

Leadership at the Crossroads of Risk: Bridging Internal and External Factors in Enhancing Risk Management Quality

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ABSTRACT

Risk management has become crucial for maintaining organizational stability and sustainability in both the public and private sectors. This study analyzes the determinants of risk management quality and the moderating role of leadership within the Ministry of Public Works, particularly the Directorate General of Highways. These factors are grounded in attribution theory and transformational leadership, while also considering previous research. This study employs a quantitative approach using primary data. Data were obtained through the distribution of online questionnaires to risk ownership units (*Unit Pemilik Risiko* or *UPR*) within the Directorate General of Highways of the Ministry of Public Works and Public Housing. A total of 162 responses were collected and processed using PLS-SEM. The results indicate that organizational culture, competence, regulation, and risk management information systems positively influence the quality of risk management, with organizational culture being the most influential variable. The study also found that leadership strengthens the influence of organizational culture, competence, and risk management information systems on risk management quality. Furthermore, the findings emphasize that leadership presence is a critical factor to reinforce compliance with regulations, thereby enhancing the overall quality of risk management within the Ministry of Public Works. The Ministry can thus focus on strengthening leadership roles to improve regulatory compliance, as compliance significantly contributes to achieving organizational objectives.

KEYWORDS Organizational Culture, Competencies, Regulations, Risk Management Information Systems, Leadership, Risk Management Quality.



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INTRODUCTION

Risk management has become an essential element in maintaining the stability and sustainability of organizations, both in the public and private sectors. An increasingly complex, dynamic, and uncertain organizational environment requires high-quality risk management as a determining factor for organizational success in both sectors (Vorst et al., 2018). Achieving these goals requires effective risk management to enable organizations to meet their targets, create and protect value, and assist in all decision-making processes.

According to Hidayah et al. (2024), the quality of risk management is defined as the level of effectiveness of an organization in implementing integrated and transparent risk

management, strengthening the principles of organizational governance, and encouraging improvements in the quality and quantity of risk disclosure. In fact, risk management has created added value for organizations that implement it as outlined in the ISO 31000 standard (Priyarsono & Munawar, 2020). Risk management in the public sector is significantly more complex and has a broader scope of impact on society. The degree and variety of risks faced by government institutions in daily operations are substantial, and the government's main responsibility is to assure the public that no risks pose potential threats to them (Ahmeti & Vladi, 2017). However, despite progress over time, many challenges remain in public sector organizations that have implemented risk management. Ministry X, which has implemented risk management, has not been free from risks and has been in the media spotlight multiple times due to various cases, including corruption, immigration issues, law enforcement irregularities, and prison riots (Eda, 2020). These facts indicate that although risk management is intended to strengthen organizational governance and create added value, in practice, some organizations that have adopted it still fail to enhance and protect organizational value.

The Ministry of PUPR has implemented risk management, as evidenced by the BPKP Performance Report for the First Quarter of 2024. The Ministries/Institutions that have reached level 4 risk management maturity (managed) include the Inspectorate General of the Ministry of Finance, the Inspectorate General of the Ministry of PUPR, and the Financial and Development Supervisory Agency (BPKP, 2024). However, in practice, the implementation of risk management has not been fully optimized within the Ministry of PUPR, affecting the achievement of organizational goals and values. This is evidenced by the ongoing occurrences of corruption cases within the Ministry of Public Works and Housing.

This research arises from a gap between the ideal and actual implementation of risk management in the Ministry of PUPR. Ideally, the Ministry's risk management maturity level is categorized as level 4 (managed). However, corruption and reputational risks remain, potentially impacting goal attainment and hindering value creation and protection. Previous studies related to the quality of risk management, such as that by Zefanya et al. (2024), employed the dummy method and variables derived from the ERM COSO Framework 2017 to assess risk management quality.

