

Research Horizon

ISSN: 2808-0696 (p), 2807-9531 (e)

Research Horizon

Volume: 05

Issue: 01

Year: 2025

Page: 47-56

Education and Training for a Sustainable Indonesian Workforce: A Literature Review

Irene Nadia Vaniarinanta^{1*}, Hermi Susanti¹, Ismi Darmastuti¹

¹ Faculty of Economics and Business, Universitas Diponegoro, Semarang, Indonesia

* Corresponding author: Irene Nadia Vaniarinanta (irenenadia2000@gmail.com)

Abstract

Education and training are key steps in improving the quality of human resources. Labor productivity is influenced by education and training that can develop knowledge and skills. This study examines the role of education and training in preparing and empowering Indonesia's workforce to face future challenges. The study analyses how quality education and training can equip the workforce with essential skills and knowledge to adapt to market dynamics and support sustainable development. Through a literature review method, the study shows that investment in human capital through education and training not only improves the competitiveness of the workforce in the global arena but also contributes significantly to inclusive and sustainable economic growth. The results of this study emphasize the importance of synergies between education, sustainable development strategies, and improving access to quality education and training programs for employees in Indonesia. These synergies are key to realizing a workforce that is competent, adaptive, and ready to contribute to a more just, prosperous, and environmentally friendly future for Indonesia.

Keywords

Education, Training, Human Resources, Sustainable Workforce

1. Introduction

In the era of globalization and rapid industrial development, the success of the vision and strategy in the organization depends on the development of effective human resources (HR), this is because HR is one of the backbones of a business that focuses on improving competence and effectiveness on an ongoing basis (Almarzooqi et al., 2019). Hermanto (2014) also stated that in the reform era, Human Resources (HR) plays a crucial role in achieving goals and development in various institutions, both in government, BUMN, and the private sector. The success of an organization is highly dependent on HR management, including maintenance, development, and education and training. Well-managed HR will be an asset, while poor management can be a threat. Furthermore, Hermanto (2014) explains that education and training aim to improve the competence and skills of human resources to optimize existing resources for progress and welfare improvement. In addition, education and training also act as an internal forum for employees to increase productivity and develop themselves. Education that is good quality will produce a successful nation because the quality of a nation in the eyes of the world is determined by the country's education level (Berlian et al., 2024).

Work productivity is influenced by education and training which has an impact on increasing knowledge and skills (Romando, et al. 2023). Human resource management requires optimal management because humans are the main factor in every company's operational activity. Companies need to pay attention to the quality of human resources involved in the production process to produce the expected quantity and quality of products (Chrisdwiandra, 2024). The quality of labour includes physical aspects, knowledge, skills, and competencies needed to convert inputs into production outputs (Romando, et al. 2023). The quality of human resources is directly proportional to the results achieved (Isnawati, et al. 2023). Quality human resources are the key to the company's success. To achieve this goal, superior human resources are needed through education and training (Apriliana & Nawangsari, 2021).

The excellence of human resources is an added value that is needed to face future life which may be more competitive and filled with challenges when compared to the present. So, to face a more challenging future, human resources need to be equipped with adequate education. To promote sustainable societal transformation, education is thought to be crucial, particularly education with an Emphasis on Sustainable Development (ESD). According to Günther et al. (2022) the key idea to achieving sustainable development worldwide is Education for Sustainable Development, or ESD. Encouraging people to think and behave in a sustainable and forward-looking way is the goal of ESD. In addition to imparting information, ESD encourages and advances the development of sustainable capabilities that will enable students to meet future social, environmental, and economic issues (Ekaputri et al., 2024).

However, education alone is not enough to support a sustainable future. There is a need to train employees to enhance their skills and capabilities. Soft skill-based practices are vital because they promote ethical decision-making, teamwork, and communication, all of which are necessary for negotiating the intricate and socially intertwined nature of sustainability issues (Pons et al., 2024). Integrating such training will have an impact on organizational sustainability, the training provided by the company will provide the knowledge and skills needed by employees (Keong, 2020). Workers who believe their employer is dedicated to moral and sustainable business practices are more likely to stick around and are generally more productive, which contributes to a company's long-term success. Bilderback, 2024). One crucial step in helping companies develop a culture of moral and responsible conduct is including training for organizational sustainability. In addition to helping businesses

meet sustainability targets, this kind of training fosters employee and customer trust (Mariam et al., 2021).

