

Green Human Resource Management in Islamic Finance: A Systematic Review of Sustainability Strategies in Indonesia

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Abstract

This study investigates the implementation of Green Human Resource Management (GHRM) within Indonesia's Islamic finance industry through a systematic literature review of 375 academic publications from 2015 to 2024. Existing research has largely centered on conventional financial institutions, offering limited insight into GHRM's role in the Islamic finance context. The review reveals that GHRM practices—such as green recruitment, sustainability training, and eco-friendly incentives—not only improve operational efficiency but also align with Maqasid al-Shariah objectives. FinTech integration further enhances green initiatives by increasing transparency and access in Islamic financial services. Nonetheless, regulatory limitations and inconsistent institutional support hinder broader adoption. A key recommendation is the introduction of Green Employee Sukuk: Shariah-compliant instruments issued by financial institutions to fund employee-led sustainability programs. Returns are tied to the performance of green investments, incentivizing employee engagement while reinforcing organizational environmental commitments. Strengthening regulatory frameworks and leveraging FinTech innovations are crucial for optimizing GHRM's impact on sustainability in Indonesia's Islamic finance sector.

Keywords: Green Human Resource Management; Islamic Finance; Sustainability; Maqasid al-Shariah; FinTech Integration

Citation (APA):

Suherman, U. D., Wirdyansyah, D. M., Mighwar, M. A., & Syaie, A. N. K. Green Human Resource Management in Islamic Finance: A Systematic Review of Sustainability Strategies in Indonesia. *Economica: Jurnal Ekonomi Islam*, 16(1), 19-43. <https://doi.org/10.21580/economica.2025.16.1.25197>

Submitted: 30 Dec 2024

Revised: 27 Mar 2021

Accepted: 11 Apr 2025

Published: 31 May 2025

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Introduction

The Islamic finance industry has experienced substantial growth in recent years, with total global assets increasing by 17% in 2021 to nearly US\$4 trillion (Taleb & Khater, 2024). This expansion has been largely driven by the dominance of Islamic banking, which accounts for approximately 70% of the industry's total assets—equivalent to US\$2.8 trillion—supported by favorable government policies, operational improvements, and rising market demand (Mayanja, 2023). The sector's financial strength is further evidenced by a remarkable 290% surge in net income. In parallel, the sukuk market recorded a 14% growth, reaching US\$713 billion in outstanding value, while Islamic investment funds experienced a 34% increase, managing US\$238 billion in assets (Hassan et al., 2025). Innovation and digitalization have been key drivers of this trajectory, reflected in the rise of digital Islamic banks in countries such as Australia, the United Kingdom, and Malaysia, which serve a growing population of tech-savvy Muslim consumers. Regionally, emerging markets like Tajikistan, Burkina Faso, and Ethiopia have shown notable progress, while Gulf Cooperation Council (GCC) countries remain industry leaders, collectively holding 43% of global Islamic banking assets (Eshimov, 2023).

Indonesia, home to the world's largest Muslim population, has also positioned itself as a central player in the global Islamic finance ecosystem, ranking among the top four alongside Iran, Malaysia, and Saudi Arabia. Since the establishment of its first two Islamic banks in 1999, Indonesia's Islamic finance landscape has grown to include 14 fully-fledged Islamic banks, 19 Islamic banking windows, and 164 rural Islamic banks (M. Anwar et al., 2020). As of 2023, the sector has demonstrated impressive growth across both banking and non-banking segments. In the banking sector, total assets reached Rp2,582.25 trillion, reflecting a year-on-year growth of 9.04%. Third-party funds (DPK) increased by 10.5% to Rp1,700 trillion, while financing expanded by 8.5% to Rp1,500 trillion. The non-banking sector has also seen strong performance, with the Islamic capital market reporting Rp500 trillion in sukuk value, including Rp75 trillion in retail sukuk and Rp50 trillion in green sukuk. Islamic insurance accumulated Rp120 trillion in assets, growing by 12%, and Islamic pension funds recorded Rp70 trillion in assets, growing by 15% year-on-year. Additionally, Islamic financing institutions reported assets totaling Rp130 trillion, marking a 10% annual increase (Otoritas Jasa Keuangan, 2023).