Following up on previous research and introducing innovation, this study adopts the SNI ISO 31000 risk management framework and the Minister of PUPR's SE Framework No. 12/SE/M/2024, particularly focusing on leadership, commitment, and the design of the risk management framework (understanding the organization and its context). Adopting ISO 31000 has been shown to have a significant positive impact and forms part of a broader strategy for performance improvement and good governance (Purwanti et al., 2025). Understanding the organization and its context in the risk management framework design involves internal and external contexts, where internal variables consist of organizational competence and culture, while external variables include regulations and risk management information systems. Additionally, this study introduces leadership as a moderating variable in terms of leadership commitment.

Improving the quality of risk management is essential to ensure that risk management outcomes can create and protect organizational value, integrate with all organizational processes, and support decision-making by optimizing resources for directing and controlling risk management. Therefore, identifying determinants that influence the quality of risk

management implementation is crucial for ensuring good governance. This study aims to analyze the main determinants of risk management quality within the Ministry of Public Works to provide a comprehensive understanding that contributes to practical improvement efforts. Besides direct determinant factors, the role of leadership in the context of risk management is also an important subject for further exploration. Leadership not only directly influences the quality of risk management but may also moderate the effects of other determinants, such as organizational culture and human resource competence.

This research seeks to deepen the understanding of key determinants influencing the quality of risk management within the Ministry of PUPR. It offers practical insights for improving organizational practices by focusing on the moderating role of leadership and its impact on risk management quality. Furthermore, the study contributes to the theoretical framework of public sector risk management by applying ISO 31000:2018 and the Minister of PUPR Decree No. 12/SE/M/2024, reinforcing the relevance of Attribution Theory and Transformational Leadership Theory. The findings are expected to enhance governance and decision-making processes, thereby strengthening organizational sustainability and value protection within public sector institutions such as the Ministry of PUPR.

RESEARCH METHOD

This study employed a quantitative approach with an explanatory causal design to examine the determinants of risk management quality within the Ministry of Public Works and to assess how leadership moderated this relationship. The design allowed the testing of hypotheses regarding the influence of organizational culture, competence, regulatory compliance, and risk management information systems on risk management quality, along with the moderating effect of leadership.

Data were collected through a structured survey questionnaire that captured respondents' perceptions of risk management quality and leadership. A five-point Likert scale was used to measure the level of agreement with statements related to organizational culture, competence, regulation, information systems, and leadership. After a pilot test confirmed the validity and reliability of the instrument, the questionnaire was distributed electronically to employees of the Directorate General of Highways, Ministry of Public Works. A total of 120 respondents were selected through random sampling to represent diverse roles in risk management.

Data analysis employed Partial Least Squares Structural Equation Modeling (PLS-SEM) using SmartPLS software. The analysis consisted of two stages: evaluation of the measurement model to test construct validity and reliability, and evaluation of the structural model to assess causal relationships among variables. A bootstrapping procedure was conducted to determine the significance of path coefficients, with leadership included as a moderating variable. This approach provided empirical evidence on the key factors influencing risk management quality and demonstrated the role of leadership in enhancing organizational governance.

RESULT AND DISCUSSION

Data Analysis Results

The evaluation of the measurement model (outer model) showed that all indicators used in this study met the criteria for convergent validity. The outer loadings value for each indicator

of the latent variables of risk management quality, risk management quality, and leadership were consistently above the recommended threshold of 0.7. In addition, the Average Variance Extracted (AVE) value for each construct also exceeds 0.5, indicating that the variance described by each construct is greater than the variance due to measurement errors.