Therefore, several questions arise regarding the effectiveness of education and training programs in preparing a more competent and sustainable workforce in Indonesia. The mismatch between the skills employees have and those required by the job often leads to a decline in performance, which limits productivity. Despite the government's efforts through various vocational education and continuous training programs, the skills gap, low digital literacy, and lack of focus on sustainability skills are still major obstacles to achieving these goals. This gap is caused by the lack of access to quality education and training programs designed to develop the competencies needed in Indonesia's dynamic labour market. This research aims to review the literature on the role of education and training in building a sustainable workforce in Indonesia and explore program effectiveness, government policies, and challenges. With this review, this research is expected to identify gaps in the implementation of education and training and provide recommendations to create a workforce that is better prepared for future sustainability demands.

2. Literature Review

Education is a multifaceted process designed to develop and enhance the potential of individuals, shaping their cognitive, emotional, and social capacities. It is a cornerstone for human development, facilitating the growth of skills, knowledge, and competencies essential for navigating the complexities of the world. According to Danes et al. (2024), education serves as a means to enhance human resources, providing individuals with the tools necessary for personal growth and societal contribution. It is not simply about acquiring information but about fostering critical thinking, problem-solving abilities, and ethical values. Hermanto (2014) further elaborates on education as a process of increasing understanding and general knowledge, emphasizing the role of education in creating awareness of the environment. This perspective highlights the connection between education and the broader societal context, stressing the importance of understanding one's surroundings in order to make informed decisions that can contribute positively to both personal development and community well-being.

Wamsler (2020) adds another dimension to education by focusing on sustainability. Education is seen as a tool for developing not only technical skills but also the attitudes and competencies necessary for addressing complex global challenges, such as climate change and social inequality. In this view, education plays a crucial role in preparing individuals to act responsibly and sustainably in their personal and professional lives, equipping them with the knowledge and values needed to create a more sustainable future.

Training is a deliberate effort aimed at enhancing the skills and competencies of individuals, particularly in the context of the workplace. As noted by Danes et al. (2024), training is an essential practice for improving the capabilities of employees, ensuring they are equipped with the necessary skills to perform their roles effectively and efficiently. However, training goes beyond just skill development; it is also a critical mechanism for personal and professional growth, fostering continuous learning and adaptability. Wamsler (2020) highlights that training is not merely about enhancing technical skills but also about building awareness and competencies that promote sustainable behavior and decision-making. In today's world, where sustainability is increasingly becoming a global priority, training plays a pivotal role in equipping individuals and organizations with the knowledge and practices necessary to make responsible and environmentally conscious decisions. This includes understanding the environmental, economic, and social impacts of their actions and integrating sustainability principles into everyday decisions.

Pillans (2024) extends the definition of training to include the concept of "reskilling," which is crucial in an ever-evolving job market. Reskilling refers to the process of supporting workers in acquiring new skills to transition into different roles or industries, especially when their current job functions are being displaced or altered by technological advancements or shifting market demands. According to Putranti et al. (2020), reskilling is essential for ensuring that workers remain competitive and adaptable in the face of changes in the workforce. It enables employees to pursue new career paths, maintain job security, and thrive in roles that require different expertise than what they previously held.

Sustainable development is a concept where the concept of development is used to meet the needs of the present without compromising the ability of future generations to meet their needs. According to Kafetzopoulos (2023) the theory of sustainable development explains how the approach is taken to achieve a balance between economic, social, and environmental goals that encourage long-term sustainability in the face of future external environment dynamics. In addition (Fergusson et al., 2020) define sustainable development as a concept where the use of resources does not deplete or damage the environment (Wahyudi, & Santoso, 2022).

RQ1: What is the role of education and training in building a sustainable workforce in Indonesia?

RQ2: What is the effectiveness of education and training programs in improving the sustainable skills of the workforce in Indonesia?

RQ3: What are the challenges faced in implementing sustainability-oriented education and training programs in Indonesia?

