

# Identifying and Mapping Human Capital Risk in the State-Owned Enterprises Organization: Evidence from PT Pupuk Indonesia

*Human Capital Risk in the State-Owned Enterprises*

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## ABSTRACT

*The study of human capital risk remains underexplored despite its critical role in ensuring organizational success. This research aims to examine the interrelationships among enterprise risk management maturity, risk culture, human capital development, employee competencies, and leadership in mitigating human capital risk. This research employs a quantitative explanatory approach, using questionnaires as the primary data collection method to analyze the relationships among the studied variables. The findings reveal that higher enterprise risk management maturity significantly reduces human capital risk by enabling a more proactive and systematic approach to risk identification and mitigation. Leadership capability emerges as a crucial factor, alongside structured and targeted human capital development programs that enhance employee competencies. A key contribution of this study is the development of a human capital risk heat and mitigation matrix, which provides a practical framework for managing human capital-related risks. This framework is particularly relevant for State-Owned Enterprises (SOEs) in emerging markets that face complex and dynamic competitive environments. By integrating enterprise risk management maturity principles with human capital strategies, organizations can strengthen resilience, improve agility, and sustain competitiveness in a VUCA (Volatility, Uncertainty, Complexity, and Ambiguity) environment.*

**Keywords:** Enterprise Risk Management, Human Capital Risk, Leadership, Risk Culture, State-Owned Enterprises.

## INTRODUCTION

State-Owned Enterprises (SOEs) play a crucial role in national and international economic activity, particularly during the Covid-19 era (Megersa, 2020; Viet Nam News, 2022). They contribute to inclusive growth, job creation, economic transformation, skill development, public service provision, prevention of natural monopoly abuse, and securing strategic national interests (OECD, 2018). Szarzec et al. (2021) demonstrated that SOEs' impact on economic growth depends critically on institutional quality levels. However, SOEs face particular governance challenges that hinder efficiency and value creation, stemming from dispersed accountability across public administration and different state bodies with conflicting policy interests, necessitating a strong organizational culture and competent human capital.

When SOEs operate in competitive markets, they must ensure a level playing field with private enterprises, treat stakeholders equitably, and maintain transparency. This is particularly urgent in emerging economies, where SOEs need resilience and agility to manage emerging risks while driving economic growth. Their preparedness in developing human capital as a foundation for risk culture remains critical (Alijoyo & Vorst, 2022). To survive and thrive in the era of sustainability and digitalization, SOEs must adopt high-

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maturity Enterprise Risk Management (ERM) practices that prioritize risk culture and human capital competency (Fraser & Simkins, 2010; Alijoyo & Norimarna, 2021).

In 2022, the Minister of SOE issued the Ministry of State-Owned Enterprises of the Republic of Indonesia Number 5 of 2022 on Risk Management, covering policy, planning, implementation, monitoring, evaluation, and reporting. This highlights the growing importance of risk management in SOEs and the need to develop human capital competencies to implement it effectively. Recruitment, development, and talent retention are crucial in supporting good governance principles, transparency, independence, accountability, and fairness. Poor human capital management can hinder organizational objectives, making human capital risk management essential. Human capital risk refers to potential problems arising from managing employees that may affect organizational goals. Studies indicate a positive relationship between human capital competencies, service quality, cultural factors, and effective risk management (Ibrahim & Melhem, 2016; Afifawati et al., 2023).

A common challenge facing organizations is building rigorous risk management systems and resilient organizational cultures. Research by Lisdiono et al. (2022) shows that risk management practices have a positive and significant effect on enterprise resilience. However, businesses require a more integrated and proactive approach to enhance resilience and develop the capacity to handle risks and disasters. Human capital risk is often overlooked until it materializes; it encompasses people, cultural, or governance factors that create uncertainty in the business environment and can adversely affect operations (Meyer et al., 2011). Failure to manage human capital risk can hinder the achievement of organizational objectives. Moreover, human capital is recognized as a key success factor in driving economic growth, particularly in emerging markets, as supported by studies from Mankiw et al. (1992), Barro (2001), Bosworth and Collins (2003), Hakeem (2010), and more recently by Schrawat and Giri (2017) and Sarwar et al. (2021).

