

HOW REGIONAL HUMAN RESOURCE CAPABILITIES AND COMPENSATION GOVERNANCE SHAPE LABOR PRODUCTIVITY ACROSS INDONESIAN PROVINCES

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ABSTRACT: Regional disparities in labor productivity across Indonesia reflect differences in how provincial systems build, mobilize, reward, and retain workforce capacity. This study examines labor productivity as an outcome of regional human resource architecture shaped by two managerial levers: capability formation and compensation design. Using publicly available 2024 data from Badan Pusat Statistik and the Ministry of Manpower for 38 Indonesian provinces, the study uses the Human Development Index as a proxy for workforce capability and the Provincial Minimum Wage as a proxy for compensation governance. Two ordinary least squares models, linear and log-linear, estimate their association with labor productivity. The indicators jointly explain 55.2% of cross-provincial variation, with both effects significant at $p < 0.001$. Robustness checks confirm that the findings are not driven by extreme cases. The study contributes a managerial typology of provincial productivity systems: dual deficit, untapped potential, compensation without depth, and integrated systems.

Keywords: Regional Human Resource Management; Labor Productivity; Human Development Index; Compensation Governance; Indonesia

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INTRODUCTION

Labor productivity in Indonesia presents a concrete managerial problem, not merely a macroeconomic statistic. In 2024, labor productivity across the 38 Indonesian provinces ranged from approximately IDR 13.68 million per worker per year in Papua Pegunungan to IDR 421.13 million in DKI Jakarta. This difference exceeds thirty times. The disparity is too large to be explained only by sectoral composition, natural resources, or regional income structure. The same pattern appears in the human and institutional indicators that shape the workforce. The Human Development Index ranged from 54.43 in Papua Pegunungan to 84.15 in DKI Jakarta, while the Provincial Minimum Wage ranged from IDR 2.04 million per month in Central Java to IDR 5.07 million in DKI Jakarta. These figures show that Indonesian provinces do not operate from the same workforce base. Some provinces combine weak human development with low compensation floors. Others show stronger capability but limited wage governance. A smaller group appears to combine stronger capability formation with higher compensation standards. The managerial problem is therefore clear: Indonesia's provincial productivity gap reflects unequal regional capacity to build, mobilize, reward, and retain productive labor.

This problem matters because labor productivity is often read through capital intensity, technology, industrial structure, agglomeration, or spatial policy. These explanations remain powerful, but they do not fully capture the managerial architecture behind productive labor. Regional productivity is shaped by density, agglomeration, and place-based institutional capacity, yet these spatial forces work through the quality of people, firms, public institutions, and labor-market coordination (Duranton & Puga, 2020; Ehrlich & Overman, 2020; Rodríguez-Pose & Ganau, 2022). A province does not receive productivity automatically from growth. It builds productivity through repeated decisions about education, health, workforce preparation, wage-setting, institutional coordination, and employment retention. These decisions accumulate into a regional human resource system. The system may be strong, weak, fragmented, or imbalanced. A province with higher human development has a broader base of worker capability, but this capability may not translate into productivity without adequate labor-market incentives. A province with a higher minimum wage may create stronger compensation signals, but wage pressure alone may fail without a deep capability base. Regional productivity should therefore be read as the visible output of an HR architecture that links workforce capability and compensation governance.

Recent human capital scholarship strengthens this reading. Human capital is no longer treated only as years of schooling or individual skill stock. It is increasingly understood as a layered capacity that includes cognitive endurance, occupational adaptability, task formation, and the institutional conditions that allow capability to become productive work (Autor et al., 2024; Brown et al., 2025; Deming, 2022; Porzio et al., 2022). This view suits the Indonesian provincial context. HDI is not merely a welfare statistic. It is a reasonable proxy for the capability platform from which regional employers, public agencies, and productive sectors draw labor. A low-HDI province faces a productivity constraint before the worker enters the workplace. A high-HDI province has a stronger capability base, but capability still needs matching, deployment, and retention. This is why the province becomes a relevant managerial unit. It contains the institutional routines that shape education, health, employability, mobility, and work readiness. In this sense, HDI captures the capability-formation side of the regional productivity system.

Strategic human capital research also supports the shift from individual capability to system architecture. The recent literature treats human capital as a collective resource that must be acquired, developed, coordinated, and deployed through systems, not merely owned by individuals (Ray et al., 2023; Wright, 2021). This logic matters for regional analysis because provinces differ in their ability to transform population-level capability into productive workforce performance. Capability does not create value in isolation. It must be matched to tasks, firms, sectors, and managerial processes. Recent evidence on managers and worker allocation shows that productivity depends on how human capability is assigned and governed inside work systems, not only on whether skill exists in the labor pool (Minni, 2026). This insight is useful beyond the firm. At the provincial level, workforce capability must be connected with jobs, compensation floors, sectoral demand, and institutional coordination. The productivity gap among provinces is therefore also a gap in regional human resource management maturity.

