

MODELING QUALITY HUMAN RESOURCES EMPOWERMENT TO DRIVE GREEN AND SUSTAINABLE ECONOMIC GROWTH IN WEST JAVA

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Abstract

The transition to a green and sustainable economy in West Java requires the support of qualified and competent Human Resources (HR) in accordance with sustainable principles. This study aims to model an effective HR empowerment strategy to drive this growth. Using a qualitative case study approach, data were collected through in-depth interviews with 30 key informants from 10 West Java regional government agencies and analysis of related policy documents. The study revealed that existing HR empowerment programs remain fragmented, poorly integrated, and face a competency gap with the needs of the green sector. A SWOT analysis identified strengths in political commitment and agency networks, but weaknesses in coordination and curriculum. Based on the findings, the SINERGI HIJAU (Integrative Synergy of Human Resources Empowerment for a Green Economy) Model was formulated as a collaborative framework. This model emphasizes the role of BAPPEDA as a coordinator, the development of a standardized Green Core Competency Curriculum, the active involvement of the industrial sector and MSMEs, the provision of incentives, and a robust monitoring and evaluation system. This study concludes that implementing this model can integrate fragmented policies and bridge competency gaps, thereby accelerating the realization of green and sustainable economic growth in West Java. Policy recommendations focus on the formation of a task force, curriculum development, and the creation of an incentive system.

Keywords: Human Resource Empowerment, Green Economy, Sustainable Development, GREEN SYNERGY Model, West Java.

INTRODUCTION

West Java Province, as the epicenter of Indonesia's national economy, faces mounting challenges in sustaining its growth amidst increasing environmental pressures. Issues such as pollution, land conversion, and biodiversity decline threaten the long-term viability of economic development. These challenges underline the urgent need for a transition towards a green economy, which emphasizes environmentally friendly, low-carbon, and resource-efficient growth. However, this transition cannot be realized without the availability of qualified, knowledgeable, and competent human resources who are able to adapt to and drive sustainable practices across sectors.

Modeling plays an essential role in research because it enables scholars to understand, analyze, and predict the behavior of complex systems or phenomena [1]. In the context of a green economy, human resource empowerment serves as a crucial driver for creating innovative, sustainable technologies and practices that improve resource efficiency while minimizing environmental impact. Empowering people with green knowledge and skills is not only a technical necessity but also a strategic imperative to strengthen West Java's economic resilience in the long run.

The urgency of this research is evident when viewed through both global and national perspectives. At the international level, the transition to a green economy is mandated by frameworks such as the Paris Agreement and the United Nations' Sustainable Development

Goals (SDGs) 2030. The UNDP's 2021–2022 Human Development Report also emphasizes the importance of developing green skills to achieve a sustainable future [2]. At the national level, Indonesia's National Medium-Term Development Plan (RPJMN) 2020–2024 highlights sustainable development strategies as a core agenda, as prepared by the Ministry of National Development Planning/Bappenas [3]. Within this context, West Java, as the province with the second highest Gross Regional Domestic Product (GRDP) in Indonesia, holds a strategic position in ensuring the success of the green economy transition [4].

Nevertheless, significant gaps remain in human resource readiness. The majority of the workforce in West Java is concentrated in conventional sectors such as agriculture and traditional manufacturing, which often lack adequate literacy in green practices. In contrast, green human resource management practices have been shown to help organizations achieve environmental sustainability goals [5]. Furthermore, there has been limited academic exploration of how human resource empowerment can be effectively integrated into regional green economic policies to support the transition to a low-carbon economy [6]. This creates a knowledge and competency gap that, if left unaddressed, may hinder West Java's ability to transition towards sustainable economic growth.