However, rapid economic growth also presents critical environmental challenges. Increased resource consumption and industrial activity often lead to deforestation, overextraction of natural resources, and elevated greenhouse gas

emissions, contributing to climate change and biodiversity loss (Tok et al., 2022). These negative externalities hinder progress toward Sustainable Development Goals (SDGs), particularly SDG 13 (Climate Action) and SDG 15 (Life on Land), while also impacting public health and economic stability due to rising pollution-related diseases and escalating healthcare costs (OECD, 2020). Addressing these challenges requires robust policy support and financial incentives that promote green innovation, including investments in clean technologies, renewable energy, and circular economic models.

In this context, Islamic finance plays a vital role in promoting sustainable economic growth through Shariah-compliant instruments that uphold ethical investment and environmental stewardship. One notable example is green sukuk, which is increasingly used to fund environmentally friendly projects, demonstrating the compatibility of Islamic financial principles with sustainability objectives (Buana & Hardiana, 2019). By integrating sustainability into financial decision-making, Islamic finance offers a distinctive value proposition that balances economic advancement with ecological responsibility.

To complement these efforts, the integration of Green Human Resource Management (GHRM) into Islamic finance can serve as a catalyst for fostering environmental responsibility at the organizational level. GHRM promotes sustainable practices within the workforce by encouraging environmentally conscious behaviors, enhancing eco-friendly initiatives, and instilling a culture of sustainability in line with Shariah principles (Airout et al., 2025). This approach aligns with Islamic values that emphasize ethical stewardship, responsible resource management, and long-term social welfare, thereby supporting both environmental preservation and institutional performance.

Despite its potential, existing research on GHRM has primarily focused on conventional financial institutions, with limited studies exploring its relevance and application within the Islamic finance sector. Although sustainability is an inherent aspect of Islamic economic principles, there remains a notable gap in the literature regarding how GHRM can be effectively integrated with Maqasid al-Shariah to enhance both environmental and social well-being. Empirical studies on GHRM in Indonesia's Islamic finance industry are especially scarce, limiting our understanding of its practical implementation, challenges, and innovations. Moreover, there is a need to explore innovative instruments—such as Green Employee Sukuk—that can offer financial incentives for employees to engage in environmentally responsible behaviors.

According to [Pham et al. \(2019\)](#), GHRM incorporates eco-friendly practices into human resource processes, including recruitment of environmentally conscious individuals, sustainability training, and incentive systems that promote green behavior. This management approach cultivates a culture of environmental accountability and aims to create a sustainable workplace. Islamic economics similarly upholds environmental stewardship by requiring economic activities to avoid harm to the environment. [Jan et al. \(2021\)](#) highlight that Islamic economics prohibits practices such as illegal logging and pollution, and encourages investment in renewable energy and sustainable agriculture, aligning with SDGs 7 (Affordable and Clean Energy) and 13 (Climate Action). Financial mechanisms like zakat and sadaqah also support environmental projects such as reforestation and community clean-up programs, further reflecting the synergy between Islamic economic principles and GHRM in fostering sustainability.

This study aims to align Green Human Resource Management (GHRM) practices with Islamic economic principles and explore their innovative application in the Islamic finance sector. By doing so, the study seeks to highlight how GHRM can serve as a strategic tool to promote sustainability, enhance employee engagement, and support the long-term growth of Islamic financial institutions.

Literature Review

Green Human Resource Management

Green Human Resource Management (GHRM) is a human resource approach that emphasizes the creation, implementation, and maintenance of systems that foster environmentally sustainable workplace practices ([Molina-Azorin et al., 2021](#)). It spans multiple HR functions—from recruitment to employee training—with the aim of increasing environmental awareness and encouraging sustainable behavior. GHRM is believed to enhance job satisfaction, employee engagement, and productivity through policies that promote environmental consciousness ([Aboramadan, 2022](#)). [Sharma & Gupta \(2015\)](#) defines GHRM as the application of HR practices that support the sustainable use of resources, thereby raising employees' environmental awareness and commitment ([Jusdijachlan & Susan Ridwan, 2023](#)).