Risk is a potential problem that can affect organizational objectives and is often compounded by uncertainty. Effective identification, analysis, and mitigation enhance organizational success, making robust risk management essential. ISO 31000 provides a framework for aligning human capital strategies with risk management (International Organization for Standardization, 2018). Risk maturity progresses from initial to optimized levels, assessed across six indicators: risk culture, framework, processes, management, performance, and resilience. Integrating human capital risk into ERM requires leadership to embed a risk culture and prepare employees to understand and implement risk processes (Cantrell et al., 2023). Emerging human skill applications introduce new hazards, highlighting the need for security systems to minimize personnel risks (Nevmerzhitskaya, 2021).

The objectives of this research are to identify and analyze human capital risk and examine the factors contributing to human capital risk, including ERM, human capital competencies, human capital development, leadership, and risk culture. The study focuses on a case study of PT Pupuk Indonesia, an Indonesian SOE, to provide practical recommendations for building effective risk mitigation programs, particularly in human capital risk management. This research is novel in exploring the dynamic influence of human capital variables on risk culture, the effect of ERM on risk culture, the interaction between human capital variables and risk culture on ERM, and how ERM ultimately impacts human capital risk. The study also develops a matrix that illustrates the heat status of human capital risk and proposes mitigation strategies, serving as a practical tool for human capital professionals to identify and manage human capital risks, thereby enhancing organizational survivability, sustainability, and resilience.

## **LITERATURE REVIEW & HYPOTHESIS DEVELOPMENT**

### **The Determinants of Risk Culture**

RIMS (2017) outlines seven key areas of proficiency, including core competencies, attributes, organizational knowledge, business knowledge, risk management knowledge,

technical skills, and management skills, which serve as essential prerequisites for professional risk management practice. In this context, human capital development plays a significant role in strengthening risk culture by enhancing employees' knowledge, training, and organizational learning processes that support effective risk management practices (Daniel, 2019). Competency refers to a set of defined behaviors encompassing skills, knowledge, and abilities required for effective job performance and employee development (Sanghi, 2003; Wijayanti & Sari, 2023). Accordingly, human capital competency positively influences risk culture, as strategic human resource management and employee competencies contribute to building a resilient organizational culture and stronger risk awareness (Georgescu et al., 2024).

To ensure the readiness of management teams and risk owners, organizations must assess and develop risk management competencies through programs such as training, development, rotation, and project assignments (Cantrell et al., 2023). Effective leadership is essential in directing and motivating members to achieve organizational objectives, requiring capabilities in communicating vision, problem-solving, motivating teams, and providing support (Supriharyanti & Sukoco, 2023). Leadership effectiveness positively influences risk culture, as effective leaders shape risk-related values, behaviors, and governance practices through strong communication and transformational guidance (Northouse, 2025). Risk culture reflects how individuals manage risk as an integral part of daily organizational activities and represents a subset of organizational culture shaped by shared beliefs, values, and behaviors in risk-related decision-making (Streicher et al., 2023; Australian Government Department of Finance, 2023). Accordingly, leadership capability plays a critical role in strengthening risk culture, particularly during Enterprise Risk Management implementation, where leaders embed risk awareness into organizational processes (Nurfitriana & Lisdiono, 2024).

H1: Human capital development has a negative effect on risk culture.

H2: Human capital competency has a positive effect on risk culture.

H3: Leadership effectiveness has a positive effect on risk culture.

H4: Leadership capability has a positive effect on risk culture.

### **The Effect of Enterprise Risk Management on Risk Culture**

Enterprise Risk Management (ERM) is a comprehensive and integrated risk management framework that focuses not only on risk identification and mitigation but also on shaping an organization's behavior and values toward risk. Empirical studies show that ERM does not stand alone but is positively interconnected with risk culture. Research by Kanu (2020) found that ERM and risk culture have a significant positive relationship; organizations that implement ERM effectively tend to have a strong risk culture because risk values, assumptions, and practices are embedded in daily decision-making processes, as well as in the organization's risk governance and communication structures. Here, risk culture is not simply the result of the implementation of formal mechanisms such as policies and procedures, but reflects the collective attitudes toward how risks are identified, reported, and addressed by all members of the organization (Kanu, 2022).

Furthermore, follow-up studies by Wijayanti and Sari (2023) found that effective ERM can strengthen risk culture through the integration of risk management practices with organizational strategy and structure. When ERM is implemented comprehensively, employees become more risk-aware, risk communication improves, and proactive behaviors in the face of uncertainty develop all characteristics of a strong risk culture. This indicates that ERM not only manages risks but also internalizes risk management values within the organizational culture, fostering a shared understanding of potential threats and the importance of mitigation across all levels of the organization. Consequently, organizations with mature ERM practices are better positioned to anticipate, respond to, and recover from unforeseen challenges, enhancing overall resilience and long-term sustainability.