Compensation governance forms the second side of the argument. Recent minimum wage research shows that wage floors can reshape labor-market outcomes through employment

adjustment, reallocation, worker sorting, prices, and firm behavior (Dube & Lindner, 2021; Dustmann et al., 2022; Kunaschk, 2024). This does not mean that a higher minimum wage mechanically increases productivity. The mechanism is more managerial. A wage floor can strengthen effort, retention, recruitment, and labor discipline. It can also pressure firms to reorganize work, use labor more efficiently, or compete for better workers. Yet compensation without capability depth can create a cost burden rather than a productivity system. Capability without adequate compensation can produce underused talent, outmigration, and weak retention. This makes UMP analytically useful. It is not only a wage regulation. It is a proxy for the province's formal compensation architecture. Its productivity relevance depends on how it interacts with the capability base represented by HDI.

This framing also responds to a gap in the Indonesian management literature. Studies on regional productivity, wages, and human development often treat these variables as separate economic indicators. They rarely translate them into an integrated management framework that explains how provinces develop and govern productive labor. Regional studies show that productivity depends on spatial structure, local labor markets, agglomeration, and institutional context (Meekes & Hassink, 2023; Ouwehand et al., 2022). The Indonesian case adds a sharper management question: how do provincial capability formation and compensation governance jointly explain workforce productivity after the expansion to 38 provinces? The creation of the new Papua provinces after the 2022 administrative reorganization makes this question empirically timely. Current data allow productivity, HDI, and UMP to be examined within Indonesia's complete post-reorganization geography. This study uses 2024 public data from Badan Pusat Statistik and the Ministry of Manpower to examine all 38 provinces. It estimates the association of HDI and UMP with labor productivity through linear and log-linear OLS specifications, supported by influence diagnostics, robust standard errors, and sensitivity analysis excluding extreme provincial cases. The purpose is not only to test statistical association. The purpose is to convert public indicators into a diagnostic map of regional HR productivity systems.

The theoretical contribution of this study lies in reframing provincial labor productivity as an outcome of regional human resource architecture. The study connects recent human capital, strategic human capital, regional productivity, and minimum wage scholarship into one management-based explanation of provincial productivity. HDI is interpreted as a proxy for capability formation, UMP as a proxy for compensation governance, and labor productivity as the observable performance outcome of their combined architecture. This synthesis moves the discussion beyond the usual macroeconomic reading of productivity and places it within strategic human resource management, public-sector HR governance, and workforce performance theory. The study also contributes a typology of provincial productivity systems: dual deficit, untapped potential, compensation without depth, and integrated systems. This typology gives theory a managerial form. It shows that provinces differ not only in productivity level, but also in the configuration of the human resource system that produces or constrains productivity.

THEORETICAL REVIEW

A Regional Human Resource Productivity Perspective

This study develops a regional human resource productivity perspective by reading Human Capital Theory and Efficiency Wage Theory as complementary rather than separate explanations of productivity. Human Capital Theory explains how a region builds the productive capacity of its workforce through education, health, training, and learning infrastructure, while Efficiency Wage Theory explains how compensation institutions help mobilize that capacity through effort, retention, worker selection, and employment discipline. In this perspective, provincial labor productivity is not treated only as the result of capital, technology, industrial structure, or regional income concentration. It is treated as the observable performance outcome of a regional HR architecture. The first arm of this architecture is capability formation, namely the extent to which the provincial system produces workers with the skills, health, adaptability, and learning capacity required for productive activity. The second arm is compensation design, namely the extent to which the provincial system establishes a wage floor that can retain, motivate, and activate the capability already built. Recent strategic human capital scholarship supports this system-level reading because human capital becomes productive only when it is acquired, developed, coordinated, and

deployed through institutions rather than merely accumulated at the individual level (Wright, 2021; Ray et al., 2023). Recent work on human capital also shows that capability is not reducible to schooling alone, but includes broader cognitive, occupational, and adaptive capacities that shape how workers respond to changing productive tasks (Deming, 2022; Porzio et al., 2022; Brown et al., 2025).

This framing makes explicit a managerial reading that remains underdeveloped in conventional regional productivity analysis. A province may possess a relatively strong human development base, but that base may not translate into high productivity when the compensation system fails to retain or motivate workers. This is the condition of capability without mobilization. A province may also set a relatively high compensation floor, but that floor may not generate commensurate productivity when the underlying workforce lacks the education, health, and skill base required to respond productively. This is the condition of compensation without depth. Stronger productivity outcomes require both arms of the system to operate together. The regional HR governance problem, therefore, is not simply to increase education or wages in isolation. It is to align capability formation and compensation governance so that the workforce has both the capacity to perform and the institutional incentive to convert that capacity into delivered output. This argument also fits recent minimum-wage scholarship, which shows that wage floors can influence effort, retention, worker sorting, firm adjustment, and productivity, but that these effects depend on the structure of the labor market and the capability base available to firms (Dube & Lindner, 2021; Dustmann et al., 2022; Coviello et al., 2022; Azar et al., 2024).

