



Green Human Resources Management in Waste Management (Study Southeast Asia)

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Abstract

Background: Waste management challenges numerous countries, particularly developing ones. This review indicates that Southeast Asia, particularly Vietnam, receives a score of 24.5 points, considered low.

Objective: This study reviews the literature on green human resource management in waste management. The author examines the issue from a regional perspective, particularly emphasizing Southeast Asia.

Method: This bibliometric analysis is based on data compiled over the last five years, from 2020 to 2024.

Results: In Southeast Asia, the company can effectively manage pollution by utilizing green human resources, including employees' skills, knowledge, and abilities related to environmental initiatives or practices. In Vietnam, initiatives are underway to promote the advancement of environmentally beneficial technologies. They are constructing a Vietnam green technology database based on an annual green technology classification system: establishing a specialized organization to develop ecologically friendly technology similar to China's green bank. By implementing green human resource management practices, organizations in Indonesia foster a work environment in which employees are confident and prepared to contribute to environmentally favourable initiatives.

Conclusion: Singapore has the highest score for Southeast Asia's most environmentally friendly country. Malaysia and Indonesia affirm that employees with skills, knowledge, and abilities related to environmental initiatives or practices are more likely to engage in environmentally oriented behaviour. Kamboja actively encourages employees to develop environmentally friendly ideas; knowledge transfer is required to achieve a better Environmental Performance Index.

Keywords: Green Human Resource Management, Waste Management, Environmental Performance

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1. Introduction

Across the globe, a substantial informal sector is engaged in textile manufacture, especially in places with both large and small populations, where a formal system for selecting recyclable materials has not yet been implemented. Environmentally sustainable development requires careful and systematic planning, implementation, monitoring, and evaluation (Ferronato & Torretta, 2019). Whether in minor or major cities, authorities in developing countries face the most critical challenge of managing solid waste (Cheng et al., 2022). Energy consumption is essential for enterprises to convert raw materials into completed commodities that produce revenue and profit. Productivity and efficiency improvements can lead to better energy utilization.

On the other hand, adopting environmentally friendly, sustainable, and renewable energy sources might be a viable option to address the balancing issue of development and pollution (Jiao et al., 2023). Trash management poses a formidable obstacle for numerous countries, especially those in the development process, due to the substantial financial resources it demands. In extreme cases, trash management can account for as much as 20% to 50% of a city's budget. Trash management is a more significant challenge in low-income nations, where more than 90% of trash is not disposed of appropriately, such as in open dump sites. The waste collection rate is also low at 39%, compared to the recorded rate of 96% among similar (Lye et al., 2024). Global garbage output is projected to reach around 27 billion tons annually by 2050, with around one-third of this waste originating from Asia (Kumar et al., 2017).

Waste management is one of the biggest challenges developing countries face, especially in Southeast Asia, including Vietnam. Rapid urbanisation, population growth, and inadequate waste management infrastructure create this challenge. In developing countries, waste collection is often uneven, and existing treatment systems tend to be unsustainable. This directly impacts air, water, soil quality, and public health. One indicator that reflects these issues is the Environmental Performance Index (EPI), published by Yale University. Vietnam's EPI score shows that the country faces serious problems in various environmental categories, including waste management. This low score indicates that Vietnam still has much work to do in achieving environmental sustainability, especially regarding waste and pollution. Vietnam's overall score in 2024 is 33.4 out of 100, which ranks the country 161st out of 180 countries.

This score shows that Vietnam has major challenges in various aspects of the environment. In the waste management and sanitation category, Vietnam scored low, around 25.7 out of 100. This is due to the lack of infrastructure for waste and liquid waste management and challenges in implementing sustainable treatment practices. Vietnam's score on biodiversity and habitat is about 36.4 out of 100, indicating ecosystem degradation and loss of habitat for various species. Deforestation and land conversion are major problems in the country. Vietnam scored better in the climate change category, at around 47.8 out of 100. While this score is higher than other categories, Vietnam still has much room to improve policies and practices related to climate change mitigation, such as reducing greenhouse gas emissions.

