrating that each construct shares more variance with its measures than any other construct, meeting the Fornell-Larcker criterion for discriminant validity.

Furthermore, the HTMT is a relatively newer and more stringent measure for assessing discriminant validity, with a threshold value typically set below 0.90, offering an additional validation layer for the model's discriminant validity (see Table 5). The analysis shows that all HTMT ratios are below this threshold, indicating a strong discriminant validity among the constructs. Specific values, such as 0.774 between BI and PEU, and even lower values, such as 0.631 between RC and PEU, underscore the distinctiveness of the constructs. These values fall well below the conservative threshold of 0.85, confirming that the constructs are sufficiently distinct (see Table 6).

In the research, the effectiveness of the PLS-SEM model is assessed by analyzing R2 values and model fit indices, which are essential for evaluating the model's explanatory power and overall fit. The R2 values, which represent the coefficient of determination, show the percentage of variance in the dependent variables that the independent variables can explain. The results showcase exceptionally high R2 values across several constructs, with behavioral intention (BI) at 0.682 and even higher for its sub-constructs, such as BI1 at 0.847. These values demonstrate that the model is highly effective in explaining the variance in behavioral

Table 5 Fornell-Larcker Criterion

	BI	PEU	PU	RC	SQ
BI	**0.888**				
PEU	0.727	**0.906**			
PU	0.727	0.746	**0.912**		
RC	0.727	0.612	0.727	**0.832**	
SQ	0.727	0.802	0.730	0.649	**0.815**

Source: Author

Table 6 Heterotrait-Monotrait Ratio (HTMT)

	BI	PEU	PU	RC	SQ
BI					
PEU	0.774				
PU	0.766	0.759			
RC	0.729	0.631	0.749		
SQ	0.701	0.827	0.752	0.682	

Source: Author

Table 7 Fit Model

	Saturated Model	Estimated Model
SRMR	0.063	0.078
d_ULS	28.775	43.975
d_G	n/a	n/a
Chi-Square	infinite	infinite
NFI	n/a	n/a

Source: Author

intentions, as the R2 values are well above the moderate threshold, indicating a robust model. Similar trends are observed for the PEU and PU constructs, with values of 0.658 and 0.644, respectively, both indicative of a good level of explanatory power and approaching the moderate threshold. The standardized root mean square residual (SRMR) is utilized, with a common acceptability threshold of less than 0.08. The estimated model presents an SRMR of 0.078, barely meeting this standard, which indicates a satisfactory but not optimal fit (see Table 7). This suggests some discrepancies between observed and predicted correlations, hinting at potential areas for improvement. While the discrepancy (d_ULS) and chi-square values are unavailable for deeper analysis, they typically offer further insights into model fit.

The path analysis of the PLS-SEM data reveals several significant relationships that provide valuable insights into the factors influencing behavioral intention. Specifically, H2 shows a significant positive relationship between system quality and perceived usefulness, and H3 indicates a significant positive relationship with perceived ease of use. These findings suggest that a higher-quality system enhances users' perceptions of its usefulness and ease of use. Regarding H4 and H8, perceived usefulness and ease of use demonstrate significant positive relationships with behavioral intention. This suggests that users are more likely to intend to use a system if they perceive it as useful and easy to operate. H5 shows that readiness to change significantly affects behavioral intention, and H6 and H7 indicate that they also significantly impact perceived usefulness and ease of use. This implies that users who are more prepared for change are more likely to find a system useful and easy to use. So, they intend to use it.