Human Capital Theory conceptualizes expenditure on education, training, and health as an investment that accumulates into workforce capability (Schultz, 1961; Becker, 1964). The theory broke from earlier views that treated labor as homogeneous and instead positioned workers' skills, knowledge, health, and learning capacity as productive assets whose returns can be measured. Endogenous growth theory extended this logic by arguing that capability accumulation can sustain long-run productivity through knowledge creation, innovation, and learning spillovers (Romer, 1990). In the provincial context, this theoretical logic is especially relevant because each province operates as a territorial system that shapes the quality of its future workforce through schools, health systems, labor-market institutions, public investment, and employment opportunities. Human capability is therefore not only an individual asset. It is also a regional asset. It determines how effectively firms, public organizations, and local industries can absorb technology, improve work processes, and move toward higher-value activities. Recent evidence on human capital and structural transformation reinforces this view by showing that productive upgrading depends on the human side of economic change, including the capacity of workers to move across tasks, sectors, and organizational forms (Porzio et al., 2022; Autor et al., 2024).

Within the Indonesian provincial context, the Human Development Index is the most comprehensive publicly available indicator of regional workforce capability. It combines life expectancy, expected and mean years of schooling, and real per capita expenditure, and it is published annually for all provinces by Badan Pusat Statistik. In this study, HDI is not read merely as a broad development or welfare index. It is read as a proxy for the capability-formation side of the regional HR system. A higher HDI indicates that a province has a stronger foundation for productive labor because its population has better health, stronger educational exposure, and a better basic standard of living. A lower HDI indicates that the province faces a capability constraint before the worker even enters the workplace. This does not mean that HDI perfectly measures skill, work discipline, vocational readiness, or firm-specific competence. It does not. HDI also contains an income-related component that may partly overlap with productivity, and this limitation is acknowledged in the later section of the study. Even so, HDI remains theoretically defensible as a provincial capability proxy because it captures the broad human conditions that make productive labor possible.

H1: Provincial workforce capability, proxied by the Human Development Index, is positively associated with labor productivity across Indonesian provinces.

Compensation Governance and the Provincial Minimum Wage

Efficiency Wage Theory argues that wages above the market-clearing level can raise productivity by strengthening effort, reducing shirking, lowering turnover, attracting better workers, and creating a more relational employment arrangement (Akerlof & Yellen, 1986; Shapiro & Stiglitz,

1984). This perspective changes the managerial meaning of wages. Wages are not only production costs. They are also governance instruments that influence how workers behave, how firms recruit, how long employees stay, and how much effort workers are willing to deliver. Recent international evidence at the firm and worker level supports this productivity-enhancing interpretation of wage floors, showing that higher wages can affect individual productivity, worker retention, and labor-market adjustment (Coviello et al., 2022; Ku, 2022; Gao et al., 2026). Other recent studies also show that minimum wages can reshape employment composition, worker sorting, firm behavior, and local labor-market outcomes, which makes the wage floor relevant to productivity governance rather than only to social protection (Dube & Lindner, 2021; Jardim et al., 2022; Dustmann et al., 2022; Azar et al., 2024).

In Indonesia, the Provincial Minimum Wage is set annually under Government Regulation 51 of 2023 with reference to inflation, economic growth, and a regional labor-market index. UMP is a regulatory floor, not an average wage and not a complete measure of compensation practice. Still, it is the most visible institutional expression of each provincial system's minimum compensation standard. For that reason, this study reads UMP as a proxy for compensation governance. A higher UMP may signal a stronger institutional commitment to the minimum value of labor, a stronger retention environment, and a stronger pressure on firms to organize work more productively. Yet this mechanism should not be read mechanically. A higher wage floor does not automatically generate productivity. Its effect depends on whether the province has the capability base needed to convert compensation pressure into productive output. Where capability is strong, UMP may help retain, motivate, and mobilize skilled workers. Where capability is weak, UMP may become a cost signal without sufficient productive depth. This is why compensation governance must be interpreted together with capability formation rather than as a stand-alone wage regulation.

H2: Provincial compensation governance, proxied by the Provincial Minimum Wage, is positively associated with labor productivity across Indonesian provinces.

