

Impact of Human Capital Management Maturity on Employee Performance in PT XYZ

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Abstract

Purpose: This study aims to analyze the effect of Human Capital Management (HCM) maturity dimensions, including leadership practices, employee engagement, knowledge accessibility, workforce optimization, and learning capacity, on employee performance at PT XYZ's Heavy Industry Unit.

Research Methodology: A quantitative cross-sectional survey was conducted involving 201 employees selected from a population of 270 through proportionate stratified sampling technique. Data were collected using a five-point Likert scale questionnaire and analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM).

Results: The findings show that all HCM Maturity dimensions positively and significantly affect employee performance. Leadership practices had the strongest influence, followed by learning capacity and knowledge accessibility. The model explains 56.3% of the variance in employee performance.

Conclusions: HCM Maturity plays an important role in improving employee performance and organizational effectiveness in the heavy industry sector. Strengthening leadership, learning capacity, and knowledge management can support productivity improvements.

Limitations: This study focuses on a single business unit and applies a cross-sectional design, limiting the generalizability of the results.

Contributions: This study provides empirical evidence of the integrative effect of HCM Maturity dimensions on employee performance in a state-owned heavy industry context, a setting underrepresented in the existing literature, and offers actionable prioritization guidance for human capital practitioners.

Keywords: *Employee Engagement, Employee Performance, Human Capital Management Maturity, Leadership Practices, Learning Capacity*

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1. Introduction

The transition to Industry 4.0 and the knowledge-based economy have fundamentally transformed organizational competitive dynamics, elevating human capital management from a support function to a strategic imperative (Naim & Lenka, 2017). Organizations now recognize that sustainable competitive advantage derives not from technological prowess or financial capital alone, but from the systematic, strategic management of human capital that enables continuous innovation and adaptation (Jiang, Lepak, Hu, & Baer, 2012). The World Bank's Human Capital Index (HCI) 2020 revealed that Indonesia achieved a score of 0.54, significantly lagging behind regional benchmarks such as Singapore (0.88), South Korea (0.80), and Malaysia (0.62), indicating persistent gaps in human capital quality and productivity within strategic manufacturing and industrial sectors (Dirgayasa, 2024). For

manufacturing-oriented organizations, strengthening leadership capability, employee engagement, knowledge accessibility, workforce optimization, and learning capacity has become essential for sustaining operational performance and organizational competitiveness ([Bassi & McMurrer, 2007](#)).

PT XYZ's Heavy Industry Unit, a strategically important state-owned manufacturing entity, exemplifies these challenges. Internal operational data from 2021 to 2023 document persistent performance deficiencies: the Gross Profit Margin declined to 11% against a 20% organizational target; contract fulfillment achieved only IDR 390 billion of an IDR 790 billion target; inventory turnover reached 944 days, exceeding the 400-day target by more than 135%, signifying substantial operational inefficiency; and employee productivity demonstrated volatility, declining from IDR 136,094 (2021) to IDR 132,432 (2022) before recovering to IDR 211,703 (2023), yet remaining substantially below comparative divisions within the same organization ([Pandey et al., 2021](#)). These persistent operational gaps are not merely technical or financial in nature; they reflect deeper systemic weaknesses in how the organization manages its human capital across leadership, knowledge, learning, and workforce dimensions.

The performance deficiencies documented above create a clear organizational imperative, such as evidence-based knowledge of which dimensions of human capital management most effectively drive employee performance in this specific industrial and institutional context. Prior empirical research has established that leadership quality, organizational culture, information accessibility, and learning capacity each individually enhance employee performance and organizational effectiveness ([Pangarso, Saragih, & Nuriz, 2021](#); [Susanty, Budiharjo, & Winarto, 2022](#); [Winarno, Prasetyo, Dudija, Pratami, & Liu, 2021](#)). However, these individual-variable studies do not address a critical practical question facing PT XYZ's management: when organizational resources for HCM investment are finite, which dimensions offer the greatest performance leverage, and how do they function together as an integrated system.

Human Capital Management Maturity, conceptualized ([Bassi & McMurrer, 2007](#)) as the organizational capacity to systematically manage human resources across five critical dimensions, and further validated in manufacturing and industrial contexts by ([Motaghi, Pakdel, & Kouravand, 2024](#)) provides an integrative framework for answering this question. Despite its theoretical and practical importance, empirical investigations of HCM Maturity within Indonesia's strategic manufacturing and heavy industry sectors, particularly within state-owned enterprises, remain limited ([Fitriana Dewi, Pringgabayu, & de Keizer, 2022](#)). This gap implies that managers at organizations like PT XYZ currently lack the specific, sector-grounded empirical evidence required to make informed, prioritized human capital investments. This study directly addresses this gap by simultaneously analyzing all five HCM Maturity dimensions and their relative effects on employee performance at PT XYZ's Heavy Industry Unit, producing both theoretical contributions to the HCM Maturity literature and practical guidance for human capital strategy in Indonesia's state-owned industrial sector.

