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THE GAP BETWEEN EDUCATIONAL OUTPUT AND INDUSTRIAL COMPETENCY NEEDS: AN ANALYSIS OF SKILLS MISMATCH IN A MANAGEMENT PERSPECTIVE

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Abstract

This study presents a comprehensive analysis of the phenomenon of skill mismatch in Indonesia during the period 2020-2025. Amid Indonesia's ambition to achieve high-income country status by 2045, empirical data shows a persistent structural dissonance between the supply of human capital from educational institutions and the demand for industry competencies. Using qualitative descriptive methods with a literature review and secondary data analysis approach, this study examines two main dimensions: vertical mismatch (over-education), which has reached critical levels among vocational graduates, and horizontal mismatch, which hinders productivity specialization. The findings show that skill mismatch is not merely a labor market issue, but a managerial challenge that impacts operational cost inefficiencies, productivity stagnation, and a 16.2% "wage penalty" for affected workers. This article also evaluates the effectiveness of management interventions such as Corporate University in state-owned enterprises (Telkom and PLN) and formulates a Strategic Human Resource Management (SHRM) framework that includes skills-first hiring and the implementation of Workplace Learning (WPL).

INTRODUCTION

Indonesia is currently in a crucial phase of macroeconomic transition, where the development narrative is dominated by the potential of the "Demographic Bonus". With a large working-age population, Indonesia has a theoretical opportunity to accelerate economic growth towards the vision of a "Golden Indonesia 2045". However, the reality on the ground during the 2020-2025 period reveals a troubling paradox: increased educational accessibility is not linearly correlated with the absorption of qualified labor or increased industrial productivity (Megaster et al., 2025).

The phenomenon that occurs is credential inflation, where higher education graduates flood into the job market that does not provide enough formal employment, creating conditions of *over-supply* in the generalist segment and *scarcity* in specific technical competency segments. The World Bank report (2021) highlights that the post-pandemic recovery has been uneven, with labor-intensive sectors recovering more slowly than technology-based sectors, further widening the digital competency gap.

From a business management perspective, this issue manifests as severe operational inefficiencies. Companies face *double disruption*: difficulty filling strategic positions due to talent *shortages* and high screening costs due to a flood of irrelevant applicants. The Indonesian Employers Association (APINDO) and the Chamber of Commerce often highlight the high cost of *retraining* that must be borne by the industry because new graduates are not "ready-to-use" (Setiyana & Oktora, 2024). Therefore, *skill mismatch* can no longer be seen only as an educational problem, but as a strategic risk for corporations that demand progressive Human Resource Management (HRM) intervention.

LITERATURE REVIEW

Human *Capital Theory*

The Human Capital Theory, pioneered by Becker (1964) and Schultz (1961), argues that education is an investment that increases the productive capacity of individuals. The basic assumption is that productivity is inherent in workers and is determined by their accumulation of knowledge as well as skills. In an efficient market, higher levels of education should result in higher marginal productivity and, consequently, higher wages (Setiyana & Oktora, 2024).

However, the persistence of *skill mismatch* in Indonesia challenges this assumption of efficiency. The phenomenon of *over-education*—where individuals have education that exceeds the requirements of employment—suggests that human capital investment is not always optimally utilized. Research shows that the *return on investment* from education becomes distorted when there is a mismatch, causing inefficiency in the allocation of national economic resources.

Job Search Theory and Information Friction

Job Search Theory (Stigler, 1961) provides an explanation of the imperfect labor market mechanism due to the cost of information. In the Indonesian context, information asymmetry is very high: job seekers (graduates) lack knowledge about the real needs of the industry, while employers have difficulty verifying the competence of graduates only from diplomas (Setiyana & Oktora, 2024). This uncertainty encourages job seekers to accept any job available (*forced acceptance*) to avoid unemployment, which is often the beginning of a *mismatch trap*.

Signaling Theory

Spence (1973) proposed *the Signaling Theory* which states that education functions as a productivity signal for employers in the midst of uncertainty of the quality of applicants. In Indonesia, this phenomenon triggers inflation of job requirements. Administrative positions, which a decade ago were filled by high school graduates, now require a Bachelor's degree (S1). Companies use a S1 degree as a rough *screening device* to reduce the number of applicants, not because the job requires bachelor's level competencies. This recruitment management practice directly contributes to *vertical mismatch statistics* (Pratiwi et al., 2024).

Jebakan Hypothesis (*Trapped Hypothesis*)

The concept *of the Trapped Hypothesis* is particularly relevant in *mismatch* studies. This theory states that workers who start their careers in *an over-educated* condition have a high probability of continuing to be trapped in that condition in later jobs. Irrelevant work experience sends a negative signal to the market, damaging long-term career prospects and creating permanent "wounds" on the worker's salary history (Pratiwi et al., 2024).

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RESEARCH METHODS

Research Design

This study uses **a qualitative descriptive method**. This approach was chosen to provide a comprehensive and in-depth picture of the phenomenon of *skill mismatch* without testing primary statistical hypotheses, but through the synthesis of existing data and facts. This method aims to describe the factual conditions of the labor market and analyze relevant management strategies.