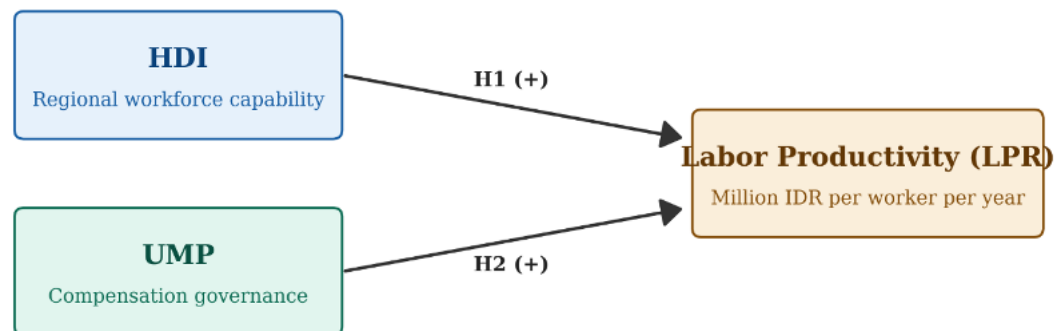


Figure 1. Conceptual Framework

RESEARCH METHOD

This study employs a cross-sectional explanatory quantitative design covering all 38 Indonesian provinces in 2024. The design fits the study's purpose because the analysis examines the contemporaneous association between the Human Development Index, the Provincial Minimum Wage, and labor productivity at one point in time. The year 2024 is also analytically relevant because it reflects the most recent administrative configuration after the 2022 reorganization of Papua, which expanded Indonesia's provincial structure from 34 to 38 provinces. The study relies exclusively on data published by official Indonesian government agencies, which strengthens replicability, transparency, and independent verification. Each variable can be traced to a publicly available administrative source, and the analytical procedure can therefore be repeated by other researchers using the same provincial data.

The unit of analysis is the province, and the study uses a complete census of all 38 Indonesian provinces as of 2024. Labor productivity is measured as gross regional domestic product divided by the number of employed persons, expressed in million rupiah per worker per year, as published by the Ministry of Manpower for 2024. The Human Development Index is taken from the 2024 provincial HDI release published by Badan Pusat Statistik on 15 November 2024.

The Provincial Minimum Wage refers to the 2024 wage schedule set under Government Regulation 51 of 2023 and effective from 1 January 2024. Because provincial labor productivity is right-skewed, the natural logarithm of labor productivity, denoted as LN(LPR), is also computed. This transformation allows the study to estimate a log-linear specification alongside the linear model, thereby reducing the influence of extreme productivity values and improving the interpretability of proportional differences across provinces.

Ordinary least squares is used as the main estimation technique because the study examines direct associations across a complete provincial census with a small number of predictors. Since the dataset covers the full population of Indonesian provinces rather than a random sample, the regression coefficients are interpreted primarily as descriptive summaries of cross-provincial association rather than as estimates generalized from a sample to a larger population. OLS is appropriate for this purpose because it provides a transparent, interpretable, and widely understood summary of how HDI and UMP are associated with labor productivity across the provincial system. More complex estimators, such as GMM, instrumental-variable models, or panel estimators, are not suitable for the present design because they require time variation, valid instruments, or larger data structures that are not available in a single-year provincial census. Nonparametric alternatives would also reduce interpretability without solving the main inferential limitation created by the small number of provincial units.

The small-N structure is addressed through diagnostic and robustness procedures rather than by replacing OLS with a less interpretable estimator as in Table 1. The analysis therefore reports heteroskedasticity-consistent robust standard errors, influence diagnostics, and a sensitivity analysis excluding the two most extreme provinces. These procedures are used to assess whether the estimated associations are stable or driven by influential cases, especially given the large productivity distance between the Province of DKI Jakarta and Papua Pegunungan, Indonesia. The empirical strategy is therefore deliberately modest. It does not claim causal identification. It provides a replicable cross-sectional diagnosis of how provincial workforce capability and compensation governance are associated with labor productivity in Indonesia's 2024 provincial system.

Table 1. Operationalization of Variables

Code	Variable	Type	Operational Definition	Source
LPR	Labor Productivity	Dependent	GRDP / number of employed persons (Million IDR/worker/year)	Indonesian Kemnaker (2024)
HDI	Human Development Index	Independent	Composite of life expectancy, education, per capita expenditure (0–100)	Indonesian BPS (Nov 2024)
UMP	Provincial Minimum Wage	Independent	Annual provincial minimum wage rate (Million IDR/month)	Indonesian Kemnaker, GR 51/2023
LN(LPR)	Log-transformed LPR	Dependent (alt.)	Natural logarithm of LPR for log-linear specification	Author computation

Two regression specifications are estimated, both consistent with the conceptual framework in Figure 1 (two direct effects, no mediation, no controls):

$$\begin{aligned} \text{Model 1: } LPR_i &= \alpha + \beta_1 \cdot HDI_i + \beta_2 \cdot UMP_i + \varepsilon_i \quad \dots\dots\dots (1) \\ \text{Model 2: } LN(LPR)_i &= \alpha + \beta_1 \cdot HDI_i + \beta_2 \cdot UMP_i + \varepsilon_i \quad \dots\dots\dots (2) \end{aligned}$$

where i indexes provinces and ε is the error term. Both models are estimated by ordinary least squares with heteroskedasticity-consistent (HC1) robust standard errors reported alongside conventional standard errors.

Three inferential limits of the design are stated up front and reinforce the interpretation of the results in Section 5. First, the data are a complete provincial census, so the regression coefficients describe the population of provinces rather than support inferences to a wider population. Second, the cross-sectional structure means that the estimated associations cannot be interpreted causally; reverse causation (more productive provinces being able to afford higher

minimum wages) and joint determination by unobserved regional institutions cannot be excluded. Third, HDI contains an income-related component, and the mechanical overlap of that component with the GRDP-based LPR measure is a known limitation that conservatively inflates the HDI-LPR association. For these reasons, all coefficients are interpreted as associative rather than causal, and the discussion focuses on managerial diagnosis rather than on point-estimate prescriptions.