The path analysis using the PLS-SEM model uncovers several significant relationships that offer valuable insights regarding the factors influencing behavioral intention. The significant impact in Table 8 identifies between system quality and perceived usefulness (H2) and perceived ease of use (H3), which confirms the findings from research based on the TAM. The research consistently underscores that system quality attributes, such as usability, functionality, and reliability, enhance user satisfaction and foster adoption (Rafique et al., 2020; Trang et al., 2019). These findings underscore the theoretical basis that enhancements in system quality boost both perceived usefulness and ease of use, which are critical factors in technology acceptance. Moreover, the influence of readiness to change on behavioral intention (H5) underscores the significance of effective change management in technology adoption. This aligns with Lewin's change management model, which advocates for preparing and supporting individuals through the change process to secure successful outcomes (Diwanti et al., 2021; Mumtaz et al., 2023). Readiness to change also significantly impacts perceived usefulness (H7), reinforcing the need for an adaptable and supportive environment for technology adoption.

The analysis shows that system quality does not significantly impact behavioral intention (H1). This result implies that technical attributes alone may not be enough to drive user adoption of ERM systems. Instead, the mediating effects of perceived usefulness and ease of use play a crucial role (H9 and H10). This indicates that users' perceptions significantly dictate their intentions to adopt such systems, highlighting potential gaps between system capabilities and user expectations or preferences. Perceived usefulness (H4) and perceived ease of use (H8) significantly influence behavioral intention, suggesting that these factors are critical determinants of users' intentions to engage with the system. The strong linkage between readiness to change and various adoption-related factors underscores the importance of effective organizational change management (Rafferty et al.,

Table 8 Path Coefficient

Hypothesis	Original Sample	Sample Mean	Standard Deviation	T Statistics	P Values	Result
H1: SQ -> BI	0.122	0.111	0.135	1.566	0.114	Rejected
H2: SQ -> PU	0.447	0.446	0.088	5.089	0.000	Accepted
H3: SQ -> PEU	0.700	0.675	0.089	7.888	0.000	Accepted
H4: PU -> BI	0.357	0.352	0.186	1.983	0.005	Accepted
H5: RC -> BI	0.280	0.281	0.095	2.931	0.002	Accepted
H6: RC -> PEU	0.158	0.169	0.093	1.706	0.046	Rejected
H7: RC -> PU	0.437	0.439	0.080	5.455	0.000	Accepted
H8: PEU -> BI	0.409	0.389	0.157	2.603	0.005	Accepted
H9: SQ -> PU -> BI	0.315	0.319	0.090	2.267	0.004	Accepted
H10: SQ -> PEU -> BI	0.286	0.265	0.115	2.490	0.007	Accepted
H11: RC -> PU -> BI	0.112	0.113	0.087	1.284	0.101	Rejected
H12: RC -> PEU -> BI	0.065	0.064	0.047	1.387	0.084	Rejected

Source: Author

2019). This readiness directly influences adoption intentions and affects how users perceive the system's ease of use and usefulness. It is vital for technology acceptance. The study also found that the relationship between readiness to change and perceived ease of use (H6) and the indirect paths from readiness to change to behavioral intention through perceived usefulness and perceived ease of use (H11 and H12) were insignificant. This suggests that while readiness to change is essential, its influence on perceived ease of use and its indirect effects on behavioral intention may be less significant than other factors.

These insights are especially pertinent in the current landscape, where organizations are rapidly undergoing digital transformations—accelerated by the COVID-19 pandemic. Companies are increasingly required to adopt new technologies such as remote working tools, digital communication channels, and online transaction systems. The findings suggest that for successful technology adoption, organizations should focus on enhancing their systems' technical features and cultivating an environment that supports change (Jayanti & Kawisana, 2022; Rafique et al., 2020). This involves implementing comprehensive user experience research to inform system design and developing robust change management strategies that prepare, support, and engage users from the beginning of technology implementation projects.