Data Collection Techniques

Data was collected through **Library *Research*** techniques and document analysis. Data sources include:

1. **Scientific Literature:** Articles of national and international accredited journals for the period 2020-2025 that discuss the topics of human resources, labor economics, and vocational education.
2. **Secondary Data:** Statistics from the BPS National Labor Force Survey (Sakernas) for 2021-2023, as well as reports from international institutions such as the World Bank and McKinsey.
3. **Corporate Documents:** Annual Report and *Sustainability Report* from sample companies (PT Telkom Indonesia and PT PLN) for case analysis of management strategy.

Data Analysis

Data analysis was carried out using *content analysis* and narrative synthesis techniques. Quantitative data from Sakernas was interpreted to look at macro trends, while qualitative data from case studies were used to explore micromanagement practices. This approach allows for triangulation of data to ensure the validity of the findings.

RESULTS AND DISCUSSION

Based on the analysis of Sakernas data for 2022-2023, Indonesia faces a persistent *level of over-education*. Setiyana & Oktora (2024) noted that the *over-education* rate in Indonesia reaches above 40%, a position comparable to other developing countries such as Mexico, but much higher than developed countries.

The distribution *of mismatches* by level of education reveals an anomalous pattern in vocational education:

- **Vocational School Graduates:** Experiencing the highest level of *over-education*, reaching 57.1% in 2023. This indicates a systemic failure in *the link and match* policy, where graduates who should be ready for work end up working in the informal sector or positions that do not require *their specific* skills.
- **University graduates:** The *over-education rate* is stable in the range of 50%, indicating the saturation of the labor market for generalist graduates.

- **General High School Graduates:** Paradoxically, they have a better matched rate (around 75%) due to their flexibility to enter the non-specialist service sector without salary expectations as high as vocational/university graduates.

In addition to level mismatches, *horizontal mismatch* (dismatch in the field of study) is a crucial issue. Multinomial logistic regression analysis shows several key determinant factors (Setiyana & Oktora, 2024; Pratiwi et al., 2024):

1. **Regional Factors:** There is a sharp disparity between Java Island and outside Java. The concentration of industry in Java-Bali attracts the migration of educated workers, but the excess supply leads to *over-education*. On the other hand, rural areas experience *under-education*.
2. **Gender:** Women are significantly more prone to *over-education*. Barriers to geographical mobility and domestic roles often force female workers to accept work under qualification provided the work location is close to where they live.
3. **Field of Study:** Graduates in Engineering and Engineering have a higher risk *of horizontal mismatch* than graduates in Business and Management. Management skills are more *transferable* to various sectors, while engineering skills are very specific and depend on the availability of the local manufacturing industry.

Microanalysis: Financial and Psychological Impact

For companies, *skill mismatch* creates a double cost burden. First, recruitment **and training costs**. A high level *of over-education* correlates with high employee *turnover*. Employees who feel their qualifications are not valued are more likely to take work as a stepping stone. Studies show that the cost of replacing employees can reach 30-150% of the annual salary.

For individuals, the impact is **Wage *Penalty***. The findings of Pratiwi et al. (2024) are striking: workers who have a history of *over-education* experience a wage disparity of **16.2%** lower than their counterparts who have a "straight" career path, even after they move to a suitable job. This confirms the existence of a "trap" effect in which the labor market punishes workers who have inconsistent career histories.

Skill mismatch negatively impacts a company's productivity through two mechanisms:

- **Skill Gap (Under-qualification):** Employees whose competencies are substandard take longer to complete tasks (*long learning curve*) and have a high *error rate*. This lowers operational efficiency directly.
- **Over-qualification:** Employees who are too smart for their jobs often experience *boredom* and *counterproductive work behavior*. They do not exert *discretionary effort* to the maximum.

An analysis of industrial psychology found a strong linear relationship between *skill mismatch* and work stress. The *skill mismatch variable* was able to explain 49.3% of variance in employee work stress (Wicaksono et al., 2015). Employees who experience *horizontal mismatches* feel anxious due to technical incompetence, while those who *experience a vertical mismatch* feel frustrated because of their *underutilized* potential, which leads to decreased job satisfaction and mental health.

HR Management Strategy and Corporate Intervention

To address these labor market inefficiencies, companies need to adopt a transformative *Strategic Human Resource Management* (SHRM) approach.

Modern companies are starting to abandon academic degree-based screening alone. The *Skills-First Hiring strategy* prioritizes validation of real competencies.

- **Competency Assessment:** The use of technical tests, *coding challenges*, or business case simulations in the early stages of selection to screen candidates based on ability, not diploma.
- **Elimination of Degree Requirements:** Global technology companies and state-owned enterprises are starting to remove the S1 requirement for certain technical positions, opening up opportunities for vocational graduates or self-taught talents who have strong portfolios. This effectively reduces *vertical mismatch*.

Large companies took over the role of education through the establishment of *Corporate Universities* (CorpU) to close the *skills gap* left by formal education.