GHRM, also referred to as green management, enables organizations to address environmental concerns by embedding sustainability principles into their strategies. It reflects an evolution of HR's role in supporting organizational goals

related to environmental conservation (Dilrukshi M.H.S. & Aluthge C., 2024). In this context, GHRM seeks to transform employees into proactive agents who support an organization's sustainability mission. As sustainability becomes a global trend, GHRM serves to align human resource policies with organizational environmental goals (Handayani et al., 2024). When implemented effectively, GHRM increases efficiency, reduces operational costs, and strengthens employee loyalty and retention.

Researchers such as Bhutto & Aurangzeb (2016), Jabbour & de Sousa Jabbour (2016), and Mandip (2012) emphasize that GHRM is a critical component of corporate green initiatives (Wiguna et al., 2023). Rooted in the triple bottom line framework—which balances economic, social, and environmental dimensions—GHRM supports long-term organizational sustainability (Faraj, 2022). It is also integrated into corporate social responsibility programs, as HR managers play a key role in educating employees and guiding them toward sustainability-focused behavior (Tulsi & Ji, 2020).

Green Recruitment and Selection

Green recruitment plays a key role in embedding sustainability into organizations by ensuring that new employees align with environmental values and practices. Prioritizing the selection of environmentally conscious individuals fosters a culture of sustainability and helps advance green initiatives. Green recruitment plays a key role in embedding sustainability into organizations by ensuring that new employees align with environmental values and practices. Prioritizing the selection of environmentally conscious individuals fosters a culture of sustainability and helps advance green initiatives (Adegoke et al., 2024). Effectively communicating the organization's green mission during recruitment enhances long-term commitment and value alignment.

Successful green recruitment requires a deliberate strategy that incorporates environmental considerations at every stage of the hiring process (Jamil et al., 2023). This involves not only evaluating candidates' qualifications but also their commitment to sustainability. Job postings and recruitment messages that reflect eco-friendly principles attract talent motivated by environmental concerns (Renwick et al., 2016).

Ramachandaran et al. (2024) identify three main aspects of green recruitment: environmental awareness among candidates, green employer branding, and green selection criteria. Environmentally aware candidates are more likely to support

workplace sustainability efforts. At the same time, companies that position themselves as environmentally responsible attract like-minded individuals, enhancing their reputation and talent pool. Integrating environmental criteria into the selection process ensures new hires contribute meaningfully to the organization's sustainability goals.

Beyond recruitment, this approach has significant benefits for both organizations and employees. Organizations build a workforce aligned with their green mission, while employees enjoy increased job satisfaction and purpose. Embedding green recruitment into HR practices lays the foundation for a sustainability-oriented corporate culture (Sanda et al., 2024).

Green Training and Development

Jabbour & de Sousa Jabbour (2016) emphasize that environmentally focused training and development encourage employees to acquire skills for environmental protection and improve their environmental problem-solving awareness (Moradeke et al., 2021). In a dynamic organizational context, green training improves self-awareness, competence, and retention of environmental information. Employees who undergo environmental training are more likely to engage in activities such as waste classification and pollution source identification.

Opatha & Arulrajah (2014) argue that training environments significantly influence how aware employees become of their ecological responsibilities. Green training not only educates but also fosters a mindset of environmental responsibility within the workforce. Arulrajah et al. (2016) stress the importance of workplace conditions in reinforcing green behaviors, while Thevanes & Arulrajah (2020) highlight that a supportive work environment enhances the effectiveness of environmental education and training programs.

Green Performance Management and Appraisal

Green performance management involves evaluating employee contributions to environmental sustainability through structured assessments, feedback, and accountability. It emphasizes eco-friendly behavior and the alignment of personal performance with environmental goals. Due to the diversity of organizational structures, a uniform performance appraisal system may not be suitable for all contexts (Taylor & Taylor, 2014). Therefore, tailored performance measurement strategies are essential.

Mustapha et al. (2017) suggest that organizations should use specific indicators—such as the number of environmental incidents, reductions in carbon emissions, adherence to green policies, and sustainability accountability—to assess performance comprehensively. These metrics not only measure environmental contributions but also reinforce sustainable values within the workplace.

Performance evaluations influence organizational culture, reward systems, and strategic direction. Managers play a vital role in embedding green indicators into performance appraisals and leading by example. Holding employees accountable for sustainability targets not only improves performance but also encourages a lasting commitment to environmental practices (Joshi & Bhrambhatt, 2024).