2. Literature Review and Hypotheses Development

2.1 Employee Performance

Employee performance constitutes the work outcomes achieved through the systematic execution of assigned duties and responsibilities in support of organizational objectives, encompassing both quantitative output and qualitative work characteristics ([Nurshadrina & Rahmawati, 2024](#); [Pradhan & Jena, 2016](#)). Performance extends beyond mere task completion to encompass behavioral dimensions, including work quality, work quantity, timeliness, autonomy, and cost-effectiveness in resource utilization ([Dirgayasa, 2024](#)). Contemporary performance frameworks emphasize that individual employee performance aggregates into organizational effectiveness, making human performance optimization central to competitive strategy ([Nurshadrina & Rahmawati, 2024](#)). In manufacturing and heavy industry contexts, performance metrics typically integrate productivity measures, quality indicators, schedule adherence, and operational efficiency, collectively determining organizational viability and market competitiveness ([Laily, Wahyuni, Koesmono, & Sari, 2023](#); [Pangarso, Winarno, Aulia, & Ritonga, 2022](#)). In this study, employee performance is operationalized through five dimensions: work quality, work quantity, timeliness, independence, and cost-effectiveness, consistent with ([Baron & Armstrong, 2007](#); [Pradhan & Jena, 2016](#)).

2.2 Human Capital Management (HCM)

Human Capital Management (HCM) represents a strategic organizational perspective that conceptualizes employees as critical assets requiring continuous development to enhance organizational performance and secure long-term competitive sustainability ([Supraptika, Faturohman, Syavera, Giovaningrum, & Fahmi, 2025](#)). Unlike traditional human resource management approaches that emphasize compliance and transactional administration, HCM adopts a value-creation orientation, systematically maximizing individual competencies and contributions to strategic organizational objectives ([Barney, 1991](#); [Baron & Armstrong, 2007](#); [Jiang et al., 2012](#)). HCM frameworks explicitly integrate human resource management practices with broader organizational strategies, ensuring alignment between personnel development, organizational capabilities, and competitive positioning ([Jiang et al., 2012](#)). Evidence demonstrates that organizations implementing strategic HCM approaches achieve superior financial performance, enhanced innovation capacity, improved employee retention, and strengthened organizational resilience ([Devi Nor, Farah Zhafira Mellyana, Vita, & Mochammad Isa, 2026](#)).

2.3 Human Capital Management Maturity Model

The Human Capital Management Maturity Model, originally developed ([Bassi & McMurrer, 2007](#)) and subsequently validated across organizational contexts ([Fitriana Dewi et al., 2022](#)), provides a multidimensional framework encompassing five critical capabilities that determine the organizational capacity to optimize human performance and competitive advantage ([Abugre & Anlesinya, 2020](#)). HCM Maturity transcends binary compliance frameworks to examine the sophistication, integration, and strategic alignment of human capital practices within organizational systems. Organizations with higher HCM Maturity levels exhibit more effective employee performance optimization, enhanced organizational learning capacity, superior innovation outcomes, and greater strategic flexibility in responding to market dynamics ([Fitriana Dewi et al., 2022](#)). The five dimensions are conceptually distinct but mutually reinforcing, such as effective leadership creates conditions for engagement, engagement facilitates knowledge sharing, accessible knowledge supports learning, and learning capacity enables workforce optimization over time ([Bassi & McMurrer, 2007](#)).

2.3.1 Leadership Practices

Leadership practices encompass the integrated capacities and behaviors through which organizational leaders motivate, direct, and coordinate organizational members toward the achievement of strategic objectives through mechanisms including effective communication, transparent decision-making, role modeling, and developmental support ([Alblooshi, Shamsuzzaman, & Haridy, 2020](#)). Extensive empirical evidence demonstrates that leadership quality substantially influences employee performance, organizational culture development, and the effectiveness of strategic alignment ([Xie, Chiu, & Ho, 2023](#)). Contemporary leadership research emphasizes transformational and servant leadership approaches that cultivate employee engagement, foster psychological safety, and inspire discretionary efforts beyond minimum job requirements ([Xie et al., 2023](#)). In manufacturing and heavy industry contexts, leadership effectiveness proves particularly critical for maintaining operational discipline, ensuring safety compliance, managing complex coordination challenges, and fostering innovation within hierarchical organizational structures ([FakhriMahendra, PradanaMahir, SyarifuddinSyarifuddin, & SuhendraYozi, 2020](#); [Motaghi et al., 2024](#)).

2.3.2 Employee Engagement

Employee engagement represents the psychological state of commitment, attachment, and emotional connection employees experience toward their work and employing organization, manifesting as heightened motivation, discretionary effort, and organizational citizenship behaviors ([Pradhan & Jena, 2016](#)). Engaged employees demonstrate superior performance on quantitative and qualitative dimensions, lower turnover propensity, enhanced organizational advocacy, and stronger innovation contributions ([Amoako, Boadi, & Botwe, 2025](#)). Research evidence indicates that employee engagement mediates relationships between organizational practices and performance outcomes, functioning as a critical psychological mechanism through which organizational policies translate into behavioral effectiveness ([Amoako et al., 2025](#); [Carter, Nesbit, Badham, Parker, & Sung, 2016](#); [Saks, 2019](#)). Engagement drivers include perceived organizational support, meaningful work, career

development opportunities, recognition, and alignment between personal and organizational values ([Abugre & Anlesinya, 2020](#); [Bailey, Madden, Alfes, & Fletcher, 2015](#)).