Based on these challenges, this study seeks to answer a fundamental question: how can a quality human resource empowerment model be designed to support the acceleration of green and sustainable economic growth in West Java? To address this problem, the research has three objectives: first, to identify existing policies and programs on human resource empowerment implemented by stakeholders in West Java; second, to analyze gaps, challenges, and opportunities in empowering human resources for green economy transformation; and third, to formulate an integrated and effective human resource empowerment model that can encourage sustainable economic growth in the region.

LITERATURE REVIEW

The quality of human resources is a crucial determinant of regional economic growth. Studies indicate that education and health, as indicators of human capital, have a positive effect on Gross Regional Domestic Product (GRDP), with investment acting as a supporting factor [4]. This relationship is further demonstrated through the Human Resources Quality Index (IKSDM), developed as an alternative to indices such as the Human Development Index (HDI) and the Community Welfare Index (IKM), thereby confirming its validity in development analysis [7].

In parallel, the global shift towards sustainable development has highlighted the importance of integrating environmental, social, and economic considerations into business practices. Manufacturing organizations, in particular, are increasingly expected to balance economic, social, and environmental performance—a task that is both challenging and, at times, controversial [8]. Implementing environmental management systems often creates tensions, as organizations must simultaneously enhance their economic, environmental, and social performance while navigating cultural norms and incorporating green behaviors into daily operations [9]. Dost et al. (2019) emphasize that distributing green ideology across functions can help mitigate these challenges, particularly when applied to two critical functions: human resources and innovation [10][11].

However, the relationship between Green Human Resource Management (GHRM) and green innovation (GI) requires further investigation. Recent studies argue that analyzing the distribution of green management across different functional areas can shed light on concurrent outcomes and interrelationships [12]. Although GHRM and GI are widely recognized for their positive environmental impacts, limited studies have examined their interaction [13]. While GHRM is often acknowledged as shaping Green Supply Chain

Management (GSCM) internally, much of the literature focuses on external pressures rather than internal drivers. Furthermore, discussions of “green versions” of HRM and innovation remain underdeveloped, especially concerning their synergistic effects on the triple bottom line (TBL)—environmental, financial, and social performance [14].

From a broader perspective, the global and national context underscores the urgency of advancing a green economy. Climate change and environmental degradation have prompted global commitments such as the Paris Agreement (2015) and the 2030 Sustainable Development Goals (SDGs), which emphasize low-carbon, inclusive, and sustainable development [6]. Indonesia has responded by embedding green economy principles into its National Medium-Term Development Plan (RPJMN) 2020–2024, focusing on developing superior human resources to drive environmentally conscious growth. Yet, challenges remain. According to the Ministry of Manpower (2023), only 15% of Indonesia’s workforce possesses skills related to the green economy, including renewable energy, waste management, and sustainable agriculture. This reflects an educational and training system that has yet to fully align with the demands of green skills. Suryana highlights that the green economy integrates environmental, social, and economic dimensions to achieve sustainable development, aiming to enhance community welfare while safeguarding the environment [15].

Best practices in human resource empowerment further demonstrate the role of knowledge sharing in promoting sustainability. For instance, the Hanjeli Tourism Village in Sukabumi Regency, West Java, provides evidence of how community collaboration, transfer of local knowledge, and integration of agriculture-tourism sectors can enhance human resource capacity despite limitations in education and technology [16][7].

West Java, as the province with the second-largest GRDP in Indonesia and a leading industrial hub, represents a strategic case for examining the green economy transition. During Governor Dedi Mulyadi’s administration (2025–2030), initiatives such as the *Jabar Green Economy Initiative* (focusing on carbon reduction through green MSMEs) and the *Jabar Juara Lahir Batin* program (emphasizing environmentally based vocational training) were launched. These programs demonstrated positive impacts in raising human resource awareness and capabilities; however, weaknesses such as insufficiently field-relevant training materials remain [17]. Consequently, a more comprehensive framework is needed to optimize human resource capacity for green growth [18].