Green Rewards and Compensation

Green rewards and compensation systems are designed to motivate, attract, and retain employees who contribute to environmental sustainability. These systems incorporate both monetary and non-monetary incentives (Das & Dash, 2024). Non-financial rewards such as recognition and praise often provide strong motivational impact, sometimes more so than monetary benefits. Integrating both types of incentives—such as eco-friendly travel allowances, environmental tax breaks, and green recognition programs—ensures balanced motivation (Koh et al., 2024).

Reward systems may include financial bonuses, sabbaticals, public acknowledgment, or other personalized forms of recognition. Green incentive programs can also be structured to encourage professional development in environmentally beneficial skills. Jabbar & Abid (2014), along with Prasad & Agarwal (2013), emphasize that such systems promote behaviors like recycling, waste management, and responsible consumption (Al-Romeedy, 2019).

Methods

This study employs a Systematic Literature Review (SLR) approach to ensure a structured, transparent, and rigorous method for identifying, evaluating, and synthesizing relevant literature on the research topic (Paul et al., 2021). The SLR methodology enables researchers to develop a comprehensive understanding of the subject by minimizing bias and increasing replicability.

The SLR process consists of three key phases: planning, conducting, and reporting. In the planning phase, research questions are clearly defined, and a detailed review protocol is established to guide the selection process. The conducting phase involves systematically identifying, screening, and synthesizing relevant studies based on established inclusion and exclusion criteria. Finally, in the reporting phase, the findings are compiled and presented in a coherent format to support deeper insights.

This structured methodology ensures that the research findings are grounded in systematically gathered and validated academic evidence, thereby enhancing both the reliability and relevance of the study's conclusions.

Review’s Research Question

After identifying the PICO framework, the following Research Questions (RQ) were formulated: RQ₁, How can the concept of Green Human Resource Management (GHRM) be applied in Indonesia’s Islamic finance industry to support sustainability? RQ₂, Which GHRM practices are most relevant and have the most significant impact on the sustainability of Islamic financial institutions? RQ₃, What are the differences in performance and sustainability between financial institutions that adopt Green Human Resource Management (GHRM) and those that do not? Finally, RQ₄, what are the key benefits and challenges of integrating GHRM in Indonesia’s Islamic finance industry?

Table 1. PICO Summary

PICO	Description
Population (P)	Islamic Financial Industry in Indonesia
Intervention (I)	Implementation of Green Human Resource Management
Comparison (C)	Islamic Financial Industry without Green Human Resource Management implementation
Outcome (O)	Improvement of sustainability, efficiency, and compliance with maqasid al-shariah principles.

Search Process and Data Collection

At the next stage, the literature search was conducted using two primary databases, Google Scholar and ScienceDirect, to ensure access to high-quality and diverse academic sources. The keywords used in the search included "Green

Human Resource Management" and "Islamic financial institutions" and "Environmental management" and "Islamic banking efficiency" and "Green Human Resource Management" and "financial industry". These terms were carefully selected to capture studies closely aligned with the focus of this research.

Inclusion and Exclusion Criteria

The inclusion criteria required articles to be peer-reviewed, based on empirical research, case studies, or systematic literature reviews, and published between 2015 and 2024. Selected studies needed to focus on Green Human Resource Management (GHRM) in relation to Islamic finance or its role in the sustainability of the financial industry. Articles not meeting these criteria were excluded, such as editorials, opinion pieces, abstracts without complete data, or non-peer-reviewed publications. Studies outside the context of Islamic finance or those discussing GHRM only theoretically without explicit links to sustainability were also excluded. This approach ensures that the selected literature is credible, relevant, and directly aligned with the research objectives.

Quality Assasment

At this stage, the identified data will be evaluated based on the following quality assessment questions:

Table 2. Quality Assessment Criteria for Inclusion of Journal Papers in Systematic Literature Review

Question	Criteria
<i>Q₁</i>	Is the journal paper peer-reviewed and based on empirical research, case studies, or systematic literature reviews?
<i>Q₂</i>	Is the journal paper published within the period of 2015-2024?
<i>Q₃</i>	Does the journal paper explicitly discuss Green Human Resource Management (GHRM) in relation to Islamic finance or sustainability?
<i>Q₄</i>	Is the full text of the article available and does it meet the eligibility criteria?
<i>Q₅</i>	Is the journal paper sourced from credible databases such as Scopus, Web of Science, or SpringerLink?