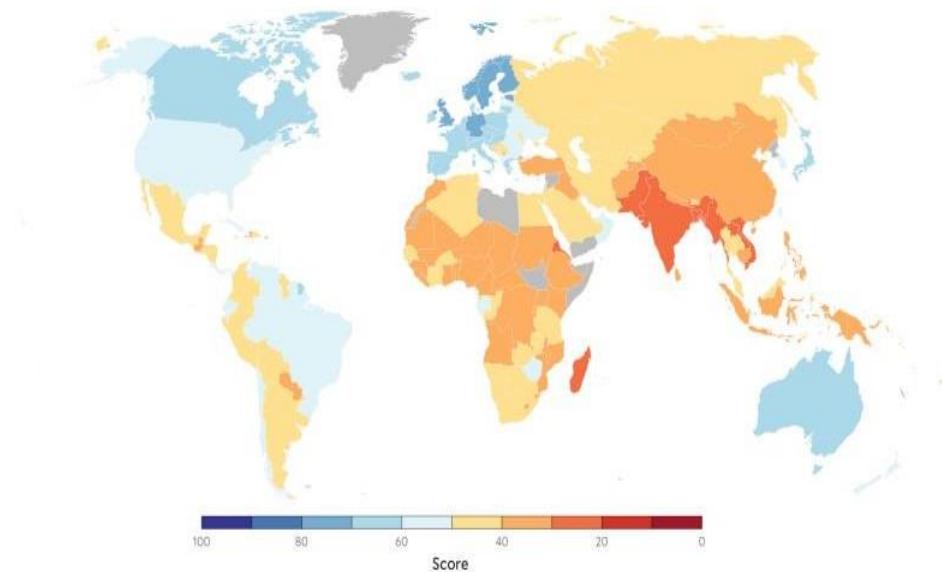


Figure 1. Environmental Performance Index scores for 180 countries

Source: Yale University (2024)

The Environmental Performance Index (EPI) observes various factors to determine how close a country is to achieving international environmental policy goals and how it compares to other countries. Policymakers can utilize the Environmental Performance Index (EPI) to make decisions that align their country's environmental agenda with international goals. Based on the 2024 EPI data obtained from the Yale Center for Environmental Law & Policy, Yale University, the progress achieved by 180 countries in assisting nations to assess their proximity to this matter is evaluated. Environmental policy targets have been set. Estonia ranks first in the EPI 2024 score. Estonia has demonstrated excellent performance in several environmental issues, ranking among the top third of all countries. The country with the lowest score is Vietnam, with a total of 24.5 points. This means that Vietnam still needs more environmental management.

Presently, the recycling rate in most Southeast Asian nations is less than 50% due to insufficient infrastructure and logistical capabilities to carry out the required activities to generate profit effectively. Economically marginalized people generally form the foundation of the recycling process in Southeast Asian countries. The entire recycling pathway's supply chain is substantially impacted by the absence of a comprehensive system to organize the collection process. These unreliable routes further diminish the profitability of the recycling process, reducing the opportunities for plastic to be recycled (Ng et al., 2023). The adverse impact on the ecological environment can be reduced through environmentally friendly product and process innovations. Companies can address environmental issues by using recycled materials to create new, more sustainable products, such as reducing solid waste and carbon emissions (Van et al., 2023).

Human resource management involves managing work and individuals towards desired goals, a fundamental activity in every organization where humans are employed. Human resources is an essential field of research that studies environmental management systems (Longoni et al., 2018). Enhancing environmental performance hinges on effectively utilizing training, collaboration, goal evaluation, non-monetary incentives, and company culture. Green HRM is an eco-centric approach that values and emphasizes the whole environment and all life within it (Stanly et al., 2024). It seeks to establish an organizational culture that is environmentally conscious and promotes employees' ecologically responsible operation (Darvishmotevali, 2022).

