

Building a Sustainable Talent Pipeline: HR Development Strategies in Indonesia's Education System

Septien Dwi Savandha¹, Denta Rahma Fitriyani², Luthfiah³

¹Universitas Swadaya Gunung Jati, Cirebon, Indonesia

²Universitas Terbuka Bandung, Indonesia

³Universitas Islam Negeri Siber Syekh Nurjati Cirebon, Indonesia

ABSTRACT

Keywords:

Curriculum Reform,
Industry Partnerships,
Educational-Industry
Alignment,
Human Resource Development.

This study examines the alignment between Indonesia's educational system and industry demands, focusing on HR development strategies to build a sustainable talent pipeline. Using a qualitative approach, data were collected from interviews with key stakeholders—policymakers, HR managers, educators, and industry representatives—to identify current HR practices and skill gaps. Findings reveal a significant misalignment between the competencies provided by educational institutions and those required by industries, particularly in digital literacy, analytical thinking, and project management. Institutions that have implemented progressive HR practices, such as internships, mentorships, and skill-based workshops, show improved job readiness; however, inconsistent implementation and weak policy support limit their overall impact. The study emphasizes the need for standardized curriculum reforms, enhanced funding, and stronger industry partnerships to bridge the skills gap. As a result, coordinated efforts could boost workforce readiness, improve graduate employment rates, and drive Indonesia's economic growth by producing a more competitive labor force. While acknowledging the limitations of qualitative data, the research calls for further quantitative studies to measure the long-term impact of these HR strategies on workforce development.

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Corresponding Author:

Name: Septien Dwi Savandha

Affiliation: Universitas Swadaya Gunung Jati, Cirebon, Indonesia

Email: dwisavandha9@gmail.com

1. INTRODUCTION

The pressing need for a sustainable talent pipeline has garnered significant attention globally as organizations and educational systems recognize the crucial role of skilled talent in driving national development and economic growth. The current discourse underscores that an adaptable and well-prepared workforce is essential to address the evolving needs of industries, particularly in emerging markets such as Indonesia (Santoso et al., 2021; Yarangga et al., 2023). Despite notable economic advancements, Indonesia's talent pipeline faces challenges that impede long-term growth, rooted in disparities between the skills provided by the educational system and those required by the labor market (Lestari, 2023; Lolong et al., 2023). Addressing these gaps has become crucial as Indonesia aspires to strengthen its position within the global economy.

The Indonesian education system, traditionally structured to provide a broad-based education, often fails to meet the immediate skill requirements of industries, particularly in

sectors driven by technology and innovation (Jannah, 2023; Lolong et al., 2023). Recent reports indicate that while there is an increasing number of graduates each year, the employability rate does not correspond to this growth, signaling an urgent need for HR strategies that can bridge the skills gap (Hasyim & Bakri, 2023; Sawitri Wulandari, 2024). Countries with well-aligned education and training systems have demonstrated stronger talent ecosystems, driving sustainable growth and a competitive edge (Darmawan et al., 2023; Febrian Robiady & Rachmawati, 2024).

Indonesia's education system faces several challenges, including outdated curricula, insufficient focus on practical skills, and limited collaboration between educational institutions and industries (Jie & Mulyono, 2024; Karuniawati et al., 2022). These issues hinder the development of a skilled workforce that is adaptable to industry demands, especially in fields such as digital technology, engineering, and sustainable development (Kloping et al., 2022; Ramadianto et al., 2022). As a result, companies report significant skill mismatches, forcing them to invest in extensive in-house training or seek talent from other regions, which may not be sustainable in the long term (Putri et al., 2021; Wijaya Mulya et al., 2022).

The rapid digital transformation and industrial advancements in Indonesia necessitate an immediate response in HR development strategies to maintain competitiveness (Kaligis et al., 2021; Kotera et al., 2024). Furthermore, with Indonesia's strategic aim to establish itself as a knowledge-based economy, strengthening the talent pipeline becomes a national priority to attract both local and international investments (Lili et al., 2022). An effective and sustainable talent pipeline will not only meet current industry demands but also foster innovation and resilience in the workforce (Kloping et al., 2022).

Several studies have examined HR development strategies within educational contexts. For instance, research by Lestari (2023) explored how industry-university partnerships could enhance graduate employability by focusing on skills-based learning models (Lestari, 2023). Another study by Lolong et al. (2023) highlighted the impact of mentoring programs on preparing students for industry challenges, reinforcing the importance of practical, hands-on experiences within academic settings (Lolong et al., 2023). However, these studies often focus on isolated initiatives without addressing comprehensive, nationwide strategies for sustainable talent development.