Each paper will be scored based on the responses to these questions. A score of 'Yes' will be assigned to papers that meet the quality assessment criteria, and a

score of 'No' will be assigned to those that do not. This systematic evaluation ensures that only relevant, credible, and high-quality literature is included in the review.

Data Analysis

The data collected in the previous stage will be thoroughly analysed in this phase. This analysis aims to provide comprehensive insights and answer all the research questions that were defined earlier in the study. The findings from this analysis will be used to draw conclusions and contribute to the overall understanding of the research topic.

Documentation

In this phase, the steps leading to the research findings will be documented in a paper following the standard Systematic Literature Review (SLR) format. This structured approach ensures clear and systematic presentation, adhering to academic SLR standards and detailing the entire process from data collection to result synthesis.

Result and Discussions

Result of Search Process and Data Collection

The search process and data collection were carried out in three stages to ensure a comprehensive and systematic approach to identifying relevant literature. In the first stage (SC1), a total of 375 records were initially identified based on the search criteria. No additional records were added, and 15 duplicates were removed, resulting in a refined set of 360 unique records. The second stage (SC2) involved screening these 360 records against the established inclusion and exclusion criteria to assess their relevance to the research topic. This stage led to the exclusion of 285 articles that did not meet the research objectives, leaving 76 articles for further consideration. In the final stage (SC3), these 76 articles underwent an in-depth assessment to evaluate their quality and relevance. This assessment culminated in the selection of 33 journal papers that met the study's criteria and were deemed highly relevant.

Table 3. Search Criteria (SC) Phase 3

No.	Journal Type	Publisher	Year	Qty
1	Journal of Islamic Marketing	Emerald Group Holdings Ltd.	2020	2
2	Environment, Development and Sustainability	Springer Science and Business Media B.V.	2024	1
3	Social Responsibility Journal	Emerald Publishing	2024	1
4	Contemporary Studies in Economic and Financial Analysis	Emerald Publishing	2024	1
5	Cogent Business and Management	Cogent OA	2023	1
6	World Development Sustainability	Elsevier Ltd	2022	1
7	Environment, Development, and Sustainability	Springer Science and Business Media B.V	2024	4
8	Journal of Business and Management Research	Scholar ISSN 0029-5582	2023	1
9	Lecture Notes in Networks and Systems	Springer Science and Business Media Deutschland GmbH	2024	1
10	Journal of Financial Reporting and Accounting	Emerald Group Holdings Ltd.	2022	1
11	International Studies of Management and Organization	Routledge	2024	1
12	Journal of Islamic Marketing	Emerald Publishing	2024	1
13	Contemporary Studies in Economic and Financial Analysis	Emerald Publishing	2024	1
14	Journal of Intellectual Capital	Emerald Publishing	2022	1
15	Benchmarking	Emerald Publishing	2024	1
16	Asia Pacific Business Review	Routledge	2024	1
17	Management Decision	Emerald Publishing	2023	1
18	Management Science	INFORMS Inst.for Operations Res.and the Management Sciences	2019	1
19	Studies in Big Data	Springer Science and Business Media Deutschland GmbH	2023	1