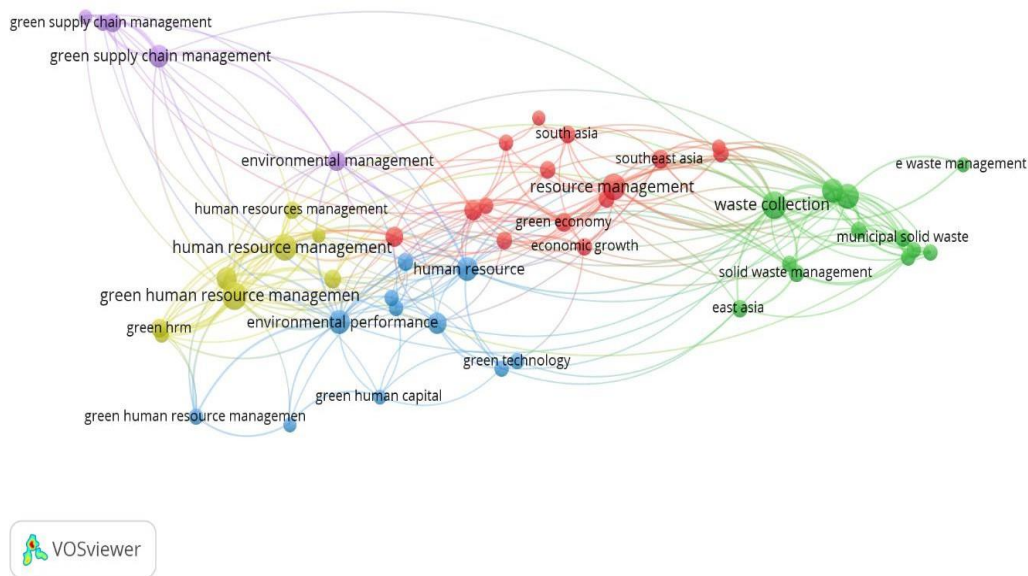


Figure 2. Map of the appearance of publication keywords related to green human resource management

Source: Process the author's data with the VOSviewer program (2024)

This analysis is based on articles indexed by Google Scholar and Scopus over the past ten years, from 2015 to 2024. The data is retrieved using the keyword "Green Human Resource Management." This diagram uses different colours to represent each cluster. The result of processing this article yields 5 clusters. Cluster One (red) is the group responsible for resource management, Cluster Two (green) is the group responsible for waste collection, Cluster Three (blue) is the group responsible for environmental performance, and Cluster Four (yellow) is the group responsible for environmentally friendly human resource management. Cluster Five (purple) is the group responsible for environmentally friendly supply chain management. The identified group will be the primary focus of the writer. The bibliometric analysis of research outcomes in green human resource management and waste management will specifically focus on the discussion in Southeast Asia.

This study aims to understand how various countries and companies in Southeast Asia apply and manage GHRM practices to support environmental sustainability in waste management industries.

2. Literature Review

The comprehensive review of existing research on green human resource management (GHRM) and its relationship with environmental performance, specifically related to waste management in Southeast Asia. GHRM has evolved as a strategic approach to integrating environmental aspects in human resource practices, aiming to increase environmental awareness and action within organisations. Various studies have shown that GHRM is important in improving a company's environmental performance by integrating green policies into daily activities, such as recruitment, training, and performance appraisal. For example, Renwick in (Roscoe, S., Subramanian, N., Jabbour, C. J., & Chong, 2019) highlighted that GHRM helps create an organisational culture supporting green practices, such as waste reduction and efficient resource management. Another study by Jabbour, C. J. C., & de Sousa Jabbour (2016) states that GHRM improves a company's operational efficiency in waste management by embedding sustainability values in employee behaviour. In the context of waste management in Southeast Asia, implementing GHRM can help overcome challenges arising from inadequate infrastructure and high levels of urbanisation. For example, a study conducted in Vietnam showed that companies implementing GHRM practices were more likely to adopt green technologies and develop effective waste management policies, although structural challenges remain (L. Q. Nguyen & Nguyen, 2024).

2.1. *Environmental Performance*

Environmental performance refers to a company's dedication to safeguarding the environment and exhibiting measurable operational criteria that fall within the prescribed boundaries of environmental conservation. The comprehensive environmental performance assessment comprises organizational ethos, ongoing enhancement, incident mitigation, and recycling efficacy. This research satisfies the second criterion for theoretical contribution by accounting for stakeholder perspectives, independent auditing, waste reduction, resource consumption, and cost savings (Roscoe, S., Subramanian, N., Jabbour, C. J., & Chong, 2019).

Training and engagement in environmentally friendly practices are crucial for all company stakeholders, as they contribute to sustainable development. The involvement of employees is crucial for environmental and social responsibility since it helps to drive employees' commitment to environmental goals (Mousa, 2020).