Table 1. Validity and Reliability Test Results

Variabel	Cronbach's alpha	Composite Reliability	(AVE)	Result
Organizational Culture	0.924	0.938	0.654	Reliable
Quality Risk Management	0.902	0.923	0.631	Reliable
Leadership	0.903	0.920	0.622	Reliable
Competence	0.907	0.928	0.683	Reliable
Risk Management Information System	0.922	0.936	0.649	Reliable
Regulation	0.877	0.909	0.666	Reliable

Source: Processed from Primary Data, 2025

Discriminant validity testing also showed satisfactory results. Based on the Fornell-Larcker criterion, the square root of AVE for each construct is higher than the correlation value between the constructs, indicating that each construct is empirically different from the other. Testing via the Heterotrait-Monotrait Ratio (HTMT) also supports these findings, with all HTMT values being below the 0.90 threshold, which confirms that discrimination between latent variables has been well achieved in this study's measurement model.

In terms of construct reliability, the results of the analysis show that all latent variables have a high internal consistency. Cronbach's Alpha and Composite Reliability values for each construct, including organizational culture, competence, regulation, risk management information systems, risk management quality, and leadership, are above 0.7. These findings indicate that the questionnaire instruments used in this study are reliable and consistent in measuring the concepts studied, so that the resulting data is suitable for further analysis.

Evaluation of Structural Models (Inner Model)

The evaluation of the structural model (inner model) is focused on testing the relationship between latent variables. The R-squared value (R^2) for the dependent variable of risk management quality indicates that a significant proportion of variance can be explained by the hypothesized determinant variables, namely organizational culture, competence, regulation, and risk management information systems. This level of explanatory indicates that structural models have adequate predictive capabilities in the context of the Ministry of Public Works, providing a basis for understanding the factors that contribute to the quality of risk management empirically.

Path coefficients analysis shows the strength and direction of the causal relationship between each determinant and the quality of risk management. The bootstrapping results revealed that most of the hypothesized pathways had t-statistical values above 1.96 and p-values below 0.05, confirming the statistical significance of the direct influence of independent variables on dependent variables. These findings strengthen the understanding of the key antecedents that shape perceptions of risk management effectiveness in the public sector organizational environment studied.

Furthermore, testing the role of leadership as a moderation variable showed the significance of the interaction between certain determinants and leadership in influencing the quality of risk management. The path coefficient for these interaction variables, which was also tested through bootstrapping, indicated that leadership effectively strengthened or weakened the relationship between those determinants and the quality of risk management. This is in line with attribution theory, where leadership actions can change the way members of an organization attribute the success or failure of risk management.

Table 2. Hypothesis Test Results

Hypothesis	Path	Path Coefficients	T-value	p-value	Results
H1	BO -> KMR	0.364	3.832	0.000	Accepted
H2	KPT -> KMR	0.199	2.886	0.002	Accepted
H3	RGL -> KMR	0.274	4.267	0.000	Accepted
H4	PSIMR -> KMR	0.263	3.667	0.000	Accepted
H5	KP x BO -> KMR	0.171	2.596	0.005	Accepted
H6	KP x KPT -> KMR	0.108	2.178	0.015	Accepted
H7	KP x RGL -> KMR	-0.205	3.091	0.001	Rejected
H8	KP x PSIMR -> KMR	0.139	2.424	0.008	Accepted

Source: Processed from Primary Data, 2025

Hypothesis 1 states that organizational culture has a positive effect on the quality of risk management. The test results showed a t-value of 3.832 and a p-value of 0.000. The value meets the significance requirements of 5% of the one-tailed test, i.e. the t-value is greater than the critical value of 1.65 and the p-value is less than 0.05. The value of the path coefficient shows a positive number of 0.364. Based on these results, it can be concluded that organizational culture has a positive effect on the quality of risk management, so hypothesis 1 is accepted.

Hypothesis 2 states that competence has a positive effect on the quality of risk management. The test results showed a t-value of 2.886 and a p-value of 0.002. The value meets the significance requirements of 5% of the one-tailed test, i.e. the t-value is greater than the critical value of 1.65 and the p-value is less than 0.05. The value of the path coefficient shows a positive number of 0.199. Based on these results, it can be concluded that competence has a positive effect on the quality of risk management, so hypothesis 2 is accepted.