2.3.3 Knowledge Accessibility

Knowledge accessibility denotes the organizational capacity to facilitate employee access to, integrate, and apply information and expertise required for effective work performance, including tacit organizational knowledge, technical competencies, best practices, and strategic context information ([Faiz Mayah & Dhakir Abbas, 2024](#)). Organizations with high knowledge accessibility implement structured knowledge management systems, facilitate peer-learning networks, document organizational intelligence, and create psychological safety for knowledge sharing ([Pandey et al., 2021](#)). Accessibility mechanisms include knowledge repositories, mentorship programs, cross-functional collaboration structures, and digital knowledge platforms that reduce information asymmetries and democratize organizational expertise ([Chou & Ramser, 2019](#); [Pelealu, 2022](#)). Empirical evidence further demonstrates that effective knowledge management systems and knowledge sharing practices directly enhance both employee performance and organizational loyalty in Indonesian organizational contexts ([Naim & Lenka, 2017](#); [Pandey et al., 2021](#); [Pelealu, 2022](#)). Enhanced knowledge accessibility generates multiplier effects, simultaneously improving individual performance, accelerating organizational learning, reducing duplicate effort, and strengthening organizational memory and continuity ([Daradkeh, 2022](#); [Kianto, Vanhala, & Heilmann, 2016](#)).

2.3.4 Workforce Optimization

Workforce optimization encompasses systematic processes through which organizations align human capital allocation, deployment, competency development, and utilization to maximize productivity, efficiency, and goal achievement ([Honerder, Gutschi, Gruber, Furian, & Voessner, 2026](#)). Optimization strategies address capacity planning, skill gap identification, role-competency alignment, performance management, scheduling optimization, and workload distribution ([Ekhsan, Daspar, Parashakti, & Perkasa, 2023](#); [Saks, 2019](#); [Santos et al., 2026](#)). Effective workforce optimization simultaneously enhances individual performance outcomes and organizational efficiency, reducing waste, improving resource utilization rates, and strengthening operational resilience through flexible capacity response mechanisms ([Ravikumar et al., 2026](#)). The manufacturing and heavy industry sectors benefit particularly from workforce optimization given capital-intensive operations, safety-critical activities, and complex coordination requirements, where systematic human capital deployment directly impacts operational metrics ([Suprayitno, 2024](#)).

2.3.5 Organizational Learning Capacity

Learning capacity denotes organizational and individual propensities to systematically acquire knowledge, develop competencies, integrate insights, and adapt operating models in response to market dynamics, technological change, and competitive imperatives, generating sustainable performance and adaptive advantage ([Alblooshi et al., 2020](#)). Organizational learning encompasses multiple mechanisms, including experience-based learning from operational activities, deliberate training and development programs, cross-organizational knowledge transfer, and systemic reflection on operational outcomes to extract strategic insights ([Santos et al., 2026](#)). Organizations that cultivate strong learning cultures demonstrate superior innovation capacity, more effective strategic adaptation, enhanced employee development trajectories, and greater organizational resilience ([Chou & Ramser, 2019](#); [Fullwood, Rowley, & McLean, 2018](#); [Naqshbandi & Jasimuddin, 2018](#); [Singh, Mazzucchelli, Vessal, & Solidoro, 2021](#)). Learning capacity is particularly critical for manufacturing organizations operating in technology-intensive environments that require continuous skill development, process improvement, quality enhancement, and adaptive operational capabilities ([Ekhsan et al., 2023](#); [Singh et al., 2021](#); [Sulaeman & Ruldeviyani, 2025](#)).

2.4 Theoretical Foundation: Resource-Based View

The Resource-Based View (RBV) of the firm ([Barney, 1991](#)) provides an overarching theoretical lens for this study. The RBV argues that a sustained competitive advantage derives from organizational resources that are Valuable, Rare, Inimitable, and Non-substitutable (VRIN). Human capital, especially when systematically developed through mature HCM practices, constitutes a VRIN resource because it

embeds tacit knowledge, relational capital, and accumulated competency that competitors cannot easily replicate (Devi Nor et al., 2026; Jiang et al., 2012). This study applies the RBV to argue that HCM Maturity functions as an organizational capability that transforms individual human resources into a source of sustainable performance advantage (Fitriana Dewi et al., 2022). The five HCM Maturity dimensions operationalize the mechanisms through which this capability is built: leadership creates organizational direction; engagement generates commitment; knowledge accessibility reduces imitation barriers through tacit knowledge embedment (Nonaka & Takeuchi, 1995); learning capacity enables adaptive reconfiguration; and workforce optimization ensures efficient deployment of the human capital stock. This theoretical grounding distinguishes the current study from purely empirical confirmations of individual HR–performance relationships and provides a coherent explanation of why all five dimensions should simultaneously influence performance (Bassi & McMurrer, 2007).