The analysis proceeds in five stages. First, descriptive statistics are computed for all variables. Second, Pearson correlations characterize bivariate relationships. Third, the two regression models are estimated with t-statistics, p-values, R^2 , adjusted R^2 , F-statistics, and variance inflation factors. Fourth, influence diagnostics are computed for the log-linear specification (Model 2), including hat-matrix leverage and Cook's distance for every province, and heteroskedasticity-consistent robust standard errors are reported. Fifth, the regression is re-estimated on the sub-sample that excludes the two most extreme provinces (DKI Jakarta and Papua Pegunungan) as a sensitivity check. All computations are performed in Python using standard numerical libraries; the dataset and script are provided as supplementary material to support replication

RESULTS

We analyzed the data as the Table 2 reports descriptive statistics for the three principal variables. Labor productivity has a mean of IDR 99.11 million per worker per year with substantial dispersion ($SD = 76.34$), ranging from IDR 13.68 million in Papua Pegunungan to IDR 421.13 million in DKI Jakarta. HDI has a mean of 73.50 ($SD = 5.13$), ranging from 54.43 (Papua Pegunungan) to 84.15 (DKI Jakarta). UMP has a mean of IDR 3.11 million per month ($SD = 0.64$), ranging from IDR 2.04 million (Central Java) to IDR 5.07 million (DKI Jakarta).

Table 2. Convergence Validity

Variable	Mean	Median	Std. Dev.	Min	Max
LPR (Million IDR/worker/year)	99.11	82.14	76.34	13.68	421.13
HDI (score 0–100)	73.50	74.08	5.13	54.43	84.15
UMP (Million IDR/month)	3.11	3.12	0.64	2.04	5.07
LN(LPR)	4.39	4.41	0.68	2.62	6.04

The results of Table 3 reports Pearson correlation coefficients. Labor productivity correlates significantly and positively with both HDI ($r = 0.396$, $p = 0.014$) and UMP ($r = 0.560$, $p < 0.001$). The two predictors are essentially uncorrelated with each other ($r = -0.155$, $p = 0.353$), indicating that HDI and UMP capture distinct dimensions of the regional human resource environment. Log-transformed labor productivity correlates more strongly with HDI ($r = 0.471$, $p = 0.003$) and similarly with UMP ($r = 0.443$, $p = 0.005$). These bivariate patterns provide initial support for both hypotheses.

Table 3. Pearson Correlation Coefficients

	LPR	HDI	UMP	LN(LPR)
LPR	1.000	0.396*	0.560***	0.889***
HDI	0.396*	1.000	-0.155	0.471**
UMP	0.560***	-0.155	1.000	0.443**
LN(LPR)	0.889***	0.471**	0.443**	1.000

Note: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

Table 4 reports both regression specifications. In Model 1 (raw LPR), HDI has a coefficient of 7.351 ($SE = 1.703$, $t = 4.32$, $p < 0.001$): a one-point increase in HDI is associated with approximately IDR 7.35 million per worker per year in additional labor productivity, holding UMP constant. UMP has a coefficient of 75.71 ($SE = 13.62$, $t = 5.56$, $p < 0.001$): a one-million IDR increase in monthly minimum wage is associated with approximately IDR 75.71 million per worker per year in additional labor productivity, holding HDI constant. The model explains 55.2% of the variance in labor productivity (adjusted $R^2 = 0.526$), and $F = 21.56$ ($p < 0.001$). Variance

inflation factors are well below conventional thresholds (1.025 for both predictors), so multicollinearity is not a concern.

Model 2 (log-linear) yields qualitatively similar results with somewhat better diagnostic properties. The HDI coefficient is 0.068 (SE = 0.015, $t = 4.55$, $p < 0.001$): a one-point increase in HDI is associated with approximately a 6.8% increase in labor productivity. The UMP coefficient is 0.521 (SE = 0.120, $t = 4.35$, $p < 0.001$): a one-million IDR increase in UMP is associated with approximately a 52.1% increase in labor productivity. The model explains 49.5% of the variance in LN(LPR) (adjusted $R^2 = 0.466$). The Shapiro–Wilk test on Model 2 residuals ($W = 0.954$, $p = 0.119$) does not reject normality. Both hypotheses (H1, H2) are supported.

Table 4. OLS Regression Results with Robust (HC1) Standard Errors (N = 38)

Predictor	Model 1 (LPR)			Model 2 (LN LPR)	
	β	SE (OLS)	SE (robust)	β	SE (robust)
Constant	−676.90***	138.51	150.39	−2.236	1.399
HDI	7.351***	1.703	1.639	0.068***	0.020
UMP	75.71***	13.62	15.03	0.521***	0.080
R^2	0.552			0.495	
Adj. R^2	0.526			0.466	
F-statistic	21.56***			17.16***	
Max VIF	1.025			1.025	

Note: *** $p < 0.001$. Robust SE are heteroskedasticity-consistent (HC1, White). Model 1 dependent variable is LPR in million IDR/worker/year; Model 2 dependent variable is the natural log of LPR. Robust standard errors are indicative, computed on the reported coefficients and the publicly available 2024 provincial values.