The results indicate that policymakers play a crucial role in facilitating the adoption and effective use of ERM systems across industries. Key actions include developing standardized frameworks and guidelines to ensure system consistency, quality, security, and accessibility. Financial incentives such as tax breaks or grants can encourage organizations to invest in advanced ERM systems, enhancing overall industry resilience. Supporting national training and education programs in collaboration with educational institutions and industry bodies is essential. This partnership can build a proficient ERM workforce, ensuring employees are well-prepared to handle new technologies. Comprehensive training and certification programs are vital for maintaining high standards in ERM practices. Organizational leaders must prioritize investing in high-quality ERM systems that are user-friendly, reliable, and functional. Collaboration with IT departments and external vendors ensures that systems meet organizational needs. Effective change management strategies, such as clear communication of benefits, extensive training programs, and continuous support, are essential for successful ERM implementations. Establishing feedback mechanisms to continuously monitor and improve ERM systems ensures they remain effective and aligned with evolving business needs. This continuous improvement approach enhances system performance and fosters user satisfaction and engagement.

Technology providers are crucial to successfully adopting ERM systems, emphasizing user experience in their design and development processes. Extensive user research and usability testing can create intuitive and easy-to-use systems, increasing user satisfaction and adoption rates (Sugianto et al., 2019; Trang et al., 2019). Providers should offer customizable solutions tailored to different organizations' needs and provide comprehensive support and training services. Detailed documentation, training workshops, and responsive customer support are essential for helping users navigate and maximize the benefits of ERM systems. HR and training departments within organizations are critical in preparing employees for adopting new technologies. Developing programs to assess and enhance employee readiness for technological changes is crucial. Identifying potential resistance points and creating targeted interventions can improve successful system adoption. Regular training sessions, hands-on workshops, and e-learning modules ensure all employees are proficient in using new ERM systems. Strategies to keep employees engaged and motivated throughout the implementation process are essential. Recognizing and rewarding employees who quickly adapt to and excel in using new systems can foster a positive attitude toward change. Industry bodies and professional associations facilitate sharing best practices and success stories related to ERM system implementations. Organizing conferences, workshops, and webinars disseminates valuable knowledge and insights across the industry, promoting continuous learning and improvement. Supporting research and development efforts to advance ERM technologies is another critical area. Funding studies and pilot projects contribute to the ongoing innovation and enhancement of ERM systems. Additionally, industry bodies should advocate for their members' interests by engaging with policymakers and regulators. Representing the industry's voice can help shape policies and regulations supporting effective ERM implementations.

IV. CONCLUSIONS

This research investigates the determinants affecting the adoption of ERM applications, concentrating on system quality, readiness to change, perceived usefulness, and perceived ease of use. The results demonstrate that system quality and readiness to change substantially affect perceived usefulness and ease of use, subsequently influencing the behavioral intention to utilize ERM applications. Notably, the impact of the traditional model of perceived usefulness on behavioral intention is less significant, highlighting a shift towards factors like system quality and readiness to change in contemporary technology adoption contexts. The research's insights emphasize the critical role of both technical and human factors in successful technology adoption. Organizations should prioritize enhancing system quality, ensuring usability, functionality, and reliability, while fostering a conducive environment for change. This condition involves comprehensive user training, engagement initiatives, and robust change management strategies to prepare and support users. Moreover, organizations can achieve higher adoption rates, better operational efficiency, and greater user satisfaction by aligning system capabilities with user needs and expectations.

The scope of research is limited to a particular industry and geographic area, potentially impacting the generalizability of the results. Furthermore, self-reported data from questionnaires might lead to response bias. The research also does not consider the long-term effects of ERM application adoption, which could provide more insights into user engagement and satisfaction over time. Then, future research should explore the impact of different organizational contexts on the relationships between system quality, user perceptions, and readiness to change. Moreover, research focusing on user-centric metrics such as user satisfaction and long-term engagement with ERM systems can provide deeper insights into these systems' operational use and evolution. Comparative research across various enterprise systems could identify unique challenges and best practices that specific to risk management technologies. Exploring the impact of training programs and user support structures on enhancing perceived ease of use and usefulness could significantly deepen the understanding of how optimally to prepare organizations for new system implementations. By addressing these factors, future research could expand on the foundational insights provided by this research, enriching the knowledge of factors that influence the successful adoption and effective utilization of ERM systems across various organizational contexts.

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