Hypothesis 3 states that regulation has a positive effect on the quality of risk management. The test results showed a t-value of 4.267 and a p-value of 0.000. The value meets the significance requirements of 5% of the one-tailed test, i.e. the t-value is greater than the critical value of 1.65 and the p-value is less than 0.05. The line coefficient value shows a positive number of 0.274. Based on these results, it can be concluded that regulations have a positive effect on the quality of risk management, so hypothesis 3 is accepted.

Hypothesis 4 states that risk management information systems have a positive effect on the quality of risk management. The test results showed a t-value of 3.667 and a p-value of 0.000. The value meets the significance requirements of 5% of the one-tailed test, i.e. the t-value is greater than the critical value of 1.65 and the p-value is less than 0.05. The line coefficient value shows a positive number of 0.263. Based on these results, it can be concluded

that the risk management information system has a positive effect on the quality of risk management, so hypothesis 4 is accepted.

Hypothesis 5 states that leadership reinforces the positive influence of organizational culture on the quality of risk management. The test results showed a t-value of 0.171 and a p-value of 0.005. The value meets the significance requirements of 5% of the one-tailed test, i.e. the t-value is greater than the critical value of 1.65 and the p-value is less than 0.05. The value of the path coefficient shows a positive number of 2.696. Based on these results, it can be concluded that leadership strengthens the positive influence of organizational culture on the quality of risk management so that hypothesis 5 is accepted.

Hypothesis 6 states that leadership reinforces the positive influence of competence on the quality of risk management. The test results showed a t-value of 2.178 and a p-value of 0.015. The value meets the significance requirements of 5% of the one-tailed test, i.e. the t-value is greater than the critical value of 1.65 and the p-value is less than 0.05. The value of the path coefficient shows a positive number of 0.108. Based on these results, it can be concluded that leadership strengthens the influence of competence on the quality of risk management so that hypothesis 6 is accepted.

Hypothesis 7 states that regulation reinforces the positive influence of leadership on the quality of risk management. The test results showed a t-value of 3.091 and a p-value of 0.001. The value meets the significance requirements of 5% of the one-tailed test, i.e. the t-value is greater than the critical value of 1.65 and the p-value is less than 0.05. The value of the path coefficient shows a negative number of -0.205. Based on these results, it can be concluded that leadership is able to negatively and significantly moderate the influence of regulations on the quality of risk management. The results of the test showed that leadership weakened the positive influence of regulation on the quality of risk management, so hypothesis 7 was rejected.

Hypothesis 8 states that leadership reinforces the positive influence of competence on the quality of risk management. The test results showed a t-value of 2.424 and a p-value of 0.008. The value meets the significance requirements of 5% of the one-tailed test, i.e. the t-value is greater than the critical value of 1.65 and the p-value is less than 0.05. The value of the path coefficient shows a positive number of 0.139. Based on these results, it can be concluded that leadership strengthens the influence of competence on the quality of risk management so that hypothesis 8 is accepted.

Results of Direct Influence Hypothesis Testing

Direct influence hypothesis testing showed that the identified determinants had a significant impact on the quality of risk management in the Ministry of Public Works. Specifically, the variables of organizational culture, human resource competence, regulatory clarity, and the effectiveness of risk management information systems have been statistically proven to have a positive effect. These findings confirm that improvements in each of these antecedent factors directly contribute to a better perception of the quality of risk management implementation, in line with the attribution theory framework underlying this study.

An organizational culture that supports risk awareness and adequate employee competence in identifying and managing risks is the main pillar. The results of this study are in line with the research of Chen et al. (2019) who stated that organizational culture shapes the

behaviors and practices expected by an organization. The results of the study are in line with several previous studies conducted by Irianto and Amirya (2024), Kwaik et al. (2023), Aldriweesh et al. (2022) and Santigie Kanu (2020) which found that organizational culture is one of the success factors in risk management practices and makes it easier for an organization to control risks.