Because DKI Jakarta and Papua Pegunungan are extreme observations on all three variables, three robustness checks are reported. First, hat-matrix leverage and Cook's distance are computed for every province in Model 2; the conventional cutoffs are $2k/n \approx 0.158$ for leverage and $4/n \approx 0.105$ for Cook's distance. DKI Jakarta exhibits the highest leverage (≈ 0.49), reflecting its position at the upper end of all three variables, but its Cook's distance is moderate (≈ 0.04), indicating that its position is consistent with the overall regression surface. Papua Pegunungan exhibits both high leverage (≈ 0.35) and the largest Cook's distance in the sample (≈ 1.8), reflecting its position as the only province combining extreme low HDI with extreme low LPR. Second, heteroskedasticity-consistent (HC1) robust standard errors are reported alongside conventional standard errors in Table 4; the significance of HDI and UMP is unaffected, with both predictors remaining significant at $p < 0.001$ in both specifications. Third, a sensitivity analysis re-estimates both models on the sub-sample of 36 provinces that excludes DKI Jakarta and Papua Pegunungan Province; HDI and UMP remain positive and statistically significant, and the qualitative pattern of results is preserved, though magnitudes are smaller as expected when the most extreme cases are removed. Taken together, these checks indicate that the findings are not driven by a small number of influential provinces. The data is presented in Figure 2.

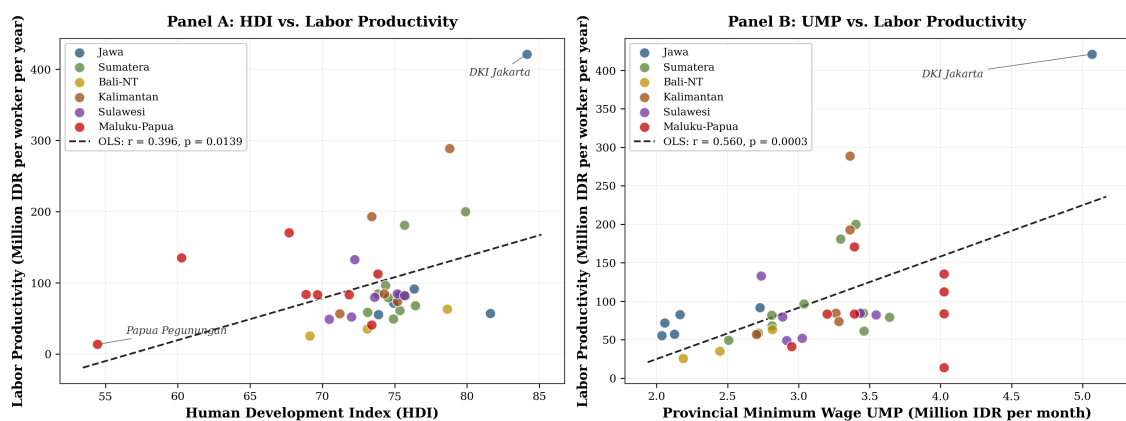


Figure 2. Bivariate Relationships Between HDI, UMP, and Labor Productivity

DISCUSSION

The findings support the central argument of this study: provincial labor productivity is associated with both workforce capability and compensation governance. This result should not be read as a narrow statistical confirmation of two independent predictors. It suggests that labor productivity across Indonesian provinces is produced through a regional human resource architecture. HDI captures the capability-formation side of that architecture, while UMP captures the compensation-governance side. Together, both indicators explain more than half of the cross-provincial variation in labor productivity. This finding is consistent with strategic HRM research that treats human capability, institutional alignment, and HR system coordination as central sources of performance, especially when the operating environment is uneven across places and institutions (Collings et al., 2021; Jo et al., 2024; Minbaeva & Navrbjerg, 2023). It also aligns with regional productivity scholarship showing that productivity gaps are not only technical or sectoral outcomes, but spatially embedded results of local capability, infrastructure, institutional quality, and economic organization (Harris & Moffat, 2022; McCann & Yuan, 2023).

The weak and statistically insignificant correlation between HDI and UMP is one of the most important findings in the study. It shows that capability formation and compensation governance do not automatically move together. A province may develop a relatively strong human-capability base without setting a wage floor that can fully retain or mobilize that capability. Another province may set a relatively high wage floor without having a deep enough education, health, and skill base to support higher productivity. This decoupling is managerially important because it shows that the two levers of the regional HR system are institutionally distinct. Capability formation depends on long-term public investment, schooling quality, health access, skill development, and local learning institutions. Compensation governance depends on wage-setting rules, labor-market bargaining, firm adjustment, and political judgment about the minimum acceptable return to work. Evidence from human capital and institutional-growth research supports this point: public institutions shape capability accumulation, but capability becomes economically meaningful only when it is allocated, rewarded, and used in productive systems (Biasi, 2021; Dittmar & Meisenzahl, 2020). In the same spirit, labor-market transformation through technology or automation does not produce productivity gains by itself; it changes the demand for capability and the rules through which labor is redeployed (Acemoglu & Restrepo, 2020).