- **PT Telkom Indonesia Case Study:** Facing digital disruption, Telkom transformed its *Human Capital Strategy*. Through **Telkom Corporate University**, they run a massive *reskilling* program for senior employees to have a *digital mindset*. The focus on *the Data Science*, *Cyber Security*, and *Digital Leadership* curriculum allows Telkom to carry out internal mobility—moving employees from *the legacy* division (which is shrinking) to the digital division (which is growing)—thereby minimizing layoffs and closing the internal talent gap (Ramdhan, 2025; Telkom CorpU, 2023).
- **PT PLN (Persero) Case Study:** PLN implements a structured learning model where participation in training has a direct correlation with KPIs and promotions. Research by Warhan et al. (2024) on fertilizer and energy companies (including PLN) shows that the combination of structured training, *mentoring*, and *job rotation* contributes significantly (43.6%) to improving competence. This proves that well-designed internal interventions are more effective than simply recruiting new graduates.

The *Workplace Learning* (WPL) strategy that is integrated with the Indonesian National Qualifications Framework (KKNI) is a long-term solution. This model is not just a regular internship, but a recognized on-the-job learning certification. With WPL, the industry can shape the competencies of prospective workers since they are still students/students, reducing the cost of induction training when they are recruited (Wardhana et al., 2024).

Policy Challenges and Education Revitalization

The government has responded to the issue of *mismatch* by issuing Presidential Regulation Number 68 of 2022 concerning the Revitalization of Vocational Education and Vocational Training. This regulation changed the paradigm from *supply-driven* to *demand-driven*. The key point is the establishment of **a Vocational Regional Coordination Team (TKDV)** involving the regional Chamber of Commerce to map specific labor needs in the region (Iskandar, 2022).

Although the regulatory framework already exists, implementation in the field faces structural constraints (Setiyana & Oktora, 2024; Iskandar, 2022):

1. **Sectoral Ego:** Lack of coordination between the Education Office, the Manpower Office, and Industry at the regional level.
2. **Industry Incentives:** Despite the Super *Tax Deduction*, many companies, especially MSMEs, feel that the administrative procedures are too complicated compared to the benefits received.
3. **Quality of Vocational Teachers:** Many vocational teachers are academic and lack the latest industry experience (*obsolete skills*), so the material taught is lagging behind industrial technology.

The above analysis shows that *skill mismatch* in Indonesia is a multidimensional phenomenon that cannot be solved with just one intervention. The data shows the failure

of market mechanisms (Signaling) and educational institutions (Human Capital) in providing accurate signals and relevant competencies.

The high rate of *vertical mismatch* in vocational graduates (57.1%) is the most worrying finding because it undermines the basic premise of vocational education as a fast path to the world of work. This indicates that the industry in Indonesia is not fully ready to absorb the middle specialist workforce, or the quality of vocational graduates has not met industry standards.

From a strategic management perspective, companies can no longer be passive waiting for "ready-to-use" graduates. The era *of Buy Talent* is over due to a shortage of supply; the era of *Build Talent* through *Corporate Universities* and strategic partnerships is a new imperative. The strategy of PT Telkom and PLN shows that investment in internal human capital produces better *returns* in the form of retention and productivity than constantly looking for perfect but rare external candidates.

CONCLUSION

This research shows that the phenomenon of skill mismatch in Indonesia is a structural problem that is multidimensional and cannot be reduced to individual failure. The main findings indicate a high level of vertical mismatch, especially in vocational education graduates, which actually reach the most critical number compared to other levels of education. This condition indicates the weak linkage between the vocational education system and the structure of industrial labor demand, as well as regional and gender disparities that exacerbate these mismatches.

From a management perspective, skill mismatch has a direct impact on organizational cost inefficiencies through increased turnover, high retraining costs, and decreased work productivity. Meanwhile, for individuals, this condition creates long-term wage penalties and psychological risks in the form of work stress and decreased job satisfaction.

Therefore, the human resource management strategy needs to shift from a buy talent approach to build talent through the implementation of Strategic Human Resource Management. This approach includes strengthening skills-first hiring, developing workplace learning, and continuing investment in internal reskilling and upskilling programs. Thus, companies not only play a role as users of labor, but also as strategic actors in closing the gap between educational output and industrial competency needs.

Based on the results and limitations of this study, several development directions are considered for further research. First, the research can expand the scope of analysis by comparing the phenomenon of skill mismatch between industrial sectors, such as the manufacturing, services, and digital economy sectors, to identify the characteristics of mismatch that are sectoral. In addition, comparative analysis between regions, especially between Java and outside Java, is important to capture differences in the dynamics of the regionally educated labor market.

Second, the next study can examine in more depth the effectiveness of various managerial interventions, especially the application of skills-first hiring, workplace learning, and university corporate development. A longitudinal approach is strongly recommended so that the long-term impact of such strategies on career mobility, job satisfaction, and employee retention can be evaluated more comprehensively.

Third, the researcher's suggestions in the future are to include a public policy perspective by examining the pattern of collaboration between the business world,

educational institutions, and local governments in developing human resources. This approach is expected to be able to produce policy recommendations that are more applicable in reducing the level of skill mismatch and increasing the competitiveness of the national workforce.

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