Singapore has the highest environmental score in Asia. Malaysia and Indonesia agree that workers with environmental knowledge, skills, and abilities are likelier to participate in environmental activities. Cambodia actively encourages workers to develop environmental ideas. This comprehensive approach has been extensively embraced in both scholarly studies and company operations, promoting the idea of taking into account the interplay between financial gain, environmental impact, and societal well-being when assessing a firm's achievements (Salopek-Žiha, 2020; Zihan et al., 2024). Environmental performance is the term used to describe an organization's efforts to surpass and meet societal expectations regarding the natural environment in a manner that transcends ordinary adherence to regulations and procedures. A company's environmental performance relies solely on the excellence of its eco-friendly products, eco-friendly behaviour, eco-friendly practices, and eco-friendly leadership style, as well as the integration of ecological sustainability into its business operations (Perez et al., 2023). Green Performance Management (GPM) is a framework utilized to assess employees' involvement in environmental management. Developing a complete framework of environmental standards is imperative to provide criteria for measuring ecologically sustainable performance. The requirements should encompass areas such as carbon emission reduction, reporting of environmental incidents, environmental accountability, and adherence to environmental legislation. Environmental-friendly management and performance assessment involve evaluating employees' behaviour and activities related to environmental management (Alqudah, M. N. K. M., & Yusof, 2024).

2.2. *Green Human Resource Management*

Green human resource management (GHRM) describes a company's resource strategy to reduce its environmental and ecological impact. This strategy is related to the company leadership strategy and individual goals. GHRM is essential to human resource management literature. The focus is on organising company environmental management practices. Green human resource management serves as a bridge between practical and environmental management (Singh, 2020).

Resources are the lifeblood of an organisation and stimulate its success in managing the environment. The aspect of human resources in environmentally friendly management is to promote environmentally friendly behaviour among employees in the workplace. A training program focused on environmental sustainability can enhance employees' understanding of the importance of environmental protection, making them more aware of environmental control measures and preventive efforts, such as waste data collection and identifying sources of pollution (J. Khan et al., 2023; Saeed et al., 2019). GHRM includes recruitment and selection, training, performance management, salary and reward systems, and engagement (Tang et al., 2018).

Human resources (HR) development in an organisation is a systematic process to enhance workers' skills to align with the organisation's goals. HR development encompasses learning experiences that foster personal and professional growth. Human resource development is an effort to change or improve employees' and volunteers' competence, knowledge, or attitudes. Human resource development includes employee training and development, leadership development, education, performance management, organisational culture development, talent management, productivity improvement, and understanding and adaptation to change. The primary objective of human resource development is to foster an

organisational environment that prioritises human beings (Vani & Ety Rahayu, 2024). Green human resource management comprises two components: the management of environmentally favourable human resources and the preservation of knowledge capital to cultivate a workforce capable of recognising and appreciating the green culture within the organisation. A component of environmentally friendly human resources is the establishment of organisational harmony and coordination between conventional human resource management practices and the organisation's environmental objectives. This department establishes an environmentally conscious workforce that comprehends, values, and executes environmentally friendly initiatives and upholds environmentally friendly objectives in all specific activities (Chouhan & Singh, 2024).

The concept of Green Human Resource Management, according to Kurniawati, E., & Ardini (2024), is as follows:

- a) Recruitment and selection:
Green HRM encourages companies to seek environmentally conscious employees committed to sustainability (Kurniawati, E., & Ardini, 2024). Recruitment and selection for environmental friendliness are critical practices in GHRM aimed at developing environmentally friendly practices that ultimately support business performance (Montalvo-Falcón et al., 2023)
- b) Training and development:
Implementing Green HRM involves providing employee training and development opportunities, specifically focusing on environmental issues and sustainable methodologies. The main goal is to increase employee understanding and awareness of the importance of sustainability (Kurniawati, E., & Ardini, 2024). Integrating green training into an organization's environmental management is critical to effectively implementing sustainability initiatives. This training equips employees with the tools necessary to address environmental issues, foster a positive mindset toward sustainability, foster a proactive attitude toward green practices, and enhance skills in waste reduction and energy conservation (Montalvo-Falcón et al., 2023)
- c) Compensation and incentives:
Green HRM encourages companies to implement a compensation and incentive system that motivates employees to participate in sustainability efforts. This can be achieved by incentivizing employees to achieve environmental performance targets or contributing to the company's sustainability initiatives (Kurniawati, E., & Ardini, 2024).
- d) Performance management:
Green HRM encourages companies to incorporate environmental performance indicators into the employee performance management system to develop employee performance in achieving company goals (Siagian, C., 2024). This aims to ensure that environmental performance is evaluated and given the same attention as financial or operational performance (Kurniawati, E., & Ardini, 2024).