H5: Enterprise risk management has a positive effect on risk culture.

### **The Determinants of Enterprise Risk Management**

Enterprise Risk Management (ERM) is a strategic organizational process designed to enhance value by identifying, assessing, and managing risks across all organizational levels, from top management to operational units (Dwonczyk, 2013). ERM encompasses systematic risk identification, analysis, mitigation, and continuous monitoring to support informed decision-making and the achievement of organizational objectives. The ERM Maturity Model classifies ERM implementation into five levels: Ad hoc, Initial, Repeatable, Managed, and Leadership, evaluated through dimensions such as ERM-based approach, process management, risk appetite, root cause discipline, risk identification capability, performance management, and business resilience (Minsky, 2008; OECD, 2021).

Advancing ERM maturity enhances governance quality, strategic integration, competency development, and organizational performance, with effectiveness largely dependent on systematic competency building and active oversight (Viscelli et al., 2016). Organizational characteristics such as firm size, regulatory environment, and independent board engagement further strengthen ERM maturity. Similarly, Farrell and Gallagher (2015) emphasize that strong top-down executive engagement facilitates the integration of ERM into organizational culture, improves the identification of risk interdependencies, and enhances firm value. In the public sector context, ERM effectiveness is supported by top management commitment, personnel self-efficacy, low conflicts of interest, HR development through training, and regulatory backing (Erlina & Muda, 2019).

ERM effectiveness is closely linked to leadership engagement, competency development, and organizational culture, which collectively promote risk-informed decision-making and resilience. Human capital development strengthens organizational risk capabilities and supports ERM implementation (Hamzah et al., 2022). However, higher human capital competencies that are not aligned with risk processes may increase organizational risk exposure, potentially reducing ERM effectiveness (Xing & Yan, 2023). Likewise, leadership influence on ERM can become negative when leadership styles are inconsistent with structured risk management practices (Simbulan & Laraya, 2022). Conversely, strong leadership capability and risk culture enhance ERM by improving risk governance, embedding risk awareness, and fostering organizational resilience (Monazzam & Crawford, 2024).

H6: Human capital development has a positive effect on enterprise risk management.

H7: Human capital competencies have a negative effect on enterprise risk management

H8: Leadership effectiveness has a negative effect on enterprise risk management.

H9: Leadership capability has a positive effect on enterprise risk management.

H10: Risk culture has a positive effect on enterprise risk management.

### **The Effect of Enterprise Risk Management on Human Capital Risk**

Human capital risk refers to potential problems in managing human capital that can adversely affect the achievement of organizational goals. Studies have identified common human capital risks, including failures in recruitment, talent development programs, succession planning, low employee motivation, and high employee turnover rates (Fu, 2014; Mitrofanova et al., 2017). Essentially, any dysfunction in human capital functions can become a source of risk, and if left unaddressed, these issues can significantly hinder organizational performance. Human capital risk management involves identifying and evaluating both actual and potential risks related to human capital, followed by implementing strategies such as avoidance, transfer, tolerance, exploitation, or mitigation, or a combination of these approaches.

Human capital risk focuses on managing workforce capability, skills, motivation, and engagement to ensure sustainable organizational performance. Friede (2018) categorizes human capital risk into four dimensions: strategic, financial, operational, and compliance talent risks, each influencing organizational sustainability and effectiveness. Proactive management of these risks safeguards critical talent, supports succession planning, minimizes disruptions caused by turnover or skill gaps, and strengthens organizational resilience amid internal and external uncertainties. Hamzah et al. (2022) argue that Enterprise Risk Management (ERM) positively affects human capital risk by enhancing organizational risk capabilities and integrating risk processes with human capital resources, thereby mitigating workforce-related vulnerabilities and improving overall risk awareness.

H11: Enterprise risk management has a positive effect on human capital risk.