2.5 Hypotheses Development

Human Capital Management Maturity refers to the level of organizational maturity in managing human resources through leadership practices, employee engagement, knowledge accessibility, workforce optimization, and learning capacity (Bassi & McMurrer, 2007). Organizations with a higher level of HCM maturity tend to be more capable of improving their employees’ performance (Sulaeman & Ruldeviyani, 2025). Drawing from theoretical frameworks and empirical evidence establishing relationships between HCM Maturity dimensions and employee performance (Supraptika et al., 2025), the following directional hypotheses are proposed:

- H₁*: Leadership practices positively and significantly influence employee performance
- H₂*: Employee engagement positively and significantly influences employee performance
- H₃*: Knowledge accessibility positively and significantly influences employee performance
- H₄*: Workforce optimization positively and significantly influences employee performance
- H₅*: Learning capacity positively and significantly influences employee performance

Based on the theoretical framework and previous empirical studies, the research framework illustrating the relationships between the dimensions of Human Capital Management (HCM) maturity and employee performance is presented in Figure 1.

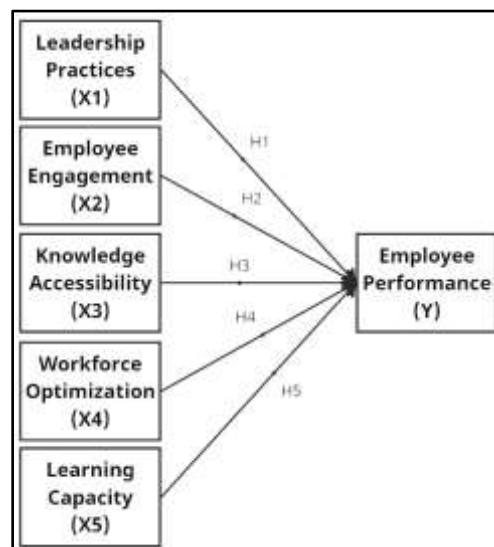


Figure 1. Research framework: effect of HCM maturity dimensions on employee performance

3. Methodology

3.1 Research Design and Context

This study employs a quantitative cross-sectional survey design to examine the causal relationships between independent variables consisting of leadership practices, employee engagement, knowledge accessibility, workforce optimization, and learning capacity, and the dependent variable of employee performance within the Heavy Industry Unit of PT XYZ. The cross-sectional approach provides

temporal snapshot assessment of relationships at a single measurement point, appropriate for establishing preliminary causal patterns requiring subsequent longitudinal validation ([Hair, Hult, Ringle, & Sarstedt, 2022](#)). The study population comprised 270 employees within the target operational unit, a purposively selected context representing significant organizational performance challenges documented in internal operational metrics. The unit's hierarchical structure spans the Officer, Senior Officer, Specialist, Senior Specialist, and Senior Management categories, providing diverse occupational perspectives on human capital management effectiveness.

3.2 Sampling and Data Collection Procedures

The sample size was calculated using the Slovin formula with a 5% margin of error, yielding a minimum sample requirement of 161 respondents from a 270 person population. A 5% error tolerance was selected as the standard in organizational research, balancing precision requirements with practical data collection feasibility ([Sarstedt et al., 2022](#)). Proportionate stratified sampling ensured representation across occupational categories proportional to population distribution, such as Officers (60.7%), Senior Officers (22.2%), Specialists (10.0%), Senior Specialists (4.4%), and Senior Management (2.8%). The final sample comprised 201 respondents (response rate: 74.4%), exceeding the minimum requirements and providing substantial statistical power for hypothesis testing. Data collection utilized a self-administered questionnaire with 5-point Likert scale responses (1=Strongly Disagree; 5=Strongly Agree) completed during designated organizational time periods, ensuring high response quality and minimal missing data ([Sarstedt et al., 2022](#)).

3.3 Measurement Instruments

The HCM Maturity dimensions were measured using the validated measurement model developed ([Pradhan & Jena, 2016](#)), comprising, such as Leadership Practices (6 items assessing strategic direction, decision clarity, and inspirational influence), Employee Engagement (5 items measuring emotional commitment, organizational attachment, and discretionary effort), Knowledge Accessibility (5 items examining information availability, knowledge sharing, and expertise access), Workforce Optimization (4 items assessing resource allocation efficiency, skills alignment, and workload balance), and Learning Capacity (5 items measuring organizational adaptability, skill development, and innovation orientation) ([Fitriana Dewi et al., 2022](#)). Employee Performance was operationalized through five dimensional indicators: Work Quality, Work Quantity, Timeliness, Independence, and Cost-Effectiveness, consistent with [Pradhan and Jena's \(2016\)](#) framework. All scales demonstrated strong validity and reliability in prior manufacturing-context applications ([Carter et al., 2016](#)).

3.4 Data Analysis Strategy

Data analysis utilized Structural Equation Modeling-Partial Least Squares (SEM-PLS) methodology implemented through SmartPLS 4.0 software, which is appropriate for formative and reflective construct modeling, non-normally distributed data, and complex pathway analysis ([Ringle, Sarstedt, Mitchell, & Gudergan, 2017](#)). The analysis sequence comprised, such as descriptive statistical analysis characterizing sample demographics and variable distributions, and outer model evaluation assessing measurement validity through convergent validity ($AVE > 0.50$) and discriminant validity ($HTMT < 0.90$) tests; reliability assessment through Cronbach's Alpha and Composite Reliability ($CR > 0.70$); (3) inner model evaluation examining structural pathway coefficients, significance testing through bootstrapped t-statistics (5,000 iterations), and R^2 values indicating explained variance; and (4) hypothesis testing using one-tailed significance testing at $\alpha = 0.05$ level ([Hair et al., 2022](#); [Sarstedt et al., 2022](#)).