2.3. *Green Intellectual Capital*

An organization's competitiveness is determined by a combination of resources, including knowledge, intellectual property, capabilities, and infrastructure, and this is called GIC. On the other hand, intellectual capital consists of three interrelated and mutually reinforcing elements: human capital, structural capital (also known as organizational capital), and relational or customer capital. Human capital relates to the organization's capacity to generate value by leveraging its workforce's expertise, learning, skills, education, competencies, and creativity. Relational capital, on the other hand, involves the knowledge and abilities possessed by the organization's employees to build and nurture relationships with stakeholders (Syahidun et al., 2024). Intellectual capital (IC) is the term used to describe the valuable assets within a company that may be improved through human resource management (HRM) methods, specifically in knowledge and competencies. Intellectual capital enhances organizational performance as individuals with good knowledge, abilities, skills, and competencies will perform better and improve organizational performance (Nisar, 2021).

Intellectual capital uses common business knowledge and information. Intellectual capital ensures competitiveness in business and gathers information about technology, experience, racial rights, education and training, communication, customer service, and other services that ultimately benefit the

industry. The intellectual property model includes ideas, patents, innovations, computer programs, designs, and materials that eventually become industrial values (Gharib et al., 2023).

Green Intellectual Capital (GIC) illustrates an organization's ability to adapt to environmentally sustainable practices. It covers aspects such as shifts in mindset, heightened ecological awareness, recycling of materials, achieving carbon neutrality, optimizing the use of resources, conserving energy efficiently, and implementing management approaches that are both practical and eco-friendly. As a strategic asset, GIC equips firms to respond proactively to the ever-evolving environmental sustainability challenges and helps them secure a competitive edge over other organizations. By understanding and applying GIC, companies can achieve economic, social, and environmental sustainability. GIC also prioritizes environmentally friendly technology, which enables the company to achieve environmentally friendly performance and provides innovative advantages compared to similar companies, resulting in sustainable profits (Ahlawat, D., Sharma, P., & Kumar, 2023). GIC can contribute to the reduction of environmental costs and the improvement of the quality of life of employees by promoting professional knowledge and awareness of energy-saving technology and environmentally responsible thinking. GIC consolidates all intangible assets, including knowledge, skills, and relationships. The number of individuals and organizations within a company involved in environmental protection or environmentally friendly innovation is from both sources. GIC comprises three dimensions: (1) Environmentally friendly human capital refers to initiatives designed to minimize an organization's harmful environmental effects by applying green practices within human resource management (HRM). These include efficient energy management, waste reduction, and active support for sustainability programs (Imron, A., & Taswiyah, 2022). (2) Environmentally friendly structural capital, efforts to reduce the company's negative impact on the environment, through the arrangement of environmentally friendly capital in human resource management (HRM) such as managing energy use efficiently, reducing waste, and supporting sustainability initiatives (Yusliza et al., 2020) and (3) ecologically friendly relational capital, is external organisational relationships that support environmental sustainability, including partnerships that have a vision for sustainability and environmentally friendly practices (Dangelico & Pontrandolfo, 2015) (Xu et al., 2022) (Bansah, P. et al, 2024). Human-centred capital encompasses human resources, including qualifications, experience, and knowledge. Organizational-centered capital encompasses all non-human knowledge repositories, including documents, databases, process descriptions, and the corporate plan (Asiaei et al., 2023)

3. **Method**

This research uses a qualitative systematic review approach to synthesize existing research. The selection of journals used as samples was international journals on the theme of green technology and waste management in Southeast Asian countries. Researchers use the VOSviewer bibliometric programme to see the relationship of publications related to green human resource management using keywords in the selection of Google Scholar and Scopus-based articles published from 2020 to 2024, so that the relationship of GHRM can be presented in vosviewer.

4. **Discussion**

Green technology is currently and will continue to be a global trend. Gradually, environmentally friendly technology will replace traditional technology because it brings significant benefits not only to every profession, every business, and every individual but also to the country and the entire world, both now and in the future. The achievements of green technology have created significant breakthroughs, bringing substantial economic value to the business world and people's lives (Duong, 2024). Accepting a new perspective helps organizations address environmental issues and improve resource management. Senior management can develop and achieve internal capabilities that improve environmental performance when managing human resources. If an organization has a long-term goal, the human resources department must participate in strategic human resource management (GHRM) and appropriate practice management to ensure workers work safely (Y. T. H. Nguyen, 2021).