The role of GHRM in improving sustainable performance is widely acknowledged. Practices such as green recruitment, environmentally based training, and sustainable reward systems have been shown to significantly enhance firms’ performance across economic, social, and environmental dimensions, aligning with the TBL approach [19]. Regional government policies—such as incentives for low-carbon industries and environmentally based HR training—are critical for accelerating this transition [20]. Nonetheless, disparities in HR capacity between regions pose major challenges, highlighting the need for differentiated policies and triple helix collaboration among government, industry, and academia [21].

Previous studies on the green economy have largely concentrated on national-level policies and technological aspects, while the role of human resource empowerment as a central driver in the regional context has not been adequately addressed. This gap is significant, considering that the green economy integrates environmental, social, and economic dimensions as part of sustainable development [22]. Without strong human resource empowerment at the local level, the transformation toward a green economy is likely to face serious obstacles. Therefore, greater scholarly attention is required to understand how

empowering human resources can support and accelerate this transformation at the regional scale.

This study seeks to address the identified gap by analyzing the implementation of human resource empowerment policies in West Java, identifying best practices and challenges in developing green-skilled human resources, and formulating evidence-based recommendations for policymakers and other stakeholders.

The significance of the research can be viewed from three perspectives. Academically, it contributes to the development of conceptual understanding of human resource empowerment in the context of the green economy [23][13]. Practically, it provides a reference for local governments in designing more effective training programs and employment policies that align with sustainable development needs [24][14]. Socially, it supports the acceleration of the green transition in West Java by enhancing human resource capacity, ultimately contributing to long-term sustainability and community well-being.

The relationship between human capital and organizational performance has long been recognized in human resource management and strategy literature. Barney (2001) argues that human capital plays a strategic role in building sustainable competitive advantage [25]. This argument is central to the Resource-Based View (RBV), which posits that organizations can achieve superior performance when they are able to utilize resources that are valuable, rare, difficult to imitate, and non-substitutable [25][26].

In the context of Green Human Resource Management (GHRM), RBV highlights how employee behaviors can be developed, motivated, and expanded to create a sustainable competitive advantage [27]. Moreover, HRM processes are increasingly expected to consider environmental impacts, since HRM practices are instrumental in supporting the implementation and maintenance of environmental management systems (EMS). This alignment can help organizations achieve improved environmental performance [28][29].

Beyond environmental benefits, GHRM also offers organizational advantages, such as enhancing employee retention and strengthening corporate attractiveness [30][31]. For regions like West Java, adopting GHRM strategies at both organizational and policy levels can serve as a foundation for aligning human resource development with the broader objectives of green and sustainable economic growth.

METHOD

This study adopts a qualitative approach with a case study design to gain an in-depth understanding of policies, practices, and dynamics related to human resource empowerment in West Java. The qualitative case study approach is considered suitable because it enables the researcher to explore complex social phenomena within their real-life context and to capture the perspectives of multiple stakeholders who are directly involved in the transition toward a green economy.

Data were collected using two primary techniques, namely in-depth interviews and document analysis. In-depth interviews were carried out with 30 key informants representing 10 government agencies that play strategic roles in human resource empowerment and sustainable development. These agencies include the West Java BKPSDM, the Manpower and Transmigration Service, the Environmental Service (DLH), the Education Office, the Industry and Trade Agency (Disperindag), the Cooperatives and SMEs Service (Diskop UKM), the Regional Development Planning Agency (Bappeda), the Energy and Mineral Resources Service, the Tourism and Culture Office, and the Health Service. Informants were selected purposively to ensure that the data collected reflected the perspectives of those with direct responsibility for human resource development, environmental management, and economic planning in West Java.

In addition to interviews, document analysis was conducted on several official policy and planning documents. These included the West Java Regional Medium-Term Development Plan (RPJMD), the Regional Strategic Policy (Jakstrada) on Waste Management, annual reports on training and empowerment programs, as well as the Governor's performance documents related to human resources and environmental management. The use of document analysis allowed the researcher to capture institutional perspectives and align interview findings with formal policy directions.