3. Methods

This research used a systematic approach by following a PRISMA diagram-based selection process to select relevant studies. The first step was a literature search through various databases with several keywords. The initial 526 articles were in the 2019-2024 publication timeframe and left 248 for further screening. At the screening stage, 174 articles were excluded due to irrelevance, leaving 74 reports for review. However, 62 reports were not accessible, and 11 additional reports were found from other sources. After an eligibility assessment, 12 reports were identified as suitable candidates for review. In the final stage, 20 articles consisting of 9 articles from the initial search and 11 articles from other sources were included in the systematic review.

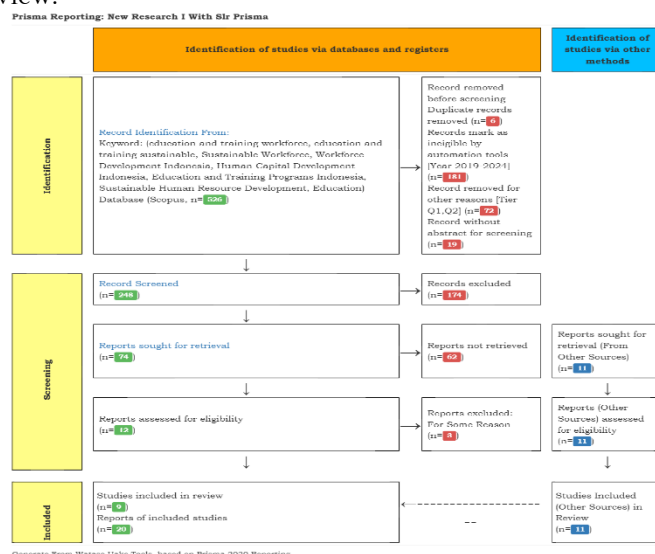


Figure 1. Prisma Analysis Report

4. Results

Based on the analysis of the data collected, several key results were found regarding the role of education and training in improving labour productivity and supporting sustainability efforts in Indonesia. The results show that industry-based education and experiential training programs have a significant positive impact on workforce productivity. Statistical analysis supports these findings, showing that the practical skills gained from these programs match the needs of today's labour market, improving employee performance and adaptability. Partnerships between educational institutions and industry have also proven to be important in ensuring that curricula match the workforce's needs. The results indicated that this collaboration facilitates the integration of relevant skills that enhance graduates' work readiness. The inferential analysis supports the hypothesis that curriculum linkage to industry needs positively correlates with work readiness.

In addition, sustainability-focused training showed significant improvements in environmental awareness and skills to adopt green technologies, which contributed to organizational performance and built an environmentally conscious work culture. In the context of the renewable energy sector, education and training also create new job opportunities, supporting a workforce ready for the energy transition. Data analysis shows a correlation between training in the renewable energy sector and new job creation, underscoring the importance of policy support for continued program investment. Furthermore, education plays an important role in providing critical thinking skills, while training hones the technical and soft skills needed to cope with dynamic job demands. On-the-job training programs have been shown to accelerate skill acquisition and increase workers' earnings. Green Human Resource Management (GHRM) programs are also effective in developing green skills and behaviours in the workplace, supporting the achievement of corporate environmental goals.

However, there are several challenges in implementing sustainability-oriented education and training programs in Indonesia. Findings show that the curriculum has not kept up with industry developments, budget limitations, and inadequate instructor skills are the main obstacles in the development of this program. The lack of awareness from some industry sectors regarding the importance of sustainability skills limits collaboration between educational institutions and industry. On the other hand, training soft skills such as communication, collaboration, and ethical decision-making is also a challenge as it requires a specialized approach and substantial investment. The results of this analysis emphasize the importance of support from government, industry, and educational institutions to overcome these barriers. Stronger collaboration and investment in sustainability-oriented training is urgently needed to build a workforce that is ready to face future sustainability challenges and contribute effectively to Indonesia.