Environmental degradation has become a major global issue in recent decades. Preserving the natural environment and its resources for future generations is an essential concern for governments and

business leaders worldwide. In conclusion, they developed and implemented competitive management practices. Environmental programs reduce pollution, gas emissions from homes, industries, and mud for businesses. Some food and beverage companies use environmental initiatives to grow due to environmental concerns. Numerous organizations endeavour to establish and execute systematic ecological management systems (Mashala, 2018).

Human resources that are environmentally conscious are also highly supported in terms of task allocation, teleconferencing, online interviews, electronic archiving, recycling, carbon emissions, waste management, eco-friendly purchasing, and virtual training (Devi, S., Yadav, B., Goel, D., Kaur, S., & Bhoyar, 2024). Protecting workers throughout the early stages of environmental practice and implementing training and development programs to improve their environmental competence is crucial. This fosters culture and ensures that workers support and participate in environmental initiatives. They monitor the success of environmentally friendly resource management practices and provide feedback to facilitate improvement. Metrics and maintenance systems allow Environmentally Friendly HR performance monitoring and improvement (Zihan et al., 2024).

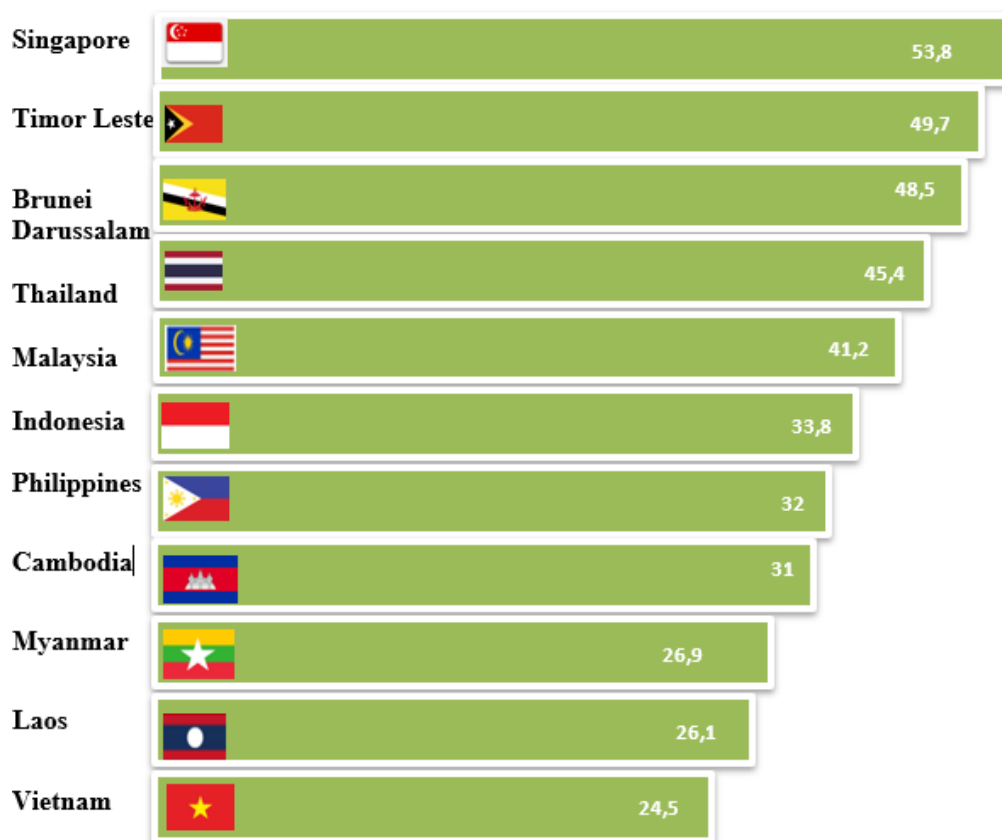


Figure 3. List of the Most Environmentally Friendly Countries in Southeast Asia

Source: Author data from Yale University's 2024 Environmental Performance

Based on 2024 EPI data, the 11 most environmentally friendly countries in Southeast Asia, the highest ranking environmentally friendly country is Singapore, with a 2024 EPI score of 53.8, and the lowest ranking is Vietnam, with 24.5 points.