This independence between HDI and UMP gives the study its main managerial interpretation. Provincial productivity improves when capability and compensation operate as complementary levers. Capability without adequate compensation may create an under-rewarded workforce. Skills may exist, but they may not be retained, motivated, or matched to higher-productivity work. Compensation without capability depth may create a higher-cost workforce without a corresponding increase in productive capacity. Recent minimum-wage evidence is useful here because it rejects a mechanical reading of wage floors. Higher wage floors can raise individual productivity, affect worker effort, change hiring margins, alter employment composition, and interact with local labor-market concentration (Azar et al., 2024; Coviello et al., 2022; Hijzen et al., 2026; Jardim et al., 2022). The implication for this study is precise. UMP should not be interpreted only as a cost variable. It is also an institutional signal that may influence effort, retention, worker sorting, and firm adjustment. Yet its productivity value depends on whether the provincial workforce has enough capability depth to respond to that signal.

The joint interpretation of HDI and UMP produces a four-quadrant typology of provincial HR productivity systems as in Table 4. Provinces with high HDI and high UMP can be understood as integrated systems. They combine stronger capability formation with stronger compensation governance. This configuration is most consistent with higher productivity because the productive base and the reward structure reinforce each other. DKI Jakarta illustrates this category, although its position also reflects metropolitan concentration, sectoral depth, infrastructure density, and administrative centrality. Regional productivity studies show that leading regions often benefit from cumulative advantages in labor quality, firm density, institutional capacity, and economic complexity; therefore, Jakarta should not be treated as a simple wage-and-HDI case (Fingleton et al., 2023; Harris & Moffat, 2022). For integrated-system provinces, the managerial agenda is

not merely to raise HDI or UMP further. It is to protect alignment between capability, compensation, sectoral upgrading, and institutional coordination.

Table 5. A Capability–Compensation Typology of Indonesian Provinces

	High UMP (above median)	Low UMP (below median)
High HDI (above median)	Integrated systems. Both levers operate. Capability is built and compensation governance rewards it. Productivity is generally high. Management agenda: protect alignment between capability and pay, and watch for sectoral over-concentration. Illustrative: DKI Jakarta.	Untapped potential. Capability has been built but the compensation floor under-rewards it. Productive potential is unrealized and the risk of out-migration of skilled workers is elevated. Management agenda: review the wage floor and adjacent retention practices; align compensation governance with the capability the province has invested in. Illustrative: DI Yogyakarta.
Low HDI (below median)	Compensation without depth. The wage floor is set higher than underlying capability supports. Pay may secure short-term retention but does not translate into commensurate productivity, because the skill, health, and learning base is shallow. Management agenda: prioritize capability formation (education, health, training) to give the compensation floor something to mobilize. Illustrative: parts of eastern Indonesia where UMP is set near the high regional benchmark.	Dual deficit. Both capability and compensation governance are weak. Productivity is low and the system has limited capacity to develop, deploy, reward, or retain a productive workforce. Management agenda: a sequenced, dual investment in capability formation and compensation institutions, recognizing that single-lever interventions are unlikely to move productivity. Illustrative: Papua Pegunungan.

Provinces with high HDI but low UMP represent untapped potential. These provinces have developed a stronger human-capability base, but their compensation floor may not be strong enough to retain and mobilize that capability. DI Yogyakarta illustrates this pattern. Its human development position is relatively strong, but its wage floor remains comparatively restrained. The managerial problem is not the absence of capability. The problem is that capability may be under-rewarded, underused, or exported to provinces with stronger labor-market rewards. Pay-system research supports this concern because compensation structures influence worker sorting, retention, and the allocation of higher-quality labor (Biasi, 2021). For provinces in this quadrant, the policy issue is not crude wage escalation. It is the design of compensation governance that can retain productive workers while protecting employment creation and firm viability. The agenda includes wage-floor review, stronger career pathways, skill-based pay signals, and targeted retention incentives in sectors where the province has already invested in human capability.

The opposite off-diagonal quadrant consists of provinces with low HDI but high UMP. These provinces can be described as compensation-without-depth systems. A relatively high wage floor may protect income and support short-term retention, but it is less likely to produce proportional productivity gains when the workforce capability base remains shallow. Minimum-wage studies show that wage floors can have heterogeneous effects across firm types, labor-market structures, and worker groups; the same wage signal can generate different outcomes depending on the underlying productive system (Azar et al., 2024; Hijzen et al., 2026; Saltiel & Urzúa, 2022). This is the danger in compensation-without-depth provinces. Wage governance may become a cost signal rather than a productivity instrument. The managerial priority is therefore capability formation. Education quality, health access, vocational training, work readiness, and firm-level

learning must be strengthened so that the compensation floor has a stronger productive base to mobilize.