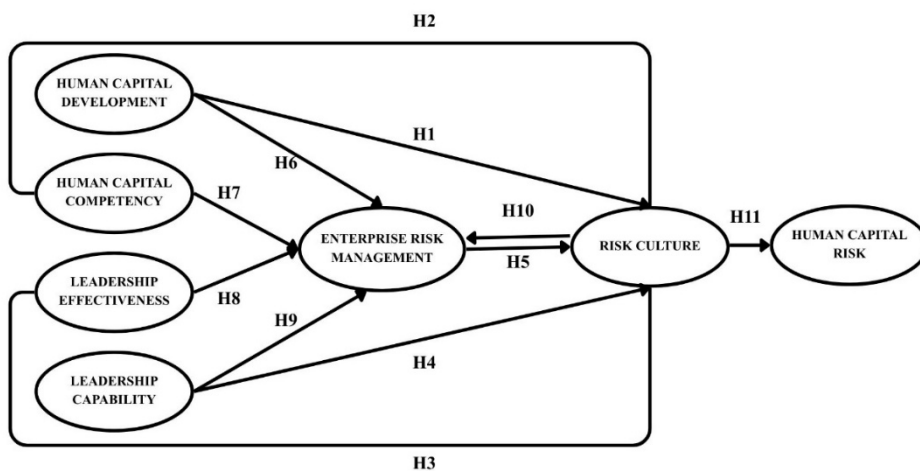


Figure 1. Conceptual Framework

Figure 1 illustrates the conceptual framework of this study, showing the relationships among human capital development, human capital competency, leadership effectiveness, and leadership capability on ERM and risk culture, which in turn influence human capital risk. Human capital development and competency directly affect both ERM and risk culture, highlighting the importance of workforce skills and training in shaping organizational risk practices. Leadership effectiveness and capability also contribute to ERM and risk culture, emphasizing the role of leaders in fostering a risk-aware environment. ERM itself reinforces risk culture, which ultimately impacts human capital risk. The framework demonstrates the dynamic interplay between human capital factors, leadership, ERM, and organizational culture in mitigating risks associated with human resources.

## RESEARCH METHODS

This study employs a quantitative explanatory research design, aiming to explain the influence of specific variables on risk culture and the implementation of Enterprise Risk Management (ERM) at PT Pupuk Indonesia. A quantitative approach was selected to analyze the relationships between variables using numerical data collected from structured responses. The primary data collection technique is a questionnaire, designed to measure respondents' perceptions of human capital competencies, human capital development, leadership capability and effectiveness, risk culture, and ERM implementation. A literature review was also conducted on relevant papers to understand the scope of human capital risk, competencies development, and ERM frameworks.

The population of this study consists of top-level management at PT Pupuk Indonesia, including general managers and managers. A sample of 70 respondents was selected

purposively, with 32.86% at the general manager level and 67.14% at the manager level. Respondents were chosen to ensure that the data reflects insights from individuals with in-depth knowledge of risk management and human capital practices in the organization.

The research instrument is a structured questionnaire using a Likert scale to capture perceptions across the study variables. The research variables include human capital competencies, human capital development, leadership capability and effectiveness, risk culture, ERM quality, and human capital risks. The collected data were further analyzed to create a human capital readiness matrix, serving as a tool to assess the readiness of employees in supporting organizational sustainability. Data analysis methods include multiple linear regression to examine the influence of independent variables on risk culture and ERM implementation, and simple linear regression to evaluate the effect of ERM on human capital risk. Descriptive analysis was also conducted to assess the level of ERM quality, risk culture capability, employee competencies, and human capital development.

The data were analyzed using SPSS, showing that the mean ERM quality at PT Pupuk Indonesia falls within the very good to good range, indicating high ERM maturity. The human capital risk assessment matrix, including risk culture capability, HC risk competency, and HC development, demonstrates generally satisfactory levels with effective mitigation strategies. Regression results further indicate that ERM has a significant positive effect on both risk culture and human capital risk, confirming that stronger ERM practices enhance organizational risk management and human capital outcomes. The heat map and risk matrix identify priority human capital risks that require immediate mitigation actions. The heat map and risk matrix identify priority human capital risks that require immediate mitigation actions.

## RESULTS

This section presents the results of the descriptive analysis and highlights the key findings related to Enterprise Risk Management (ERM) maturity and human capital risk assessment at PT Pupuk Indonesia. The analysis aims to evaluate the current level of ERM implementation and identify critical human capital risks within the organization. The findings provide an overview of the effectiveness of risk management practices and their alignment with organizational objectives. Furthermore, the results offer insights into priority risk areas that require strategic attention and improvement. These findings serve as a basis for further discussion and managerial implications.