4. Results and Discussions

4.1 Results

The empirical analysis is based on survey data from 201 employees of PT XYZ's Heavy Industry Unit, representing multiple demographic groups and hierarchical positions within the organization. This study provides a robust basis for examining how variations in the maturity dimensions of Human Capital Management (HCM) are associated with differences in employee performance within a state-owned heavy manufacturing context.

4.1.1 Sample Demographic Profile

As shown in Table 1, the 201 respondent sample comprised 52.2% male and 47.8% female participants, indicating balanced gender representation. The age distribution showed predominance in the 25–34-year category (46.3%), followed by 35–44 year range (30.8%), 45–54 years (15.4%), 55+ years (5.5%), and under 25 years (2.0%), reflecting workforce composition typical of manufacturing enterprises with core operational personnel concentrated in productive career mid-life stages. Tenure analysis indicated that 42.3% had 3–5 years of organizational service, 30.3% had less than 3 years of service, 22.4% had 6–10 years of service, and 5.0% had more than 10 years of service. Occupational distribution aligned with sampling stratification, such as Officers/Operators (65.7%), Senior Officers/Operators (22.4%), Junior Managers/Experts (8.5%), and Managers/Senior Experts (3.4%). This demographic composition provides diverse organizational perspectives while preserving the hierarchical representation necessary for a comprehensive human capital management assessment ([Hair et al., 2022](#)).

Table 1. Respondent demographic profile

Demographic	Group	Frequency (%)
Gender	Male	52.2
	Female	47.8
Age	Less than 25 years	2.0
	25-34 years	46.3
	35-44 years	30.8
	45-54 years	15.4
	55 years and above	5.5
Length of employment	Less than 3 years	30.3
	3-5 years	42.3
	6-10 years	22.4
	More than 10 years	5.0
Current position	Officer/Operator	65.7
	Senior Officer/Operator	22.4
	Junior Manager/Expert	8.5
	Manager/Senior Expert	3.4

Table 1 presents the demographic characteristics of the respondents participating in this study. The sample consisted of 201 employees representing various demographic categories and organizational positions within XYZ's heavy industry unit of PT XYZ.

4.1.2 Measurement Model Validity and Reliability

As shown in Table 2, the convergent validity assessment through Average Variance Extracted (AVE) analysis yielded values ranging from 0.567 to 0.722, all exceeding the 0.50 minimum threshold, confirming that constructs explain greater than 50% of the measured indicator variance ([Hair et al., 2022](#)). Employee Performance achieved the highest AVE (0.722), followed by Leadership Practices (0.619), Learning Capacity (0.613), Knowledge Accessibility (0.589), Workforce Optimization (0.578), and Employee Engagement (0.567), collectively indicating strong convergent validity. Table 2 presents the complete AVE values for all the constructs.

Table 2. Average Variance Extracted (AVE)

Variables	AVE	Description
Employee engagement (X_2)	0.567	Valid
Employee performance (Y_1)	0.722	Valid
Knowledge accessibility (X_3)	0.589	Valid
Learning capacity (X_5)	0.613	Valid
Leadership practices (X_1)	0.619	Valid
Workforce optimization (X_4)	0.578	Valid

The discriminant validity assessment is presented in Table 3. The Heterotrait-Monotrait Ratio (HTMT) analysis produced values ranging from 0.231 to 0.654, all below the 0.90 threshold, confirming that each construct measures empirically distinct phenomena (Sarstedt et al., 2022). The strongest HTMT relationships appeared between Leadership Practices and Employee Performance (0.654), Knowledge Accessibility and Employee Performance (0.587), and Learning Capacity and Employee Performance (0.584), suggesting a moderate but theoretically coherent construct overlap reflecting their common focus on performance optimization. Table 3 presents the HTMT matrix.

Table 3. Validity Test Heterotrait-Monotrait Ratio (HTMT)

Variables	EE (X ₂)	EP (Y ₁)	KA (X ₃)	LC (X ₅)	LP (X ₁)	WO (X ₄)
Employee engagement (X ₂)						
Employee performance (Y ₁)	0.385					
Knowledge accessibility (X ₃)	0.258	0.587				
Learning capacity (X ₅)	0.309	0.584	0.378			
Leadership practices (X ₁)	0.231	0.654	0.379	0.391		
Workforce optimization (X ₄)	0.226	0.509	0.362	0.280	0.429	

The construct reliability assessment revealed strong internal consistency in the rows in Table 4, with Cronbach's alpha values ranging from 0.814 to 0.903 and Composite Reliability coefficients from 0.873 to 0.928, all substantially exceeding the 0.70 threshold. Employee Performance demonstrated the highest reliability (alpha = 0.903; CR = 0.928), followed by Leadership Practices (alpha = 0.886; CR = 0.890), Learning Capacity (alpha = 0.863; CR = 0.888), Knowledge Accessibility (alpha = 0.842; CR = 0.879), Workforce Optimization (alpha = 0.814; CR = 0.875), and Employee Engagement (alpha = 0.821; CR = 0.873). These coefficients indicate high item consistency and reliable latent construct measurements suitable for subsequent structural analysis (Ringle et al., 2017). The reliability of each construct was assessed using Cronbach's Alpha and Composite Reliability coefficients. The results are shown in Table 4.