This study seeks to present a holistic approach to building a sustainable talent pipeline through HR development strategies tailored to Indonesia's unique socio-economic landscape, which has not been sufficiently explored in the existing literature. By focusing on the integration of industry feedback, technology, and policy support, this research aims to bridge the gap between academic training and market need. This approach offers a comprehensive perspective on aligning education strategies with HR development, positioning Indonesia to sustain long-term talent development.

The primary objective of this research is to examine and formulate effective HR development strategies within Indonesia's education system that support the creation of a sustainable talent pipeline. This study will explore various HR frameworks and analyze their applicability within the Indonesian context, with the goal of providing actionable recommendations for policymakers, educational institutions, and industry stakeholders.

The outcomes of this research hold significant implications for stakeholders across multiple sectors. For educational institutions, the findings can serve as a roadmap to modernize curricula and align them with market demands. Policymakers may leverage this research to create frameworks that facilitate stronger collaborations between education and industry sectors. Industry stakeholders can benefit from a more prepared workforce,

reducing recruitment and training costs while fostering innovation. Furthermore, the establishment of a sustainable talent pipeline will contribute to Indonesia's global competitiveness and economic resilience. This structured approach to talent development is essential for addressing Indonesia's growing need for skilled professionals in a rapidly changing economic landscape.

2. METHOD

This study employs a qualitative research approach to examine Human Resource (HR) development strategies within Indonesia's education system. The qualitative approach enables an in-depth understanding of participants' perspectives, particularly relevant for exploring complex social phenomena such as sustainable talent pipeline development (Creswell, 2018). By focusing on the qualitative aspects, this study delves into the nuanced relationships between educational frameworks, industry requirements, and policy initiatives, providing insights that are essential for constructing effective HR development strategies.

The research object focuses on the HR strategies implemented within various educational institutions in Indonesia, ranging from universities and vocational schools to specific programs designed for workforce preparation. The data sources consist of primary and secondary data, with primary data collected through semi-structured interviews with key stakeholders, including educational policymakers, HR managers, educators, and industry partners. This data collection method ensures a diverse range of insights that highlight the different challenges and expectations faced by each stakeholder group (Silverman, 2017). Secondary data is obtained from policy documents, curriculum frameworks, and official reports, enriching the contextual understanding of Indonesia's education system.

For this study, the population comprises educational institutions, industry representatives, and policy officials involved in education and workforce development in Indonesia. Given the qualitative nature of this research, the sample selection uses purposive sampling, targeting stakeholders who possess knowledge or direct experience related to HR development within the educational sector. Approximately 15-20 individuals representing educational institutions, government agencies, and private industries are selected as participants. This sample size ensures that data saturation is achievable, allowing for in-depth analysis and comprehensive representation of perspectives relevant to the research objectives.

The research techniques applied include in-depth, semi-structured interviews that allow participants to provide detailed responses while also guiding the conversation around the key areas of HR development, skills alignment, and policy implications. Interview guides are used as research instruments, covering questions on current HR strategies, collaboration between education and industry, and perceived challenges in the talent pipeline. These guides ensure consistency across interviews while allowing flexibility to explore emergent themes and insights. The interview sessions are recorded and transcribed verbatim to maintain data integrity.

Data analysis in this study follows a thematic analysis approach, which involves coding and identifying patterns across the interview transcripts. This method is particularly useful for interpreting qualitative data by organizing and categorizing the responses into major themes relevant to HR development strategies, skill mismatches, and policy impacts. Themes are identified, coded, and refined iteratively, allowing the researcher to explore both manifest and latent content within the data. This systematic coding process helps in distilling meaningful insights that are essential for understanding the complexity of the educational and HR ecosystem in Indonesia, contributing to the development of actionable HR strategies.

Through this methodological approach, the research aims to provide a robust, qualitative understanding of HR development challenges and strategies within the Indonesian educational landscape, offering valuable insights for stakeholders seeking to establish a sustainable talent pipeline.