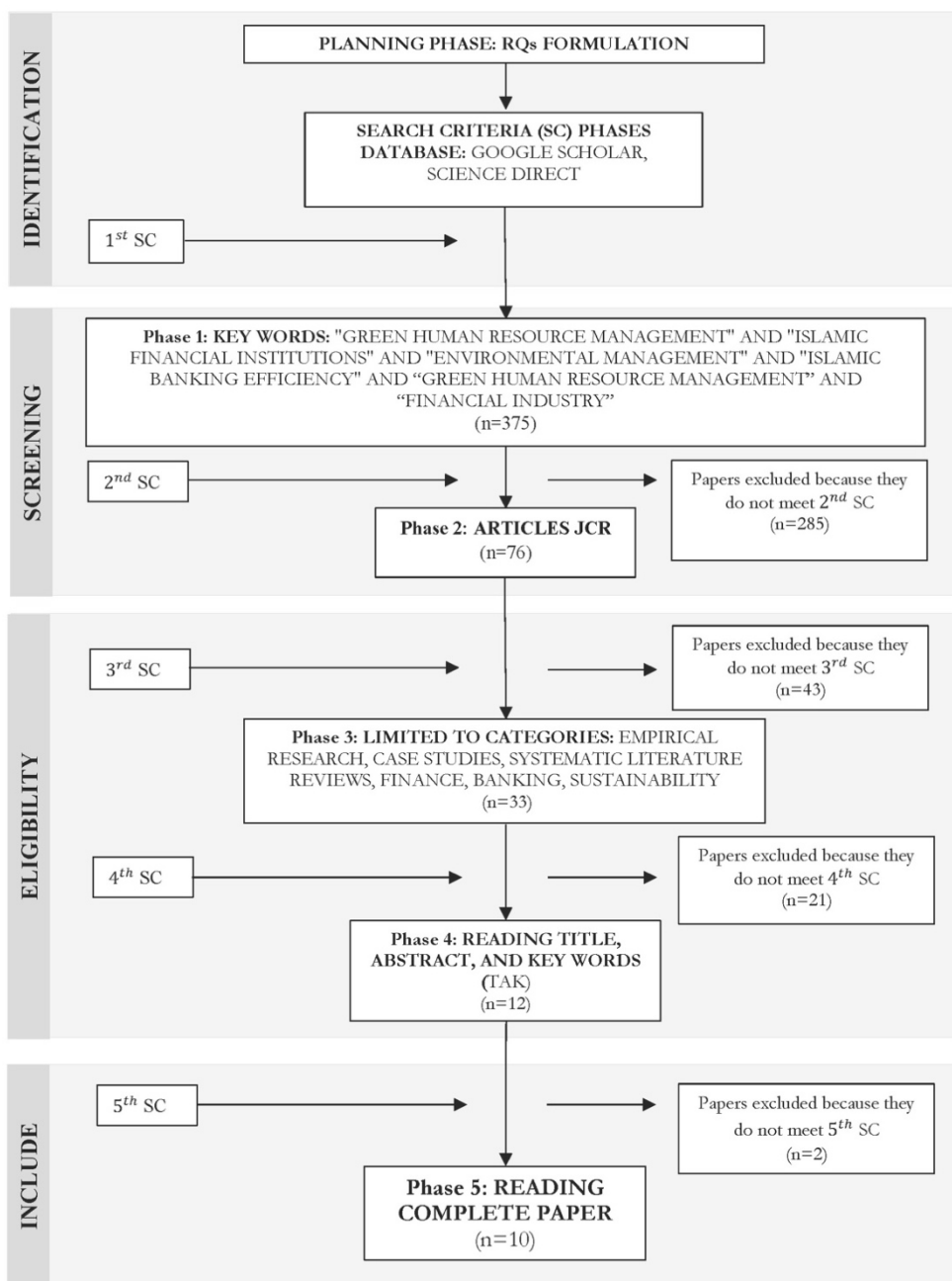
No.	Journal Type	Publisher	Year	Qty
20	Journal of Human Values	Sage Publications India Pvt. Ltd	2021	1
21	Review of International Business and Strategy	Emerald Publishing	2024	1
22	Cogent Business and Management	Cogent OA	2024	1
23	Journal of Islamic Marketing	Emerald Publishing	2024	1
24	Digital Transformation for Business and Society: Contemporary Issues and Applications in Asia	Taylor and Francis	2023	1
25	International Journal of Professional Business Review	Dialnet	2023	1
26	International Journal of Environmental Research and Public Health	MDPI	2022	1
27	Journal of Economic and Administrative Science	Scholar ISSN 2587-2672	2024	1
28	Frontiers in Environmental Science	Scholar ISSN 2296665X	2024	1
29	Economics, Finance and Accounting Studies	Scholar ISSN 00280836	2024	1

Results of Inclusion, Exclusion Criteria, and Quality Assessment

From the 33 articles that passed the third stage (SC3), the selection process continued with the fourth stage (SC4), which involved reviewing the titles, abstracts, and keywords. This step eliminated 21 articles that did not meet the established criteria. In the fifth stage (SC5), a full-text review was conducted, leading to the exclusion of 2 additional article due to its misalignment with the research objectives. Consequently, out of the initial 33 articles, only 10 met all the criteria and were deemed suitable for further analysis.