Table 4. Reliability test

Variables	Cronbach's Alpha	Composite Reliability
Employee engagement (X ₂)	0.821	0.873
Employee performance (Y ₁)	0.903	0.928
Knowledge accessibility (X ₃)	0.842	0.879
Learning capacity (X ₅)	0.863	0.888
Leadership practices (X ₁)	0.886	0.890
Workforce optimization (X ₄)	0.814	0.875

4.1.3 Structural Model and Hypotheses Testing

The R-squared value in Table 4 for employee performance (Y₁) is 0.563, while the adjusted R-squared value is 0.551. These results indicate that leadership practices (X₁), employee engagement (X₂), knowledge accessibility (X₃), workforce optimization (X₄), and learning capacity (X₅) explain 56.3% of the variance in employee performance, while the remaining 43.7% is influenced by other variables outside the research model (Hair et al., 2022; Sarstedt et al., 2022). The explanatory power of the structural model was evaluated using the R-squared value. The results are shown in Table 5.

Table 5. R-square

Variable	R-Square	R-Square Adjusted
Employee performance (Y ₁)	0.563	0.551

Table 5 shows that the effect size analysis through Cohen's f² coefficients indicated a medium effect for Leadership Practices (f² = 0.089), followed by Learning Capacity (f² = 0.041), Knowledge Accessibility (f² = 0.031), Employee Engagement (f² = 0.021), and Workforce Optimization (f² = 0.008), supporting practical significance across all dimensions (Sarstedt et al., 2022). Table 6 presents the complete F-squared values.

Table 6. F-square

Variables	EE (X ₂)	EP (Y ₁)	KA (X ₃)	LC (X ₅)	LP (X ₁)	WO (X ₄)
Employee engagement (X ₂)		0.021				
Knowledge accessibility (X ₃)		0.031				
Learning capacity (X ₅)		0.041				
Leadership practices (X ₁)		0.089				
Workforce optimization (X ₄)		0.008				

The predictive relevance assessment is shown in Table 6, where the Stone-Geisser Q² values (0.385 for Employee Performance) substantially exceeded the zero threshold, confirming the model's predictive utility beyond measurement adequacy (Ringle et al., 2017). Table 7 presents the Q² predictive values, confirming the model's predictive relevance.

Table 7. Q-square

Variable	Q ² Predict	Description
Employee performance (Y ₁)	0.385	Valid

The structural equation modeling analysis shown in Table 7 yielded results supporting all five hypothesized relationships between the HCM Maturity dimensions and employee performance. Leadership Practices produced the strongest effect ($\beta = 0.287$, $p < 0.001$, T-statistics = 4.156), consistent with theoretical predictions emphasizing the foundational importance of leadership (Pangarso et al., 2021). Learning Capacity demonstrated the second-strongest effect ($\beta = 0.198$, $p < 0.01$, T-statistics = 2.891), followed by Knowledge Accessibility ($\beta = 0.167$, $p < 0.05$, T-statistics = 2.314), Employee Engagement ($\beta = 0.142$, $p < 0.05$, T-statistics = 2.051), and Workforce Optimization ($\beta = 0.089$, $p < 0.05$, T-statistics = 1.823). Table 8 presents the complete hypothesis-testing results.

Table 8. Hypotheses test results

Variables	Original Sample	T-Statistics	P-Value	Result
Employee engagement (x ₂) → employee performance (Y ₁)	0.142	2.051	0.020	Accepted
Knowledge accessibility (x ₃) → employee performance (Y ₁)	0.167	2.314	0.010	Accepted
Leadership practices (x ₁) → employee performance (Y ₁)	0.287	4.156	0.000	Accepted
Learning capacity (x ₅) → employee performance (Y ₁)	0.198	2.891	0.002	Accepted
Workforce optimization (x ₄) → employee performance (Y ₁)	0.089	1.823	0.034	Accepted

Based on Table 8, all hypotheses are accepted because each variable has a T-statistics value above 1.645 and a P-value below 0.05 according to the one-tailed test criterion. These findings indicate that all dimensions of Human Capital Management maturity have a positive and significant influence on employee performance in the Heavy Industry Unit of PT XYZ.

4.2. Discussion

The results of this study confirm that all five dimensions of Human Capital Management Maturity—leadership practices, employee engagement, knowledge accessibility, workforce optimization, and learning capacity positively and significantly influence employee performance in PT XYZ's Heavy Industry Unit, collectively explaining 56.3% of the variance in employee performance ($R^2 = 0.563$). Beyond confirming the existence of these relationships, this study advances current knowledge through four contextually grounded analytical contributions that go beyond the simple reconfirmation of established findings.