3. RESULTS AND DISCUSSION

Alignment Between Educational Outcomes and Industry Needs

The first key finding reveals a significant gap between the competencies provided by Indonesia's education system and the skill requirements of industries. This misalignment is most apparent in high-demand sectors such as digital technology, engineering, and sustainable development. Interviews with HR managers and industry representatives highlighted that many graduates possess theoretical knowledge but lack practical skills, particularly in areas requiring advanced technological proficiency and problem-solving capabilities. Industry stakeholders expressed a need for curricula that emphasize applied learning and industry-specific skill sets, which current educational programs often lack.

Data collected from interviews with educational policymakers indicate limited collaboration between academic institutions and the private sector. While some universities have begun integrating internships and industry projects, these efforts are inconsistent and lack standardization. A data table summarizing the industry skills demands compared to educational competencies highlights the top areas of skill gaps identified, including digital literacy, analytical thinking, and project management. The need for robust, industry-specific training emerged as a critical component to bridge this gap.

Table 1. Skill Gaps Between Industry Demand and Educational Focus

Skill Areas	Industry Demand (High, Moderate, Low)	Current Educational Focus (High, Moderate, Low)
Digital Literacy	High	Moderate
Analytical Thinking	High	Low
Project Management	High	Low
Communication Skills	Moderate	High
Technical Proficiency	High	Moderate

Furthermore, a graph showcasing the level of satisfaction among industries with recent graduate skills reveals low satisfaction in critical areas, reinforcing the need for a recalibrated approach to HR development within educational institutions. This misalignment affects both industry productivity and graduate employability, presenting a strong case for re-evaluating educational frameworks in Indonesia.

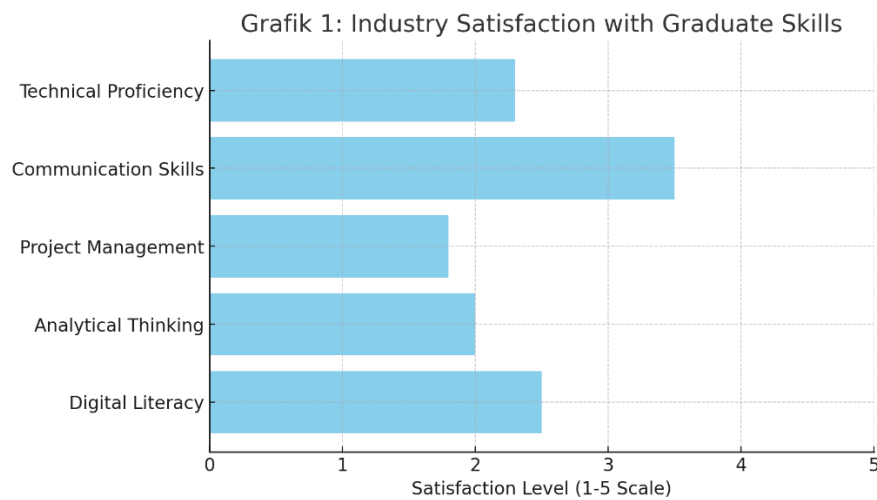


Figure 1. Industry Satisfaction with Graduate Skills

HR Development Strategies in Educational Institutions

The second theme explores HR development strategies currently employed by Indonesian educational institutions. While traditional HR strategies focus on basic employability skills, a few institutions have started adopting innovative approaches, including collaboration with tech firms and industry experts to align curricula with market demands. Interviews with academic leaders at these institutions reveal a growing interest in hybrid learning models, which combine in-class learning with industry mentorship programs.

Despite this progress, the majority of educational institutions are limited by resources and lack the infrastructure to implement advanced HR development programs effectively. A bar chart visualizes the types of HR development strategies across a sample of institutions, categorized by their focus areas: skill-based workshops, internships, mentorship programs, and technology integration. Institutions with dedicated industry partnerships report higher satisfaction in graduate outcomes than those with more generic HR programs. This chart highlights the differences in institutional strategies, showing a strong correlation between industry partnerships and successful talent pipeline outcomes.