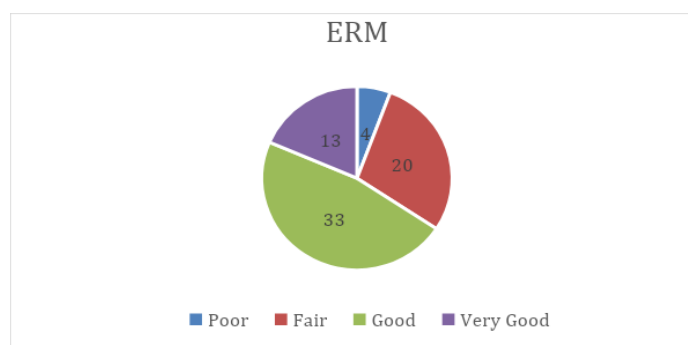


Figure 2. Distribution of ERM Maturity Levels

Figure 2 shows that the descriptive analysis indicates that the overall quality of ERM at PT Pupuk Indonesia is at a very good to good level. Specifically, the largest portion of the ERM assessment falls within the good category (33%), followed by fair (20%) and very good (13%), while only a small fraction is classified as poor (4%). This distribution suggests that ERM practices in the organization are generally well-established and consistently implemented, reflecting a relatively mature risk management framework.

**Table 1.** Mean of ERM Maturity

Category	Score
Very Poor	39
Poor	68.25
Good	97.5
(Mean ERM)	107.5714
Very Good	126.75
Excellent	156

Based on Table 1, the average ERM maturity score is 107.57, reflecting a generally good quality of risk management practices within the organization. Based on the assessment of human capital risks, three top priorities have been identified: the lack of competent Human Capital (HC), an ineffective human capital plan, and the absence of structured career development programs. These high-priority risks require immediate attention and mitigation actions. These results suggest that PT Pupuk Indonesia maintains a solid foundation in ERM practices, risk culture, and human capital development, while highlighting key areas where targeted interventions are needed to strengthen organizational sustainability and risk mitigation efforts.

**Table 2.** Matrix Human Capital Risk, Heat Status, and Mitigation

Human Capital Risk	Prob	Impact	Heat Status	Human Capital Risk Mitigation
Lack of competent employee	2.33	4.04	Undesirable: Action needed	Conduct a monitoring program included in Performance management and create a digital employee journal. Develop a training program for reskilling or upskilling employee competencies.
HRP not effective	2.41	4	Undesirable: Action needed	Revaluation of HRP in the management meeting and ask every manager to contribute and assess the suitability of the HRP for management objectives.
The HR system is not effective	2.22	3.85	Acceptable: Monitor	Reevaluate the HR System, identify factors causing the ineffectiveness of the system, and train employees regarding the HR manual.
Wrong HR development	2.21	3.8	Acceptable: Monitor	TNA (Training Needs Analysis) to ensure the right program for the right person, at the right time
No career development	2.28	4.18	Undesirable: Action needed	Develop Career Management in the company; ask employees to participate in career planning, especially the talent.
The work climate is not conducive	2.04	3.75	Acceptable: Monitor	Re-analyze work climate using the right tools, such as OCAI (Organizational Culture Assessment Instrument), to develop the right climate according to the vision and mission of the organization.
Low employee motivation	2.13	3.63	Acceptable: Monitor	Identify which factors cause low motivation and find the sources of employee motivation, followed by the right program to achieve the vision and mission of the organization.
Unfair performance appraisal	2.2	3.74	Acceptable: Monitor	Reevaluate the performance appraisal system, especially the standard of each performance appraisal needs to be more objective; make sure every appraiser has the same understanding of the standards and mechanisms of appraisal.
An incentive system can not retain competent employees	1.46	3.41	Desirable: No Action	There's no action needed; risk is still at a desirable level.
Many senior employees resign	2.07	3.59	Acceptable: Monitor	Conduct an exit interview to find out the reason for the employee's resignation, and create a follow-up

Human Capital Risk	Prob	Impact	Heat Status	Human Capital Risk Mitigation
				program. Conduct employee research on employee satisfaction, employee engagement, and employee gathering to find out the source factors of dissatisfaction.

Table 2 presents human capital risks along with their probability, impact, heat status, and recommended mitigation actions. High-priority risks classified as “Undesirable; Action needed” include lack of competent employee (2.33, 4.04), Human Resource Planning (HRP) not effective (2.41, 4.00), and no career development (2.28, 4.18), with mitigation strategies such as monitoring programs, reskilling/upskilling, HRP reevaluation, and career management initiatives. Risks like HR system not effective (2.22, 3.85), wrong HR development (2.21, 3.80), work climate not conducive (2.04, 3.75), low employee motivation (2.13, 3.63), unfair performance appraisal (2.20, 3.74), and many senior employees resigning (2.07, 3.59) are “Acceptable: Monitor,” with mitigations including training, TNA, climate analysis, motivation programs, appraisal standardization, exit interviews, and employee satisfaction surveys. Finally, the incentive system cannot retain competent employees (1.46, 3.41), which remains “Desirable: No Action.”