Based on Figure 1, the systematic literature review resulted in 9 journals that successfully passed the inclusion and exclusion criteria, as well as the quality assessment guided by the formulated evaluation questions.

Figure 1. Research Protocol - PRISMA Flow Diagram



Research and Discussion

Case Studies from Different Countries

Green Human Resource Management (GHRM) aligns with Islamic principles by promoting sustainability, ethical responsibility, and employee engagement. It integrates corporate social responsibility (CSR) to support eco-friendly banking and responsible investments, fostering a sustainable work environment (Bukhari et al., 2019).

In BRICS financial sectors, GHRM has demonstrated long-term benefits. A study (2000–2018) found a strong link between green finance, fintech, and CO2 emissions. Bidirectional causality exists between CO2 emissions and green finance, while GDP and energy innovation show unidirectional causality, confirming GHRM's role in sustainability (Udeagha & Ngepah, 2023). Bangladesh offers a model for Indonesia's Islamic banking sector, particularly in sustainability training. Employee programs enhance environmental awareness, while CSR strengthens community ties. Although green recruitment remains underdeveloped, Indonesia could prioritize candidates with environmental consciousness to align with Islamic finance values (Hossain et al., 2024).

China's case highlights digitalization's impact on green innovation. A one-standard-deviation increase in digitalization leads to a 2.92% rise in green innovation quantity and 2.12% in quality. Additionally, digitalization improves human capital, fostering a skilled workforce for sustainability (Wang & Zhong, 2024). Pakistan's financial sector benefits from GHRM through reduced corporate waste (0.812) and energy consumption (0.658). Fintech integration further enhances sustainability, with green innovation acting as a moderator (Khan & Urooj, 2023). Vietnam implements green banking through sustainable loans and risk assessment frameworks. Digital transformation improves accessibility to green financial services, while favorable loan terms boost green investments (Bang et al., 2023).

Turkey's private banks promote GHRM through employee training and participation in global sustainability initiatives like WWF Earth Hour, strengthening their role as leaders in green banking (Özbay et al., 2024). Uzbekistan integrates GHRM with big data analytics (BDA), improving operational efficiency by 20% and financial performance by 15%. Combining GHRM with Green Supply Chain Management (GSCM) enhances resource conservation and financial sustainability (Abdivakhobovich, 2024). In the UAE, sustainability

initiatives have led to measurable success. By 2022, 1,000+ employees participated in sustainability training (85% satisfaction). Green financing boosted loan applications by 30%, while carbon footprint reduction efforts cut emissions by 20%, illustrating GHRM's effectiveness in banking (Bouteraa et al., 2024).

Relevant Innovations in Indonesia's Islamic Finance

Innovations in Indonesia's Islamic finance industry can draw insights from global best practices, such as sustainability training programmes in Bangladesh that effectively raise environmental awareness among employees, fostering a culture of sustainability aligned with Shariah values (Gazi et al., 2024). These programmes help employees understand their social and environmental responsibilities, reinforcing Islamic teachings on justice and societal well-being. Similarly, Pakistan's success in integrating financial technology (fintech) demonstrates how digital solutions can enhance operational efficiency and accessibility in Islamic financial services (Qambrani, 2024). By leveraging fintech, Islamic banks can provide more transparent, Shariah-compliant products that uphold fairness and transparency in transactions. Additionally, Vietnam's implementation of green financial products aligns with Shariah principles by promoting environmentally responsible investments that benefit society (Le, 2024). Further, China's advancements in digital banking highlight how online platforms can expand financial inclusion while ensuring Shariah compliance (Baig et al., 2023). Corporate social responsibility (CSR) initiatives and big data analytics also play a crucial role in strengthening ties between Islamic banks and the community, facilitating better decision-making, and enhancing the industry's sustainability and long-term relevance.

Innovations Applicable to the Islamic Finance Industry in Indonesia

Based on the reviewed literature, several innovative practices can be applied to enhance sustainability within Indonesia's Islamic finance industry. These innovations are designed to align with Shariah principles while advancing environmental responsibility and employee engagement across various sectors, including Islamic banking, insurance, and capital markets.