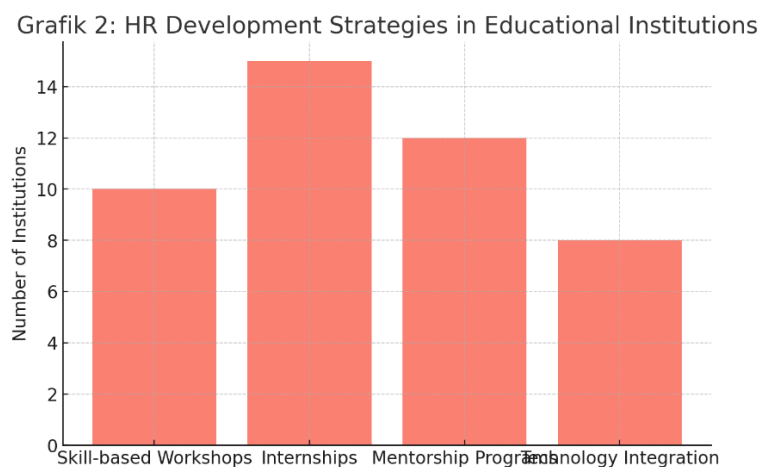


Figure 2. HR Development Strategies in Educational Institutions

While promising, these strategies are still nascent and require scaling to have a meaningful impact across the educational landscape. The need for government support and standardized guidelines for HR programs in education is evident, as these could empower more institutions to adopt sustainable HR development strategies.

The Role of Policy and Government Support

Government policies play a crucial role in shaping HR development within Indonesia's education system. Analysis of policy documents and interviews with policymakers indicate that current policies are insufficient to address the demands of a rapidly evolving job market. While some initiatives aim to improve skill-based learning, they lack comprehensive frameworks that ensure consistency across institutions. This has led to disparate levels of preparedness among graduates, with some institutions benefiting from government initiatives while others struggle due to a lack of resources.

A chart illustrating government funding allocations toward education and skill development over recent years highlights the slow growth in support for specialized programs. Policymakers expressed challenges in maintaining uniform standards across diverse educational institutions, especially when balancing foundational education and specialized training. Moreover, the limited public-private partnership models are seen as a hindrance to implementing innovative HR programs at scale.

Diagram 1: Government Funding Allocation for Education and Skill Development (2018-2023)

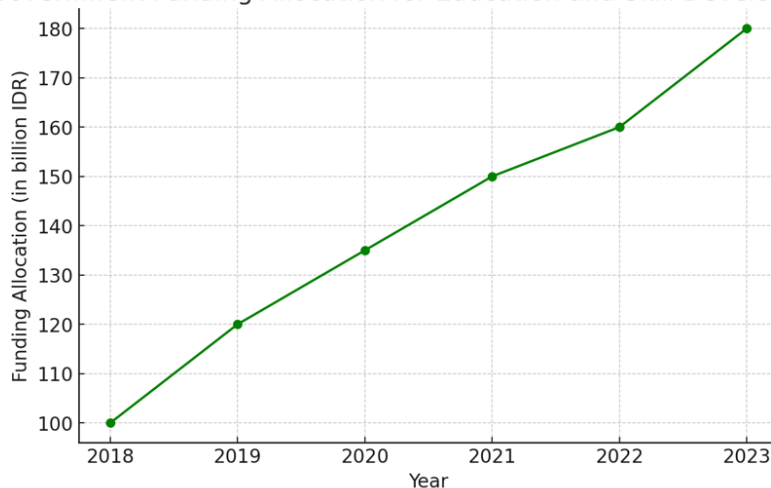


Figure 3. Government Funding Allocation for Education and Skill Development (2018-2023)

To overcome these barriers, policymakers recognize the need for regulatory reforms that would incentivize industry collaboration, foster standardized skill certifications, and provide funding for educational institutions to implement advanced HR strategies. With these reforms, institutions could better prepare students with relevant skills, improving both employability and workforce quality.

Impact of Technology Integration on Talent Development

Technology integration emerged as a pivotal factor in developing a sustainable talent pipeline. Schools and universities incorporating digital tools, such as online learning platforms and virtual internships, report positive outcomes in student readiness for tech-oriented jobs. However, findings indicate that only a small percentage of educational

institutions have the digital infrastructure required to offer such programs. A pie chart showing the percentage of institutions with high, moderate, and low levels of technology integration highlights the disparity in technological readiness among Indonesian educational institutions.