The results of the second hypothesis test prove that competence has a positive effect on the quality of risk management. The results of this study are in line with Xia's (2024) research that says that employee competencies are needed in organizational risk management to deal with dynamic organizational conditions, build resilience, and achieve long-term success. Organizations need employees with good teamwork skills and competence in completing projects (Sahib et al., 2022). Research by Marling et al. (2024) proves that optimal competence can have an impact on a better risk management process, so that competency results lead to better and quality results.

The results of the analysis show that these two internal factors significantly improve the quality of risk management. Employees who feel competent and supported by a proactive culture tend to attribute the success of risk management to the internal capabilities of the organization. This reinforces confidence in the effectiveness of risk management practices implemented at the Directorate General of Highways.

Furthermore, the existence of clear regulations and the implementation of an effective risk management information system have also proven to be crucial determinants. The results of the third hypothesis test prove that regulation has a positive effect on the quality of risk management. The results of this study are in line with the research of Alman (2023) and Oliveira et al. (2018), which states that regulations have an influence on organizations to adopt risk management, where regulations protect organizations from emerging risks. This is in line with the research of Adeniran et al., (2024), which states that compliance with regulations has an effect on risk management. In studies in several countries, it is stated that efficient regulation depends on the characteristics of each country. Provisions and guidelines on risk management contribute to regulatory requirements in these three countries (Bledow et al., 2019).

The results of the fourth hypothesis test prove that the risk management information system has a positive effect on the quality of risk management. The results of this study are in line with Irawan's (2022) research which states that the information system from risk management applications shows an influence on the quality of information due to the ease of access to its use so that each risk is mitigated and then followed up based on the level of risk is quickly reported. An organization's strategic management practices supported by applications, can follow the direction set by the organization's risk management. The implementation of risk management information systems can improve strategy and flexibility in dealing with the uncertainty of the organizational environment (Yoshikuni et al., 2023). The implementation of the risk management information system at PDAM Tirtanadi allows real-time monitoring, can estimate potential leaks, and responds quickly in order to minimize the impact on operations and customer service. Risk management information systems support more effective decision-making in planning risk mitigation measures and ensuring more efficient operational performance (Aria et al., 2025).

Comprehensive regulation provides firm guidance, while a good information system facilitates accurate monitoring and reporting of risks. These two factors reduce ambiguity and

increase transparency, so that members of the organization can consistently attribute improved quality of risk management to systemic improvement and compliance with procedures set by the Ministry of Public Works.

Results of Testing the Hypothesis of the Influence of Leadership Moderation

The results of the fifth and sixth hypothesis tests showed that leadership significantly moderated the relationship between certain determinants and risk management quality. The interaction between leadership variables and organizational culture and human resource competencies has been shown to have a significant effect on the quality of risk management. These findings indicate that the effectiveness of organizational culture, competence in improving the quality of risk management can be strengthened by a supportive and transformational leadership style, in line with attribution theory that states that leadership shapes perceptions of the causes of risk management success in the Ministry of Public Works.

In more detail, the positive influence of organizational culture on the quality of risk management becomes stronger when the perceived level of leadership is high. Leaders who are able to internalize risk-aware values and encourage active participation in the risk management process will magnify the positive impact of the culture. This suggests that attribution of risk management success is more likely to be directed at internal organizational factors, such as a solid culture, when supported by effective leadership in the Directorate General of Highways.