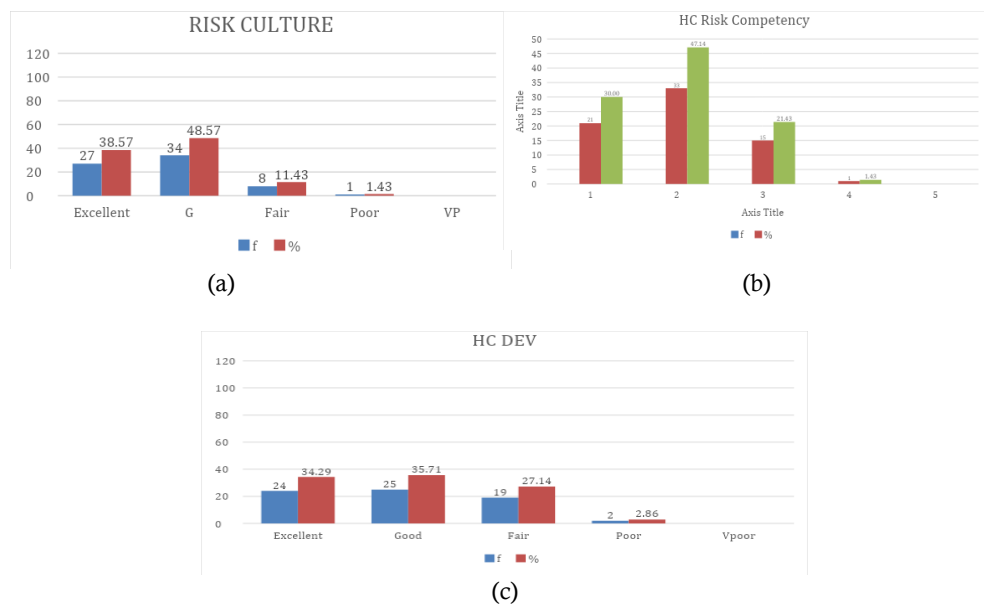


Figure 3. (a) Quality of Risk Culture Capability (b) HC Risk Competency (c) HC Development

Figure 3 illustrates the assessment of risk culture, HC risk competency, and HC development within the organization. In terms of risk culture, most respondents rate it as Good (34 individuals; 48.57%), followed by Excellent (27; 38.57%), while fair and poor ratings are minimal. HC risk competency shows a similar pattern, with the highest concentration in category 2 (33; 47.14%), indicating moderate competency levels, while lower and higher levels are less frequent. For HC development, the majority of employees fall into the Good (25; 35.71%) and Excellent (24; 34.29%) categories, with fewer in Fair (19; 27.14%) and Poor (2; 2.86%). Figure 3 highlights that while risk culture and HC development are generally positive, there remains room to strengthen competency and development initiatives across the workforce.

Table 3. Direct Effect on Risk Culture

Path	B (Unstandardized)	Std. Error	Beta (Standardized)	t- statistic	sig.
HC Development → Risk Culture	-0.085	0.255	-0.027	-0.332	0.741
HC Competency → Risk Culture	1.039	0.254	0.362	4.085	0.000
Leader Effectiveness → Risk Culture	1.242	0.409	0.291	3.033	0.003
Leader Capabilities → Risk Culture	0.878	0.197	0.399	4.459	0.000
Constant	-3.505	4.269	-	-0.821	0.415

The result of the analysis produces a linear regression model as:  $Y = -3.505 - 0.085X_1 + 1.039X_2 + 1.242X_3 + 0.878X_4$ . In this model,  $X_1$  represents HC development,  $X_2$  represents HC competency,  $X_3$  represents leader effectiveness,  $X_4$  represents leader capabilities, and  $Y$  represents risk culture. The effects of leader effectiveness, leader capabilities, HC development, and HC competency on risk culture are shown in Table 3. The findings indicate that while HC development has no discernible effect on risk culture ( $B = -0.085$ ,  $p = 0.741$ ), HC competency ( $B = 1.039$ ,  $p < 0.001$ ), Leader effectiveness ( $B = 1.242$ ,  $p = 0.003$ ), and leader capabilities ( $B = 0.878$ ,  $p < 0.001$ ) do. This suggests that while risk culture is not greatly impacted by human capital development alone, it may be strengthened by increasing leaders' competency, capabilities, and effectiveness.