Singh et al. (2022) highlight the critical role of education, training, and e-learning in Saudi Arabia's efforts to close the skills gap and empower its workforce. They suggest that e-learning, guided by constructivist theory, can bridge the gap between the local workforce and global standards. Similarly, Pimpa (2023) examines sustainability education in universities, emphasizing the need for programs designed to meet the future sustainability skills required by students, thereby enhancing their career readiness. Tahir et al. (2024) focus on the role of eco-friendly human resource management (HRM) practices, advocating for training approaches that foster green competences and employee engagement to improve environmental performance within organizations. On-the-job training is also a central theme, as discussed by Wicaksono et al. (2024), who find a significant correlation between on-the-job training and increased wages for Indonesian migrant workers. This type of training not only boosts performance but also enhances competitiveness in the workforce. Furthermore, Mukhuty et al. (2022) identify human factors as barriers to the

development of Industry 4.0, with socially responsible HRM practices proposed as solutions to overcome these challenges by enhancing collaboration, leadership, and skills development.

Training in soft skills, such as communication and ethical decision-making, is emphasized by Pons et al. (2024), who argue that such skills are essential for promoting sustainability practices in the workplace. Employees with strong interpersonal skills are more likely to adopt and promote sustainable practices. Likewise, Bilderback (2024) stresses the importance of combining sustainability training with the United Nations' Sustainable Development Goals (SDGs), which not only improve productivity and employee happiness but also encourage environmentally friendly behaviors and enhance organizational reputation.

In the context of talent management, Pillans (2024) discusses the necessity of reskilling as part of a future-ready workforce strategy. The study advocates for strategic workforce planning, flexible work practices, and targeted upskilling programs to navigate evolving business environments. Similarly, Rukadikar & Khandelwal (2024) examine the potential of Generative Artificial Intelligence (GAI) in supporting leadership development through personalized learning and real-time upskilling, particularly in adapting to digital change. Other studies, such as those by Simbolon & Simbolon (2024) and Zahrani (2022), focus on the broader impact of sustainability education and its role in promoting entrepreneurial culture and technological transitions. These studies underscore the importance of creating a sustainable industrial future by ensuring that individuals are equipped with the necessary skills and knowledge to support renewable energy initiatives and technology transfer.

5. Discussion

Education and training play an important role in building a sustainable workforce in Indonesia. According to research, education and training are closely related to increasing work productivity, whereas industry-based training provides practical skills needed in the workplace (Fransiskus, 2016; Middleton, 1993). The study of Siswanto, Firdaus, and Mariana (2022) shows that education and training also play a role in improving employee performance. Furthermore, vocational education and training supported by real-world experience can help create a workforce that is ready to face the changing needs of the industry (Fairman et al., 2020). Collaboration between educational institutions and industry is important so that the curriculum implemented is relevant to market conditions. With this collaboration, the trained workforce is expected to not only be productive but also improve the competitiveness of companies and the economy (Fairman, et al, 2020). Sustainability-focused education also plays a big role in building a sustainable workforce as it can raise awareness of environmental and social issues, which are highly relevant in the current global context (Saeed, et al. 2022). Green competency-oriented training programs enable employees to adopt green technologies and implement environmentally friendly practices that not only benefit individual performance, but also improve overall organizational performance (Kim, 2022; Anwar et al. 2020). Companies that provide sustainability-related training can build an organizational culture that supports sustainability, where every employee feels responsible for environmental impacts (DuBois, 2012). Effective education and training can also encourage innovation among employees, resulting in more efficient and sustainable solutions, thus contributing to the company's competitive advantage (Gilal, et al. 2019).

The effectiveness of education and training programs in improving the sustainability skills of the workforce in Indonesia is reflected in improved skills and awareness of sustainable practices. According to Ziyaden et al. (2024), programs that focus on green competency training can increase environmental awareness among

employees and encourage innovations that support sustainability. The effectiveness of these programs is also evident from the link between training that integrates Green Human Resource Management (GHRM) and corporate environmental performance, which shows that GHRM practices encourage employees' green behaviour and improve corporate sustainability performance (Pons, et al. 2024; Tahir et al., 2024). In addition to technical skills, this training also includes the development of soft skills, such as communication and collaboration, which are increasingly important in this digital era to implement sustainability practices (DuBois, 2012). With these additional competencies, employees are more encouraged to make tangible contributions to the company's sustainability goals. For example, in Indonesia, education and training in the renewable energy sector make an important contribution to preparing a workforce ready to fill technical roles such as solar and wind energy technicians, which supports Indonesia's competitiveness in the global market (Sahat & Dwi, 2024).