The test results on the seventh hypothesis show that the hypothesis is rejected. The test results prove that leadership weakens the positive influence of regulation on the quality of risk management. The results of this interpretation illustrate the condition that the better the leadership in an organization, the lower the role of regulation on the quality of risk management. In conditions where leadership in an organization is still low, the role of regulations will be higher in maintaining compliance with organizational rules. This statement is supported by the results of research by Aditya et al. (2024) which states that leadership cannot strengthen the influence of regulations on the implementation of risk management, this is due to differences in leadership styles owned by organizational leaders. The disalignment of regulations and policies between the central and regional governments leads to inconsistent implementation of risk management, thus affecting the quality of risk management (Irianto & Amirya, 2024). This shows that leadership is unable to play a role as a strengthening factor for regulation, because overlapping policy directions actually limit the space for leaders to move in implementing risk control effectively. Research that agrees with the research is Owusu & Aba Ochil (2023) who stated that leadership cannot strengthen the influence of regulations or policies, so regulatory or policy factors must be strong and clear independently, regardless of the leadership style used.

The results of this study do not support the transformational leadership theory which states that transformational leaders, in addition to being known as pioneers of change in the organization, also have a high exemplary character, are able to articulate goals clearly, are able to empower employees to achieve their best standards, and act in a way that makes followers want to trust them (Handayani et al., 2023). The relationship with indicators according to Fields & David (2014) begins with effective capabilities where leaders are always looking for opportunities to test employees' abilities and are always up to date with regulatory developments in the organization. Leaders who are able to foster cooperation with others well

will create an atmosphere of mutual trust in the projects they lead. A leader ensures that employees comply with mutually agreed regulations and participates as an example for employees. Ability to delegate authority, consistent leaders in implementing regulations and ensuring the team has clear goals in making work plans. Leaders in delegating tasks and time provide briefings and examples to all employees.

Leadership in the Ministry of Public Works can be said to have no effect in strengthening the influence of regulations on the quality of risk management. This can be due to instability in the leadership structure, which is characterized by frequent leadership changes in the Ministry of Public Works and Public Works. This causes the leadership to have no significant influence on strengthening regulations. A high enough turnover of leaders results in leaders not being able to play a role as a factor that strengthens the influence of regulations on the quality of risk management, because the direction and policy commitments carried by each leader tend to change and are not sustainable.

The results of the eighth hypothesis test prove that leadership reinforces the positive influence of competence on the quality of risk management. The results of this study are in line with the research on Management Information Systems moderated by leadership in the research of Septyaningtyas et al. (2022), stating that the better the leadership, the better the leadership, the more the influence of information technology on readiness in the implementation of Government Regulations. In line with previous research conducted by Darmawan et al. (2023), leadership strengthens the influence of management information systems. A good management information system will make it easier for work and targets can be met easily. The success of the implementation of a risk management information system depends not only on the technology used, but also on the commitment and support of the organization's leadership. Employees in the implementation of new applications sometimes take a long time to adapt, on the one hand the system that has previously been successfully implemented but has to migrate to a new system. The migration of the old risk management information system to the new risk management information system requires support from the leadership to be implemented immediately. Leaders can provide training on the new risk management information system to employees. Leaders play a role in fostering employee competence through several activities, including: mentoring, potential-based assignments, support in continuous professional development.

CONCLUSION

This study confirms that the quality of risk management in the Ministry of Public Works, particularly within the Directorate General of Highways, is significantly influenced by four key factors: organizational culture, competence, regulations, and risk management information systems, all of which positively contribute to enhancing risk management quality by not only improving formal reporting but also minimizing harmful risks to the organization. Additionally, leadership serves as a moderating variable that strengthens the impact of organizational culture, competence, and information systems on risk management quality, with transformational leadership fostering a participatory work environment, employee development, and adaptation to risk management systems. However, strong leadership may weaken the effect of regulations, as employees view compliance as a personal responsibility rather than a mere formal obligation. This research highlights the importance of strong internal

organizational factors and adaptive leadership in ensuring effective risk management, which directly influences the achievement of organizational goals. Future research should explore the dynamics of leadership in the public sector further, particularly focusing on top management's commitment and leadership styles, and could also benefit from incorporating additional variables such as integration and continuous improvement to provide a more comprehensive understanding of risk management in public organizations.

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