The proportion of food and green waste in developing countries ranges between 53% and 57%. There is an inverse correlation between the increase in organic waste and the economic growth of developing countries. In developing countries, only 20% of the waste generated is recyclable. On the contrary, around 51% of waste may be recycled in developed countries (I. Khan et al., 2022).

Malaysia holds the position of being the second-largest palm oil producer and exporter. Biomass is a type of agricultural waste in Malaysia with an annual production of at least 168 million tons. Palm oil is the most plentiful biomass source and possesses the greatest components for renewable energy

production. Multiple components of the oil palm plant can be efficiently employed in energy recycling. Palm oil is the preferred option for producing renewable energy since it has a very low moisture content, around 7%, which is the lowest compared to other biomass materials (Yow, H. M., Razak, A. A., & Alheemar, 2024). Research (Nisar, 2021) A study conducted in Malaysia confirmed that employees with skills, knowledge, and abilities regarding environmental initiatives or practices are more likely to engage in environmentally-oriented behaviors. Intellectual modalities produce environmentally supportive behavior among hotel staff. This research finding also states that the training provided to employees and maintaining green discipline within the organization builds and facilitates environmentally friendly employee competencies, which contribute to pro-environmental behavior.

When organizations engage in GHRM practices in Indonesia, they cultivate a work environment where employees feel capable and prepared to take environmentally friendly initiatives. GHRM practices, such as environmentally focused training, programs to increase environmental awareness, and integrating sustainability goals into employee performance appraisals, increase employee effectiveness. Employees who receive training and the necessary resources to implement environmentally friendly practices develop a stronger belief in their abilities. The increase in self-efficacy motivates them to take initiative and engage more proactively in environmental activities within the organization (Setyaningrum et al., 2024). GIC focuses on all intangible resources a company can utilize to achieve a competitive advantage. Intellectual and Environmentally Friendly Capital and Environmentally Friendly Human Resource Management are essential factors that can enhance Organizational Performance Sustainability. Both of these factors have been proven to impact the improvement of Sustainable Organizational Performance in the manufacturing industry in Indonesia (Zainal, V. R., Siswanti, I., & Nawangsari, 2024). Research (Yuris Danilwan, Dewi Budhiartini, Yuli Isnaini, Ikbar Pratama, 2020) States that training and involvement in environmentally friendly practices significantly influence environmental sustainability performance. If management strives to improve strategic approaches related to environmentally friendly human resources, more productive results will be achieved, increasing the value of their performance in the future. Efficient performance management and environmentally friendly compensation directly impact the achievement of perfect environmental sustainability and motivate employees to remain loyal to the company and work diligently to meet their standards. Indonesian workers did not experience a significant impact from the innovative recruitment mechanism. Meanwhile, they are only impressed by the training that focuses on the environment, engagement, compensation, and other efficient performance management that influences their perception of company operations and makes them feel a part of it.

Research (Kitchot et al., 2020) the research conducted in Thailand suggests that when a small and medium-sized enterprise (SME) decides to improve its performance by integrating Supply Chain Management (SCM) into its strategic management agenda, it is also necessary to establish Human Resource Management (HRM) practices as a system to ensure that they are in alignment with the strategic direction. The efficacy of small and medium enterprises (SMEs) in Thailand has significantly improved with the help of human resource management (HRM) as a mediator or intervention.

The Vietnamese government recognises the significance of environmentally sustainable production as a policy to mitigate the adverse effects of climate change. This research substantiates the notion that ecologically responsible innovations improve environmental performance. Upon establishing ecological awareness in members, they can actively communicate, contribute ideas, express opinions, or even provide suggestions to manufacturing companies about environmental protection (Van et al., 2023). Energy efficiency involves reducing energy consumption and replacing it with environmentally friendly sources to reduce environmental pollution and its adverse impacts on humans (Thuan, L. D., Minh, M. T. H., & Huy, 2024). In Vietnam, a unique organization has been established to promote the development of environmentally friendly technologies. This organization is similar to the Green Bank in China. It has a leader, supervisory board, and executive experts. The Green Technology Organization collects and builds a database of Vietnam's green technologies based on the annual green technology (Duong, 2024). The concept of a Circular Economy and its diverse applications and related practices, such as energy conservation, waste management, and eco-friendly purchasing, have garnered national attention in Vietnam. Universities and communities are promoting these practices to increase awareness of the Circular Economy among the younger generation. These endeavours have increased the awareness of the Circular Economy among the younger generation of Vietnam, particularly students. This

knowledge and skill set enables them to participate in environmentally friendly practices, such as waste sorting, and encourages them to adopt these behaviours (Tran et al., 2024).