However, there are several challenges in the implementation of sustainability-oriented education and training programs in Indonesia. One of the main challenges is the gap between the available curriculum and market demands, especially in terms of industry-relevant sustainability skills (Danes, et al. 2024). Many education and training institutions lack curricula and instructor skills that match the needs of the sustainability industry (Fairman, et al. 2020). In addition, infrastructure and budgetary constraints hamper curriculum development and facility improvements needed for effective learning. Sustainability training programs generally require large investments in human resources, experts, and infrastructure (Mukhuty, et al. 2022). The lack of collaboration between educational institutions and industry in developing relevant training is another challenge, especially since not all industry sectors realize the importance of sustainability skills for their workforce. This is exacerbated by budget constraints, which may hinder the sustainability of future training programs. In addition, sustainability training also faces difficulties in teaching soft skills, such as communication skills and ethical decision-making, which are needed to deal with the complexity of sustainability challenges that are often social in nature (Pons, et al. 2024). Therefore, stronger support from the government, industry sector, and educational institutions is needed to achieve effective sustainability education and training programs in Indonesia.

6. Conclusion

Education and training play a critical role in building a workforce that was ready to face the challenges of sustainability in Indonesia. Industry-focused education and training programs that integrate real-world experience are proven to improve workforce productivity as well their readiness to face market dynamics. Partnerships between educational institutions and industry are essential to ensure that curricula are in line with current workforce needs. In addition, sustainability training that focuses on developing technical and soft skills, such as communication and collaboration, also supports an organization's environmental performance. However, this article also highlights the challenges faced in implementing sustainability-oriented education and training programs in Indonesia. Some obstacles include budget constraints, inadequate instructor skills, and a lack of industry awareness of the importance of sustainability skills. Therefore, government support, stronger collaboration between the education and industry sectors, and investment in relevant training are urgently needed to create a competent workforce ready to contribute to Indonesia's sustainable future.

References

- Almarzooqi, A. H., Khan, M., & Khalid, K. (2019). The role of sustainable HRM in sustaining positive organizational outcomes: An interactional framework. *International Journal of Productivity and Performance Management*, 68(7), 1272–1292.
- Berlian, U. H., Nurpratiwi, E. R., Mu'ammara, N., Dirgantara, I. M. B., & Soesanto, H. (2024). Systematic Literature Review: Green Marketing. *Research Horizon*, 4(4), 251–260.
- Bilderback, S. (2024). Integrating training for organizational sustainability: the application of Sustainable Development Goals globally. *European Journal of Training and Development*, 48(7–8), 730–748.
- Chrisdwandra, I. (2024). The Effect of Service Recovery on Customer Satisfaction with Customer Trust as an Intervening Variable. *Research Horizon*, 4(4), 239–250.
- Danes, P. P., Larasati, Lady, Hati, C. M. P., & Amrina, D. H. (2024). The Influence of Education and Training on Labor Productivity in Indonesia. *Journal of International Conference Proceedings*, 6(6), 369–379.
- Ekaputri, A. M., Dani, A. N., Sukresna, I. M., & Indriani, F. (2024). Customer Interest in Saving with Easy Mobile Banking to Support Green Marketing. *Research Horizon*, 4(4), 233–238.
- Fairman, B., Voak, A., Abdullah, H., & Indarjo, A. (2020). Re-skilling vocational education and training practitioners in Indonesia. *Journal of Physics: Conference Series*, 1516(1).
- Fergusson, L., van der Laan, L., Shallies, B., & Baird, M. (2020). Work, resilience and sustainable futures: The approach of work-based research to problems and their solutions. *Journal of Work-Applied Management*, 12(1), 22–41.
- Grimes, P. W., Lopus, J. S., & Amidjono, D. S. (2022). Financial life-skills training and labor market outcomes in Indonesia. *International Review of Economics Education*, 41(September), 100255.
- Günther, J., Overbeck, A. K., Muster, S., Tempel, B. J., Schaal, S., Schaal, S., Kühner, E., & Otto, S. (2022). Outcome indicator development: Defining education for sustainable development outcomes for the individual level and connecting them to the SDGs. *Global Environmental Change*, 74(May), 102526.
- Irfan, S. M., Qadeer, F., Abdullah, M. I., & Sarfraz, M. (2023). Employer's investments in job crafting to promote knowledge worker's sustainable employability: a moderated mediation model. *Personnel Review*, 52(8), 2025–2047.
- Kafetzopoulos, D. (2023). Environmental dynamism and sustainability: the mediating role of innovation, strategic flexibility and HR development. *Management Decision*, 61(6), 1697–1716.
- Keong, O. C. (2020). Determinants of intentions to engage in sustainability accounting & reporting (SAR) and moderating role of internal audit function: The perspective of accountants. *Arthatama*, 4(1), 33–43.
- Mariam, I., Budhiana, J., Permana, I., Dewi, R., Rahmanishati, W., Noviyanti, L., ... & Umehopa, Y. F. (2021). Knowledge, attitudes, disaster training and self efficacy on disaster preparedness. *Research Horizon*, 1(5), 179–188.
- Martiawan, R., Achdiat, A., Ruyani, N. R., Ediyanto, E., & Jamaludin, M. (2023). Analysis of Food Security in Regional Context: West Java Provincial Government as a Case Study. *Research Horizon*, 3(1), 1–8.
- Mukhty, S., Upadhyay, A., & Rothwell, H. (2022). Strategic sustainable development of Industry 4.0 through the lens of social responsibility: The role of human resource practices. *Business Strategy and the Environment*, 31(5), 2068–2081.
- Pillans, G. (2024). Reskilling and rethinking work: how to build a future-fit workforce. *Strategic HR Review*, 23(4), 158–163.
- Pimpa, N. (2023). Sustainability training in business education in Thailand. *Cogent Education*, 10(2).
- Pons, S., Khalilzadeh, J., Weber, M. R., & Smith, R. A. (2024). Cultivating sustainability savvy: the role of soft skills in shaping sustainable practices. *International Hospitality Review*.
- Putranti, H. R. D., Suparmi, S., & Susilo, A. (2020). Work life balance (WLB) complexity and performance of employees during Covid-19 pandemic. *Arthatama*, 4(1), 56–68.
- Rukadikar, A., & Khandelwal, K. (2024). Leadership development through self-upskilling: role of generative artificial intelligence. *Development and Learning in Organizations*, 38(4), 27–30.