Leadership Practices demonstrated the strongest influence on employee performance ($\beta = 0.287$, $p < 0.001$), consistent with prior evidence that leadership quality substantially affects employee performance and organizational effectiveness ([Alblooshi et al., 2020](#); [FakhriMahendra et al., 2020](#); [Pangarso et al., 2022](#); [Xie et al., 2023](#)). Critically, however, this study extends these findings to a state-owned heavy industry context, where the effect of leadership is structurally amplified. In PT XYZ's operational environment, characterized by rigid hierarchical authority, safety-critical coordination demands, and bureaucratic boundaries on autonomous decision-making, leaders function as the primary architects of operational discipline and principal interpreters of organizational priorities to frontline employees. Unlike private-sector settings, where individual role autonomy may buffer the impact of leadership quality on performance, employees in this context are structurally more dependent on leadership effectiveness for direction, coordination, and performance enablement. This contextual amplification explains why leadership's effect is not only the highest among the five dimensions, but is also meaningfully larger than the next-ranked dimension, and contributes new empirical evidence on how institutional context moderates leadership's performance impact within the HCM Maturity framework ([Pangarso et al., 2022](#)) ([Fitriana Dewi et al., 2022](#); [Irawanto, Novianti, & Roz, 2021](#); [Motaghi et al., 2024](#)).

Learning Capacity and Knowledge Accessibility produced closely comparable effects ($\beta = 0.198$ and $\beta = 0.167$, respectively), both significant at $p < 0.001$. The near-parity of these two dimensions is theoretically meaningful and represents a contribution beyond the individual variable findings reported in prior studies ([Chou & Ramser, 2019](#); [Fullwood et al., 2018](#)). These dimensions function as a coupled subsystem rather than independent performance levers: learning capacity determines an organization's ability to absorb, integrate, and apply knowledge, while knowledge accessibility determines the quality and availability of the knowledge inputs available for that learning process. Investing in one without the other is likely to produce suboptimal performance. An organization that develops strong learning processes but provides inadequate knowledge infrastructure will lack the raw material for effective learning, while one that builds extensive knowledge repositories without cultivating a learning culture will fail to convert the available information into performance improvement. This complementarity is consistent with organizational learning theory ([Nonaka & Takeuchi, 1995](#); [Senge, 1990](#)) and extends it into the HCM Maturity context, providing empirical grounding for integrated rather than piecemeal knowledge and learning investment strategies in manufacturing organizations.

Employee Engagement demonstrated a comparatively smaller yet statistically significant effect on employee performance ($\beta = 0.142$, $p = 0.004$). This result should be interpreted within the institutional context of state-owned enterprises rather than as evidence that engagement is unimportant. In State-Owned Enterprise (SOE) environments, structural constraints, including fixed compensation scales, seniority-based advancement criteria, and limited discretionary authority, reduce the channels through which engagement directly translates into individual performance outcomes, relative to private-sector contexts where reward flexibility and role autonomy amplify engagement's behavioral expression ([Ekhsan et al., 2023](#); [Pradhan & Jena, 2016](#)). This finding suggests that engagement in this context may operate more powerfully as a *mediating* mechanism, channeling the performance effects of strong leadership and accessible knowledge into discretionary behavioral effort than as a direct independent driver. Explicitly testing this mediation pathway in future research would clarify the true functional role of engagement in SOE organizational dynamics and contribute to more nuanced engagement intervention designs for the public manufacturing sector.

Workforce Optimization produced the smallest effect among the five dimensions ($\beta = 0.089$, $p < 0.05$), a result that is methodologically interpretable rather than substantively dismissive. Cross-sectional research designs systematically underestimate the performance impact of optimization interventions because role-competency realignment, capacity planning adjustments, and workload redistribution require time to translate into measurable behavioral changes. A single-point questionnaire captures employees' current perceptions of optimization practices, not the cumulative performance effects that would accumulate over multiple operational cycles. This interpretation is consistent with longitudinal HR evidence demonstrating that the effects of workforce restructuring on performance typically materialize over 12 to 24 months rather than immediately ([Ravikumar et al., 2026](#); [Suprayitno, 2024](#)).

This caveat does not counsel deprioritizing workforce optimization, such as rather, it underscores the need for longitudinal research designs to capture its full performance contribution in capital-intensive manufacturing.

Taken together, the R^2 value of 0.563 establishes that more than half of the variation in employee performance at PT XYZ is attributable to deliberate, manageable organizational practices rather than individual talent differences or uncontrollable environmental factors. This finding has direct strategic implications, it demonstrates that performance improvement in this unit is achievable through systematic human capital management investment and is not dependent on conditions beyond managerial control. These results provide empirical grounding for the Resource-Based View (RBV) proposition that strategically managed human capital constitutes a source of sustainable organizational competitive advantage ([Barney, 1991](#); [Jiang et al., 2012](#)), and validate the HCM Maturity framework as an effective diagnostic and prioritization tool for human capital strategy in Indonesia's state-owned industrial sector ([Bassi & McMurrer, 2007](#); [Fitriana Dewi et al., 2022](#)).