The data obtained were analyzed using three techniques. First, triangulation was applied by comparing data from interviews, documents, and limited observations in order to validate the findings and increase their reliability. Second, thematic analysis was conducted by categorizing data into key themes such as training policy, green vocational education, inter-institutional synergy, and implementation challenges. This helped to highlight recurring patterns as well as variations across different agencies. Finally, SWOT analysis was employed to evaluate the strengths, weaknesses, opportunities, and threats associated with the existing human resource empowerment programs. This analytical framework provided a structured means to assess the internal and external factors influencing the effectiveness of these programs.

Overall, the combination of interviews, document analysis, and systematic analytical techniques enabled the study to present a comprehensive and evidence-based exploration of how human resource empowerment contributes to accelerating the green economy transition in West Java.

RESULTS AND DISCUSSION

The findings of this study highlight both progress and persistent challenges in the empowerment of human resources to support the green economy transition in West Java. Based on in-depth interviews with key policymakers and analysis of official documents, it is evident that various agencies have initiated sector-specific programs. However, these efforts remain fragmented, limited in scale, and often lack integration into a coherent policy framework.

At the institutional level, the West Java Human Resources Development Agency (BKPSDM) has prioritized capacity building for civil servants through training in renewable energy, environmental management, and digital governance. Similarly, the Department of Manpower and Transmigration has introduced vocational programs oriented toward environmentally friendly skills, but financial and infrastructural constraints restrict their reach across districts and cities. The Department of Environment has promoted waste management, clean energy use, and circular economy practices, although coordination with other agencies remains suboptimal. Meanwhile, the Education Office has made progress by incorporating sustainable entrepreneurship into secondary education curricula, yet the unevenness of implementation between schools reduces its effectiveness.

The private and community sectors also play an important role but face significant challenges. The Department of Industry and Trade promotes green industry through eco-label certification, yet MSME participation is hindered by limited access to financing and information. The Cooperatives and SMEs Office has launched financing schemes for green entrepreneurs but has yet to establish monitoring systems to assess long-term sustainability outcomes. In tourism, eco-tourism initiatives are developing but are constrained by the low skill capacity of local human resources, while the health sector faces challenges in adopting green hospital concepts due to the limited availability of environmentally friendly medical resources.

Document analysis reinforces these findings by showing that human resource empowerment for the green economy is already incorporated into the 2019–2024 West Java Regional Medium-Term Development Plan (RPJMD). The plan outlines commitments to green training and entrepreneurship development, yet progress remains inconsistent across sectors. Furthermore, disparities exist between urban and rural areas, with urban regions adapting more quickly to green initiatives, while rural areas lag behind due to limited infrastructure, resources, and awareness.

The thematic analysis reveals three core patterns shaping West Java’s green human resource policies. First, individual capacity strengthening is pursued through education, vocational training, and certification in green competencies. Second, institutional empowerment is sought through coordination, regulations, and incentives for environmentally friendly practices. Third, the development of a broader green ecosystem emphasizes collaboration between government, industry, academia, and society in establishing an integrated value chain for sustainable economic growth. These three dimensions underscore the necessity of a multi-layered approach to ensure that individual skills, institutional structures, and broader ecosystems align with one another.

Despite these positive developments, significant challenges remain. The most pressing is policy fragmentation, with each agency implementing isolated programs without a common curriculum or shared performance indicators. Competency gaps between industry needs and graduate qualifications also persist, especially in technical fields such as energy auditing, waste management, and sustainable agriculture. Budgetary limitations exacerbate these issues, as funding is often prioritized for short-term, urgent programs rather than long-term green capacity building. Additionally, cultural barriers, such as resistance from conventional industries and the slow pace of mindset change among workers and bureaucrats, make it difficult to build a sustainability-oriented work culture.