Research (Chanveasna, U., Veasna, S., & Sovannara, 2024). Activities carried out in Cambodia. The implementation of environmentally sustainable human resource management practices directly impacts employee creativity. The GHRM internship has been empirically demonstrated to promote organizational innovation. When firms promote and support people in exploring novel ideas and techniques, they are more likely to produce inventive solutions to current difficulties. This might result in the organization's creation of novel products, services, or processes, granting the business a competitive edge in the market.

Singapore has effectively developed its urban waste management, which consists of two distinct subsystems for waste collection and transportation. The purpose of both these systems is to gather waste produced by individuals. The Public Waste Collection Systems (PWCs) focus on home waste, while the General Waste Collection Systems (GWCs) concentrate on waste from industrial and commercial sources. Source sorting is a vital factor in the performance of systems and specialist organizations, which perform most of the labor. By scaling up sequencing efforts, the expenses associated with incineration facilities can be minimized, allowing enterprises to generate extra revenue by selling recyclable materials. A range of policies and programs have been devised and implemented to attain a 70% recycling rate for urban garbage. These initiatives specifically focus on several categories of waste, including food, electronic, and packaging waste. For instance, Singapore is proficient in managing food waste (He et al., 2023). Singapore has implemented an integrated waste management system to separate recyclable materials at waste facilities and convert them into energy (Velasco, 2024).

Despite the increase in urbanization and industrialization, Singapore has accomplished a clean environment, social inclusion, and economic progress. Singapore acknowledges the necessity of substituting the linear economic model of "take-make-dispose" with a circular economic model that emphasizes resource consumption and production reduction. This new model is dedicated to optimizing resource utilization by preserving as much of it as possible and designing refuse management from resource ecosystems. Singapore has successfully closed numerous resource cycles by implementing a circular economy approach in various sectors. For instance, Singapore can recycle water indefinitely and utilize it continuously. Most water is converted into potable water by collecting and processing every drop of used water. Ash and non-combustible waste are disposed of in the Semakau Landfill, as approximately 87% of domestic waste in Singapore is incinerated. Since 2023, Singapore has imposed a minimum levy of five cents per single-use bag in supermarkets to decrease usage. Singapore proposes a street layout emphasizing public transportation, cycling, and walking, with autonomous vehicles complementing these modes of transportation in the future. In Singapore, private transportation management initiatives include the imposition of fees on vehicles accessing specific roads, the imposition of measures to control the population growth rate of vehicles, and the limitation of car ownership to address traffic congestion (Velasco, 2024). A waste management company offers top-notch equipment and services to optimize waste collection and disposal. The relevant equipment includes mobile and fixed storage equipment, mobile waste bins, intelligent waste bins for waste and recycling, rear loaders, open containers, and compactors. In addition, the company also offers several intelligent waste collection solutions, such as smart scales, smart trash bins, stationary or mobile compactors, small trash bins, fatigue warning systems using Eiconic, and drivers (Soudachanh et al., 2024).

5. Conclusion

Singapore is Southeast Asia's most environmentally friendly country with the highest score. Waste management in Singapore involves separating recyclable waste using the Public Waste Collection System (PWC) and the General Waste Collection System (GWC). Approximately 87% of domestic waste in Singapore is incinerated, resulting in the ash and non-incinerable waste being disposed of in the Semakau Landfill. Singapore has implemented a minimum charge of five cents per single-use bag in supermarkets to reduce usage in 2023. Malaysia and Indonesia assert that employees with skills, knowledge, and abilities related to environmental initiatives or practices are likelier to engage in environmentally oriented behaviour. In research in Cambodia, environmentally friendly human resource

management was carried out by encouraging employees to develop new ideas and approaches related to the environment. A study conducted in Vietnam indicated that instilling environmental awareness among employees can enhance the knowledge shared with the manufacturing company.

6. Suggestions

This research has identified avenues for further research, but only through a literature review. Green human resource management still needs to be improved in terms of research. It is hoped that future quantitative data research will examine green human resource management in waste management by adding other variables.

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