Table 4. Regression Results on the Influence of ERM on Risk Culture

Path	B (Unstandardized)	Std. Error	Beta (Standardized)	t- statistics	Sig.
ERM → Risk Culture	0.227	0.045	0.520	5.024	0.000
Constant	53.370	4.997	-	10.680	0.000

Table 4 shows the effect of ERM on risk culture. The results indicate that ERM has a positive and significant impact on risk culture ( $B = 0.227$ ,  $p < 0.001$ ), meaning that higher implementation of ERM is associated with a stronger risk culture. The constant is also significant ( $B = 53.370$ ,  $p < 0.001$ ), indicating the baseline level of risk culture when ERM is not considered. Further, ERM determines risk culture significantly, as:  $Y = 53.370 + 0.227X_1$ . In this model,  $Y$  is risk culture, while  $X_1$  is ERM.

Table 5. Regression Result: The Effect of ERM

Path	B	Std. Error	Beta	t- statistics	Sig.	Zero- order	Partial	Part
HC Development → ERM	2.509	1.178	0.348	2.131	0.037	0.594	0.257	0.202
HC Competency → ERM	1.583	1.314	0.241	1.204	0.233	0.582	0.149	0.114
Leader Effectiveness → ERM	-	2.016	-	-1.669	0.100	0.412	-0.204	-
Leadership Capability → ERM	1.849	1.037	0.367	1.782	0.079	0.487	0.217	0.169
Risk Culture → ERM	0.192	0.572	0.084	0.336	0.738	0.520	0.042	0.032
Constant	8.318	19.780	-	0.421	0.676	-	-	-

Table 5 presents the effects of HC development, leadership capability, leader effectiveness, HC competency, and risk culture on ERM. The results show that HC development has a positive and significant effect on ERM ( $B = 2.509$ ,  $p = 0.037$ ), while leadership capability, leader effectiveness, HC competency, and risk culture do not have significant effects ( $p > 0.05$ ). The correlations indicate that HC development also has the strongest zero-order correlation with ERM ( $r = 0.594$ ), suggesting that improving human capital development contributes most to enhancing ERM, whereas the other variables

show weaker and mostly non-significant associations. The linear regression showed as  $Y = 8.318 + 2.509 X_1 + 1.583 X_2 - 3.365 X_3 + 1.849 X_4 + 0.192 X_5$ .

Table 6. Regression Result of the Influence of ERM on HC Risk

Path	B (Unstandardized)	Std. Error	Beta (Standardized)	t-statistics	Sig.
ERM → HC Risk	-0.045	0.024	-0.226	-1.913	0.060
Constant	26.220	2.610	-	10.045	0.000

The effect of ERM on HC risk is displayed in Table 6. Although the effect is not statistically significant at the 0.05 level, the results show that ERM has a negative but non-significant influence on HC risk ( $B = -0.045$ ,  $p = 0.060$ ), indicating that more ERM implementation tends to reduce HC risk. When ERM is not taken into account, the constant, which represents the baseline level of HC Risk, is significant ( $B = 26.220$ ,  $p < 0.001$ ). The regression equation  $Y = 26.220 - 0.045X$  shows that ERM negatively affects human capital risk.

## DISCUSSION

The results show that general human capital development does not significantly influence risk culture at PT Pupuk Indonesia. This suggests that broad development programs, when not directly tied to risk management objectives, are insufficient to instill risk-aware behaviors among employees. Consistent with Barro (2001) and Friede (2018), human capital initiatives must be strategically aligned with organizational goals to impact organizational culture effectively. In contrast, human capital competency significantly enhances risk culture. Employees with higher competencies demonstrate stronger capabilities to identify, assess, and respond to potential risks. This finding aligns with Wijayanti and Sari (2023), who emphasize that employee competencies are central to organizational performance, including the development of a proactive risk culture. By focusing on targeted competency programs, organizations can better equip their workforce to support risk management objectives.