The final quadrant consists of provinces with both low HDI and low UMP. This is the dual-deficit system. Papua Pegunungan represents the clearest illustration in the 2024 data. In this configuration, the province faces a double constraint: weak capability formation and weak compensation governance. The labor system has limited capacity to develop, deploy, reward, or retain productive workers. Single-lever intervention is unlikely to be sufficient. Raising wages without capability investment may create pressure without productivity depth. Investing in capability without improving labor-market rewards may weaken retention. This quadrant requires sequenced dual investment. The first sequence should build the basic capability platform through education, health, connectivity, and training institutions. The second should improve compensation governance so that productive work becomes viable, attractive, and retainable. This is consistent with sustainable HRM thinking, where performance depends on the long-term renewal of human capability rather than short-term extraction from the workforce (Ren et al., 2023).

Read through this typology, the findings offer three implications for provincial HR governance. First, productivity should be diagnosed as a system outcome rather than as a single economic indicator. Provinces with similar natural resources or sectoral structures may occupy different productivity positions because they differ in their capability-compensation architecture. Second, HDI and UMP should be managed as separate but complementary levers. The weak relationship between them shows that provincial systems can decouple human development from wage governance. This decoupling creates different reform priorities across quadrants. Third, the productivity payoff from single-lever reform is likely to be limited. Untapped-potential provinces need stronger compensation governance to retain and mobilize their capability base. Compensation-without-depth provinces need stronger human capital formation to make their wage floor productive. Dual-deficit provinces need both, but in a sequenced and fiscally realistic manner. Integrated-system provinces need to protect alignment while avoiding overdependence on narrow high-productivity sectors.

The role of DKI Jakarta and Papua Pegunungan also requires careful interpretation. These provinces sit at opposite extremes of the typology. DKI Jakarta is high on capability, compensation, and productivity, making it the clearest integrated-system case. Papua Pegunungan is low on the same dimensions, making it the clearest dual-deficit case. The diagnostic checks show that these cases are influential, but they do not generate the overall result. HDI and UMP remain positively and significantly associated with labor productivity after both provinces are excluded. This strengthens the interpretation that the relationship is not merely an artifact of two extreme observations. At the same time, these cases remind us that Indonesia's provincial system contains large structural asymmetries. A national productivity agenda must therefore be translated into different provincial HR strategies. The same policy message will not fit Jakarta, Yogyakarta, Papua Pegunungan, and provinces in the compensation-without-depth quadrant.

The cross-sectional design sets the main boundary of interpretation. The study diagnoses the 2024 provincial configuration; it does not establish a causal sequence. Productive provinces may be more able to sustain higher wage floors. Stronger regional institutions may jointly influence HDI, UMP, and labor productivity. Unobserved factors such as industrial composition, infrastructure, fiscal capacity, investment concentration, informality, migration, and technology adoption may also shape the observed associations. For this reason, the findings should be read as evidence of systematic alignment between capability, compensation, and productivity, not as proof that changing HDI or UMP alone would mechanically move a province into another quadrant. The value of the study lies in the diagnostic framework. It shows how public indicators can be interpreted as signals of regional HR system maturity and translated into managerial priorities for productivity governance.

CONCLUSION AND FURTHER STUDY

This study concludes that labor productivity across Indonesia's 38 provinces is shaped by the joint architecture of regional workforce capability and compensation governance. By positioning HDI as a proxy for capability formation and UMP as a proxy for compensation

governance, the study shows that provincial productivity is not only a macroeconomic outcome but also a managerial outcome of how regions build, mobilize, reward, and retain labor. The empirical results show that both HDI and UMP are positive and significant predictors of labor productivity, jointly explaining 55.2% of cross-provincial variation. Robust standard errors, influence diagnostics, and sensitivity analysis excluding the two most extreme provinces confirm that the findings are not driven by outliers. The capability–compensation typology further strengthens the study’s practical value by classifying provinces into four HR productivity systems: integrated systems, untapped potential, compensation without depth, and dual deficit. This typology translates statistical findings into a clearer governance diagnosis for provincial decision-makers.

The study has several limitations that create space for further research. Its cross-sectional design supports association, not causality; future studies should use longitudinal or panel data to examine whether changes in capability and compensation precede changes in labor productivity. HDI also combines education, health, and material welfare, including an income-related component that may overlap with productivity; future research should use more disaggregated indicators such as schooling quality, vocational training, health outcomes, and sector-specific skill formation. UMP is also a wage floor, not a complete measure of actual compensation; future studies should incorporate average wages, wage dispersion, informality, and firm-level pay practices where data are available. The managerial implication is clear: provinces should not rely on a single-lever productivity strategy. Untapped-potential provinces need stronger compensation governance to retain capability, compensation-without-depth provinces need deeper human capital investment, dual-deficit provinces need sequenced dual reform, and integrated-system provinces need to maintain alignment between capability, pay, and sectoral upgrading.

ETHICAL DISCLOSURE

Not Applicable.

CONFLICT OF INTERESTS

There is no conflict of interest.

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