- Simbolon, S., & Simbolon, D. M. (2024). Sustainable Workforce in a Green Era: Indonesia's Energy Sector Transition. *International Journal of Energy Economics and Policy*, 14(3), 702–710.
- Singh, H. P., Singh, A., Alam, F., & Agrawal, V. (2022). Impact of Sustainable Development Goals on Economic Growth in Saudi Arabia: Role of Education and Training. *Sustainability (Switzerland)*, 14(21), 1–25.
- Tahir, A. H., Umer, M., Nauman, S., Abbass, K., & Song, H. (2024). Sustainable development goals and green human resource management: A comprehensive review of environmental performance. *Journal of Environmental Management*, 370(September), 122495.
- Trivellas, P., Malindretos, G., & Reklitis, P. (2020). Implications of green logistics management on sustainable business and supply chain performance: evidence from a survey in the greek agri-food sector. *Sustainability*, 12(24), 10515.
- Wahyudi, F. E., & Santoso, R. S. S. (2022). The Role of Social Capital in Community Based Ecotourism: A Case of Batang District, Central Java, Indonesia. *Research Horizon*, 2(5), 511-531.
- Wamsler, C. (2020). Education for sustainability: Fostering a more conscious society and transformation towards sustainability. *International Journal of Sustainability in Higher Education*, 21(1), 112–130.
- Wang, M., & Zhou, C. (2023). How Does Graduate Training Promote Sustainable Development of Higher Education: Evidence from China's "Double First-Class" Universities' Programs. *Sustainability (Switzerland)*, 15(2).
- Wicaksono, P., Al Afa, B., Susanna, N., & Aninditya, F. (2024). Skill formation and income: Insights from the Indonesian migrant workers. *Social Sciences and Humanities Open*, 10(August), 101086.
- Zahrani, A. A. (2022). Promoting sustainable entrepreneurship in training and education: The role of entrepreneurial culture. *Frontiers in Environmental Science*, 10(September), 1–15.



Copyright: © 2025 by the authors. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution-ShareAlike 4.0 International License (<https://creativecommons.org/licenses/by-sa/4.0/>).