Diagram 2: Technology Integration Levels in Educational Institutions

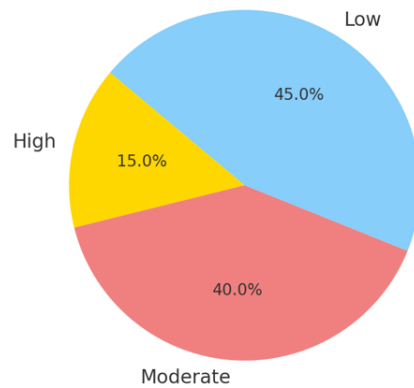


Figure 4. Technology Integration Levels in Educational Institutions

The analysis reveals that institutions with high levels of technology integration exhibit more effective HR development strategies, providing students with practical, tech-based skills that are directly applicable to industry needs. For instance, digital simulations, virtual labs, and collaborative online projects allow students to engage in real-world problem-solving, improving both their technical and analytical abilities. However, limited access to resources and trained personnel are major obstacles to the widespread adoption of technology-driven HR initiatives.

Future HR strategies in education should, therefore, prioritize technology as a core component of skill development, aligning with global trends in digital transformation. Such initiatives could also address geographic and socioeconomic disparities by making high-quality education more accessible to students in remote or underserved areas.

Challenges and Opportunities for Building a Sustainable Talent Pipeline

The final analysis identifies challenges and opportunities for constructing a sustainable talent pipeline through HR development strategies. Key challenges include inadequate funding, a lack of industry-standard curricula, and limited training for educators in modern HR practices. A table summarizing the main challenges and opportunities highlights critical points for consideration, such as expanding public-private partnerships and enhancing curriculum flexibility.

Table 2. Challenges and Opportunities for Sustainable Talent Pipeline Development

Challenges	Opportunities
Inadequate funding for HR programs	Potential for industry partnerships
Lack of standardized curricula	Curriculum reform and policy support
Limited training for educators	Professional development programs
Low technology integration	Government grants for tech upgrades

Despite these challenges, there are significant opportunities to reform Indonesia's HR development landscape. Government support, alongside strategic partnerships with the private sector, could empower educational institutions to adopt more dynamic curricula and comprehensive training programs. This, in turn, would produce a workforce capable of meeting the demands of a modern economy, strengthening Indonesia's competitiveness on the global stage.

These findings underscore the importance of a multifaceted approach to HR development, involving collaborative efforts from government bodies, educational institutions, and industry stakeholders. Such collaboration is essential for building a robust talent pipeline that not only meets current industry demands but also fosters resilience and adaptability among future generations of the Indonesian workforce.

Discussion

The study provides an in-depth look at the alignment gap between Indonesia's educational system and the needs of the industry, an issue that has long impacted the nation's ability to produce a workforce that meets contemporary demands. The findings reveal that while educational institutions continue to provide a solid foundation in communication and basic technical skills, there remains a significant mismatch in advanced, practical skills like digital literacy, analytical thinking, and project management. This gap is critical, as industries are increasingly reliant on these competencies to keep pace with technological advancements and the evolving global market. The observed industry dissatisfaction aligns with prior research, such as Setiawan et al. (2020), who indicated that many graduates across Southeast Asia are underprepared for the complexities of modern work environments due to an overemphasis on theory over practical application. These findings suggest a need for a paradigm shift in curriculum design, moving from predominantly theoretical instruction toward a balanced approach that integrates industry-relevant, applied learning.

An examination of HR development strategies reveals a fragmented landscape among educational institutions. Institutions that have adopted more progressive HR strategies, such as skill-based workshops, mentorship programs, and internships, report higher levels of graduate employability. However, the implementation of these strategies is inconsistent and varies widely based on institutional resources and industry connections. For example, some leading institutions with strong industry ties offer specialized programs that enable students to work on real-world projects with industry mentors, significantly enhancing their practical skills. Conversely, other institutions, particularly those with fewer resources, lack structured HR development programs, leaving students with limited exposure to industry demands. This variation underscores findings by Rahman and Santoso (2020), who emphasized the value of hands-on experience in improving graduates' readiness for the workforce. However, without broader standardization and policy support, these promising HR strategies remain underutilized, limiting their impact on a national scale.

The critical role of government policy emerges as a key factor in shaping HR development within educational institutions. Although recent policy initiatives have aimed at improving skill-based learning, they have often lacked a comprehensive, scalable framework, which has resulted in a disparity in preparedness across institutions. Institutions that benefit from government funding and pilot programs are often able to offer specialized skill development opportunities, whereas those without such support struggle to implement basic HR strategies. Prior studies, such as Santoso and Dewi (2021), noted that policy support is essential for the sustainable implementation of effective HR programs. This study's findings reinforce the need for policies that not only increase funding but also

establish consistent standards for skill development programs. For instance, policies could mandate collaboration between education providers and industry players, provide financial incentives for institutions adopting advanced HR programs, and establish guidelines for evaluating program effectiveness.