Leader effectiveness also shows a positive and significant effect on risk culture. Leaders who act as role models and guide employees in decision-making reinforce the importance of risk-aware behaviors in daily operations. This result supports Alijoyo and Norimarna (2021) and Lisdiono et al. (2022), who underline that leadership is critical in embedding a risk-conscious culture within state-owned enterprises. Similarly, leader capabilities significantly strengthen risk culture, confirming the role of capable leaders in fostering organizational resilience and embedding risk awareness into operational practices. The findings further reveal that ERM implementation positively and significantly impacts risk culture. ERM frameworks enable systematic identification and mitigation of risks, thereby integrating risk awareness into organizational routines. This aligns with Farrell and Gallagher (2015) and Annamalah et al. (2018), who suggest that structured ERM frameworks enhance preparedness and cultivate a risk-conscious culture.

The analysis also shows that human capital development significantly supports ERM implementation, while leadership effectiveness, leader capabilities, human capital competency, and existing risk culture do not show significant effects on ERM. This finding corresponds with Dwonczyk (2013) and Mitrofanova et al. (2017), who argue that strategic human capital development is foundational for effective risk management systems. By improving employee skills and aligning development programs with risk objectives, organizations can enhance the effectiveness of ERM implementation. Although ERM's effect on human capital risk is negative but not statistically significant, the trend indicates that higher ERM implementation may reduce workforce-related risks, which is consistent with Malik (2015) and Mayfield et al. (2016) that ERM is more effective when integrated with human capital strategies.

The results indicate a clear hierarchy in determinants of risk culture. While human capital development alone does not directly impact risk culture, it indirectly contributes

through ERM implementation. Risk culture is primarily driven by human capital competency, leadership effectiveness, leadership capabilities, and ERM practices. These findings confirm prior research emphasizing the need for integrated approaches, combining targeted competency development, leadership enhancement, and structured ERM to foster a strong risk-aware culture (Talim, 2012; Friede, 2018; Annamalah et al., 2018; Lisdiono et al., 2022).

In practical terms, PT Pupuk Indonesia should adopt an integrated strategic approach that emphasizes competency-based human capital development, leadership enhancement, and the strengthening of a systematic ERM framework supported by Human Resource Information Systems (HRIS). Such an approach would not only improve workforce capabilities but also reinforce a strong risk-aware culture across organizational levels. By aligning HR planning with ERM principles, the company can proactively identify, assess, and mitigate human capital risks, thereby improving operational stability and decision-making quality.

Furthermore, integrating ERM maturity principles with long-term human capital strategies will enhance organizational resilience and adaptability in dynamic operational contexts. This alignment enables the organization to respond more effectively to uncertainty while maintaining sustainable performance. In a VUCA (Volatility, Uncertainty, Complexity, and Ambiguity) environment, the synergy between risk management systems and strategic HR development becomes a critical driver of agility, competitiveness, and long-term organizational sustainability.

## **CONCLUSION**

The study indicates that PT Pupuk Indonesia demonstrates strong leadership effectiveness, solid employee competencies, and well-structured competency development programs, all of which contribute to the establishment of a high-quality risk culture within the organization. Leaders act as role models whose behavior significantly shapes employees' risk awareness and decision-making processes, while continuous competency development fosters risk-conscious attitudes that gradually become embedded in the organizational culture. Moreover, a high level of ERM maturity helps reduce human capital risks by minimizing both the likelihood and impact of workforce-related challenges. These findings underscore the pivotal role of leadership in cultivating a robust risk culture and suggest that organizations, particularly Indonesian state-owned enterprises, should prioritize leadership development programs that emphasize risk management behaviors and exemplary practices. By integrating ERM maturity principles with strategic human capital management, organizations can enhance resilience, strengthen agility, and maintain competitiveness in an increasingly dynamic and VUCA environment.

Effective human capital competency development aligned with ERM enhances organizational resilience, reduces risk exposure, and supports sustainable performance, while the proposed matrix of HC risk, heat risk status, and HR risk mitigation provides a practical tool for monitoring and mitigating workforce-related risks. However, this study is limited to PT Pupuk Indonesia and may not fully generalize to other organizations or sectors. The assessment relies on self-reported measures of leadership, competency, and risk culture, which could introduce bias, and the cross-sectional design restricts the ability to capture long-term changes in risk culture or ERM effectiveness. Future research could examine dynamic interactions between leadership, human capital development, and ERM over time using longitudinal designs, conduct comparative studies across multiple state-owned enterprises or different cultural contexts, and explore specific HR interventions and their direct impact on risk reduction to strengthen generalizability and practical application.

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