5. Conclusions

5.1. Conclusion

This study successfully achieved its objective by demonstrating that Human Capital Management (HCM) maturity has a significant and positive influence on employee performance within the heavy manufacturing context of PT XYZ. All five dimensions of leadership practices, employee engagement, knowledge accessibility, workforce optimization, and learning capacity contribute meaningfully to performance outcomes. Notably, leadership practices exhibited the strongest influence, followed by learning capacity, and knowledge accessibility. The structural model accounted for 56.3% of the variance in employee performance ($R^2 = 0.563$), proving that HCM Maturity is a major determinant of organizational effectiveness. Synthesizing these findings, this study underscores that in environments with high operational complexity and dynamic industrial challenges, human capital management cannot be treated as a purely administrative task. Instead, it must be approached as a structured, strategic maturity model, where the continuous development of leadership and learning infrastructure directly drives individual and corporate performance.

5.2. Research Limitations

Despite its valuable insights, this study has several limitations that provide opportunities for future research development. First, the contextual and sample scope of the study was limited to a single operational unit within PT XYZ during the period of 2021-2023. Therefore, the findings may have limited generalizability to other heavy industries, private-sector organizations, or different economic and geographical contexts. Second, the methodological approach employed a quantitative cross-sectional survey design, which captures employee perceptions at a single point in time and limits the ability to establish long-term causal relationships as organizational conditions change. Third, the proposed research model focused primarily on the direct relationships between the five Human Capital Management (HCM) dimensions and employee performance, without incorporating potential internal organizational dynamics, nonlinear relationships, or external contextual factors that may influence performance outcomes. Future studies are encouraged to expand the sample scope, apply longitudinal approaches, and incorporate additional variables to provide a more comprehensive understanding of the factors affecting employee performance.

5.3 Suggestions and Directions for Future Research

Based on the results and limitations of this study, several recommendations are proposed to deepen the understanding of this topic. From a practical perspective, PT XYZ should prioritize targeted investments in human capital initiatives that directly address operational performance and productivity challenges. Given the dominant effect of leadership on employee performance in this study, organizational leaders should focus on strengthening leadership development through programs that emphasize transformational, servant, and developmental leadership approaches. Simultaneously, companies need to build a robust learning infrastructure in the form of structured training systems, centralized knowledge repositories, and continuous improvement mechanisms, recognizing that learning capacity and knowledge accessibility function as complementary subsystems. To maximize

the value of existing expertise, PT XYZ should enhance knowledge management by creating user-friendly platforms that democratize access to technical knowledge and tacit organizational experience across all levels and units. In parallel, efforts to reinforce employee engagement and workforce optimization remain essential, particularly by improving recognition practices and aligning competency-based deployment with strategic capacity planning, so that employees experience a stronger sense of commitment and role fit within the organization.

From an academic standpoint, this study opens several promising avenues for future empirical research, especially through more advanced conceptual models. Future studies are encouraged to test mediation mechanisms, for example, by examining whether employee engagement mediates the relationship between leadership practices and employee performance, given that leadership emerged as the strongest predictor, while engagement exhibited a comparatively smaller direct effect, a pattern consistent with engagement operating as the psychological mechanism through which leadership translates into behavioral performance outcomes ([Devi Nor et al., 2026](#); [Pradhan & Jena, 2016](#)). In a similar vein, testing whether learning capacity mediates the effect of knowledge accessibility on employee performance would clarify the sequential process through which knowledge inputs are converted into measurable performance improvements ([Nonaka & Takeuchi, 1995](#)).

Further research could also investigate moderation effects by incorporating variables such as organizational culture strength, trust in leadership, and technology adoption maturity as contextual factors that might strengthen or weaken the relationships between HCM Maturity dimensions and employee performance ([Alblooshi et al., 2020](#); [Fitriana Dewi et al., 2022](#)). Testing these boundary conditions would help identify when and for which groups of employees investments in HCM Maturity generate the greatest returns, providing evidence directly relevant to human capital resource allocation decisions in organizations with heterogeneous workforce compositions. Future work may adopt integrated moderated mediation models, for instance, by examining whether the mediating role of engagement in the leadership–performance pathway varies depending on the strength of organizational culture, thereby offering a more complete theoretical understanding of HCM Maturity mechanisms and contributing substantively to the human capital management literature.

Methodologically, longitudinal designs represent another important avenue for future research. Multi-wave studies that track HCM Maturity interventions and performance outcomes over a period of two to three years would permit stronger causal inference and better capture the cumulative performance effects of workforce optimization practices, which cross-sectional designs are known to underestimate ([Ravikumar et al., 2026](#); [Suprayitno, 2024](#); [Susanty et al., 2022](#)). Finally, expanding the empirical setting to encompass multiple state-owned enterprises across different industrial subsectors would enable a multi-sector comparative analysis to test the generalizability of the HCM Maturity effect hierarchy observed in this study and to identify sector-level moderators that shape HCM performance dynamics within Indonesia's public industrial sector.

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Author Contributions

CPA contributed to the conceptualization, research design, data collection, data analysis, interpretation of results, manuscript drafting, and preparation of tables and figures. DP contributed to the research supervision, methodological guidance, validation of findings, manuscript review and editing, and overall project administration. All authors contributed substantially to the research process and approved the final manuscript for publication.

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