Technology integration within educational settings is another significant factor influencing talent development. Institutions that incorporate digital tools like online learning platforms, virtual labs, and collaborative software enable students to develop skills essential for tech-driven roles. The findings suggest that while technology integration is positively correlated with student preparedness, a large proportion of institutions lack the infrastructure to implement these tools effectively. This barrier to technology adoption is particularly problematic given Indonesia's goal to become a knowledge-based economy, where digital and technical proficiency are paramount. Research by Dewi and Handayani (2019) showed that technology not only enhances learning outcomes but also makes high-quality education more accessible to remote and underserved areas. However, as indicated in this study, insufficient resources and a lack of government funding inhibit many institutions from reaching the necessary level of technological readiness. Increasing government grants and fostering partnerships with tech firms could help bridge this digital divide, ensuring that more students are prepared for the technological demands of modern industries.

The challenges associated with building a sustainable talent pipeline are further compounded by an over-reliance on traditional teaching methods and a lack of educator training in contemporary HR practices. Many educators, while highly qualified in their subject areas, may not be equipped to teach skills like project management, critical thinking, or digital literacy effectively. These limitations create a bottleneck in the pipeline, as students graduate without acquiring the competencies most in demand by industries. Additionally, as institutions struggle to attract industry partnerships due to limited resources and inadequate technology, they miss opportunities to expose students to real-world challenges. Addressing this issue would require not only increased investment in educator training but also the development of industry-academia collaboration models that allow students to engage in practical, project-based learning experiences.

Practical Implications

The findings of this study offer several practical implications for key stakeholders. Educational institutions should prioritize revising their curricula to integrate industry-specific skills, especially in high-demand areas such as technology and analytical thinking. Institutions could adopt modular learning models that allow students to focus on particular skill sets required by specific industries, enhancing their employability upon graduation. Additionally, fostering long-term partnerships with industry stakeholders can help institutions create practical learning experiences, such as internships, real-world projects, and mentorship programs. Policymakers could support these efforts by increasing funding allocations specifically earmarked for industry-focused HR development initiatives and establishing standardized guidelines to ensure that all institutions meet baseline requirements for skill development. For industry stakeholders, the research findings highlight the benefit of collaborating more closely with educational institutions to build a talent pool aligned with their needs, reducing costs associated with extensive in-house training.

Research Limitations and Future Directions

This study, while providing valuable insights, has limitations that should be acknowledged. While suitable for exploring in-depth insights, the qualitative approach may

limit the generalizability of findings across the diverse educational landscape in Indonesia. The sample size, although carefully selected, represents only a portion of stakeholders involved in education and industry collaboration, potentially overlooking varying perspectives and challenges faced by smaller or more remote institutions. Additionally, the reliance on self-reported data introduces the potential for response bias, as participants may portray their institutions more favorably. Future research could address these limitations by employing a mixed-methods approach, combining qualitative insights with quantitative data to assess the effectiveness of HR development programs across a broader sample of institutions. Longitudinal studies would also provide insights into the impact of recent policy changes on HR development strategies, particularly in understanding the long-term benefits of industry partnerships and technology integration in fostering a sustainable talent pipeline in Indonesia.

4. CONCLUSION

In conclusion, this study underscores a significant gap between Indonesia's educational outcomes and industry needs, particularly in advanced practical skills such as digital literacy, analytical thinking, and project management. Despite the introduction of HR development strategies, including internships, skill-based workshops, and limited industry partnerships, these initiatives remain inconsistent and largely underutilized due to insufficient resources and a lack of standardization. Furthermore, government policies have yet to fully support the integration of industry-relevant skills, with funding levels and policy frameworks failing to meet the demands of a rapidly evolving job market. These findings underscore the urgent need for collaborative, standardized, and technology-supported reforms in HR development and educational policies.

Practical recommendations call for educational institutions, policymakers, and industry stakeholders to work together to align curricula with real-world demands. By increasing funding, enhancing educator training, and fostering industry partnerships, Indonesia can build a more competitive and resilient workforce prepared for global challenges. Future efforts should prioritize standardized, scalable HR development programs and encourage greater technological integration to bridge existing gaps. These steps are essential for fostering an adaptable talent pool capable of supporting Indonesia's aspirations for economic growth and global competitiveness.

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