Evaluation of the strengths, weaknesses, opportunities, and threats (SWOT) of the HR empowerment program in West Java produced the following findings:

Table 1. SWOT Analysis

STRENGTHS	WEAKNESSES
There is political commitment in the RPJMD. Complete network of services/agencies. Vocational training institutions (BLK, SMK) are available. The potential for a large number of young human resources.	Coordination and synergy between agencies are still weak. The curriculum and training modules are not specifically "green". Limited and unfocused budget allocation. Monitoring and evaluation of programs that are not yet effective.
OPPORTUNITIES	THREATS
Global demand for green products and services is increasing. Policy and funding support from the central government. Rapid development of green technology. Increased public awareness of the environment.	The pressure of intense global economic competition. Unstable political policy changes. Resistance from conventional industries that are reluctant to change. Rapid rate of environmental degradation.

The SWOT analysis provides further insight into the strengths, weaknesses, opportunities, and threats that characterize West Java’s green human resource empowerment. Political commitment, institutional networks, and a young workforce constitute major strengths, while poor coordination, insufficiently green curricula, and weak monitoring

systems represent core weaknesses. On the opportunity side, global market demand, central government support, and rapid green technology development offer favorable conditions. However, threats include global competition, unstable policy continuity, resistance from conventional sectors, and accelerating environmental degradation.

In response to these challenges, this study proposes the SYNERGY GREEN Model, an integrative framework to align human resource empowerment with sustainable economic objectives. At its core, the model assigns Bappeda as the policy integrator, ensuring coherence between agencies and alignment with the RPJMD. Education and training institutions (BKPSDM, Education Office, and Manpower Agency) are tasked with standardizing a Green Core Competency Curriculum, covering both technical skills (renewable energy, waste management) and soft skills (environmental ethics, systems thinking). Industry and MSMEs contribute by providing input on labor market needs and absorbing training graduates through internship and apprenticeship schemes. Regulatory frameworks and policy incentives, such as tax breaks or ease of licensing for green firms, serve as mechanisms to encourage adoption. Meanwhile, a monitoring and evaluation system with measurable indicators, such as the number of green-certified workers and the growth of green MSMEs, ensures accountability and continuous improvement.

The model also emphasizes the importance of addressing empowerment across three layers. At the micro level, individuals require training, certification, and entrepreneurship skills tailored to the green sector. At the meso level, institutions must collaborate across agencies to provide incentives, share resources, and integrate green technologies into small and medium enterprises. Finally, at the macro level, ecosystem development is pursued through triple helix collaboration between government, academia, and industry, thus creating a systematic and sustainable foundation for West Java's green economy transition.

In conclusion, the findings suggest that while West Java has laid an important foundation for green human resource development, more integrative, coordinated, and systemic approaches are required. The SYNERGY GREEN Model offers a conceptual roadmap that not only addresses current gaps but also positions West Java to leverage its strengths and opportunities in building a green and sustainable economy. Empowering human resources in this way will not only improve competitiveness but also ensure that economic growth is achieved without compromising environmental sustainability and social equity.

CONCLUSION

The findings of this study show that West Java possesses a solid policy foundation to drive the transition toward a green and sustainable economy. However, the effectiveness of these efforts is hindered by weak inter-institutional coordination, limited program sustainability, and unequal implementation across regions. Human resource development, which should serve as the backbone of the green economy, is still fragmented and has yet to be integrated into a comprehensive system. The persistent gap between the competencies required by the green sector and the skills supplied by educational and training institutions further complicates this transition.

To address these challenges, the SINERGI JAU Model is proposed as a collaborative framework that strengthens policy integration, establishes a standardized green core curriculum, enhances industry participation, and ensures accountability through a rigorous monitoring and evaluation system. By adopting this model, West Java can move toward a more coherent, inclusive, and future-oriented strategy for human resource empowerment, ultimately supporting the acceleration of its green and sustainable economic growth.

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