Green Employee Sukuk

Green Employee Sukuk is a Shariah-compliant incentive mechanism in which employees are rewarded with green sukuk certificates for their participation in

corporate sustainability initiatives. Islamic banks may issue these sukuk to fund activities such as eco-leadership training or green project implementation. Employees earn sukuk for achieving sustainability targets, with proceeds used to support projects like solar panel installations or the procurement of electric vehicles. Returns generated from energy savings or operational efficiency are distributed to sukuk holders. In the Islamic capital market, Green Employee Sukuk can be incorporated into employee incentive schemes and used to finance digitalization projects focused on energy efficiency. Islamic insurers may link these sukuk to employee benefit programs, supporting green initiatives like waste management in office environments. This innovation not only promotes employee involvement in sustainability efforts but also reinforces corporate environmental responsibility in accordance with Shariah values (Daoulhadj & Hussin, 2023).

Green Insurance for Employees

Green Insurance for Employees is a Shariah-compliant insurance model that provides coverage for environmental risks while funding ESG-compliant projects such as renewable energy and reforestation. Premiums paid under this scheme are invested in green sukuk, and employees who adopt eco-friendly habits receive incentives, including premium reductions. Islamic banks can offer this insurance as part of their employee benefits package, while Islamic insurers may include extended health coverage for risks related to environmental factors. Digital claims processing enhances efficiency and transparency. This initiative supports corporate sustainability objectives and increases employee motivation through financial and ethical alignment (Aysan et al., 2025).

Eco-Lending Criteria for Internal Loans

Eco-Lending Criteria for Internal Loans refers to a Shariah-compliant internal financing scheme that enables employees to access funds for purchasing green assets, such as electric vehicles, solar panels, and energy-efficient home improvements. Financing contracts may include Murabahah, Ijarah, or Qard Hasan, and employees are required to provide proof of environmentally responsible fund usage. Funding can be sourced from corporate social responsibility (CSR) budgets, retained profits, or green sukuk proceeds. Partnerships with sustainable vendors offer discounts and support the broader adoption of eco-friendly lifestyles. Islamic banks may assist employees in acquiring electric vehicles, while Islamic capital markets can channel internal resources toward renewable energy investments.

This initiative not only fosters a culture of sustainability but also enhances employee loyalty and ethical workplace engagement (Cecere et al., 2020).

Digital Environmental Footprint Dashboard

The Digital Environmental Footprint Dashboard is a tech-driven platform designed to track and manage the environmental impact of Islamic financial institutions and their employees in real time. By leveraging the Internet of Things (IoT) and big data analytics, the dashboard monitors energy usage, waste generation, and transportation habits, providing detailed reports and automated sustainability recommendations. Key features include carbon footprint tracking, gamified engagement tools, and personalized impact reduction strategies. Islamic banks can use the dashboard to monitor energy consumption at branch level and reward performance improvements, while Islamic capital markets and insurers can track digital and operational resource footprints. This platform enhances sustainability, transparency, and accountability, supporting the realization of *Maqasid al-Shariah* through data-driven environmental stewardship (Bastos et al., 2025).

Comparative Analysis of Institutions with and without GHRM

The adoption of Green Human Resource Management (GHRM) by financial institutions is associated with enhanced organisational performance and sustainability outcomes, in comparison to those institutions that do not implement GHRM. For example, studies have demonstrated that institutions that implement GHRM report considerable reductions in waste and energy consumption, which in turn lead to enhanced operational efficiency. Additionally, these institutions frequently demonstrate superior financial outcomes, including augmented profitability and elevated customer engagement with environmentally-friendly products (Shoaib et al., 2021). Furthermore, GHRM encourages the development of an environmental responsibility culture among employees, which in turn leads to higher levels of employee engagement and commitment to sustainability initiatives. Conversely, institutions that do not adopt GHRM may encounter inefficiencies, diminished employee enthusiasm regarding sustainability, and unrealised prospects in green finance, which collectively affect their overall performance and reputation in a market that is increasingly focused on sustainability.

Benefits and Challenges of GHRM in Islamic Finance

The integration of GHRM in Indonesia's Islamic finance industry presents a number of significant advantages. Firstly, it is in accordance with the fundamental tenets of Islamic finance, which place emphasis on social responsibility and ethical practices. This can serve to enhance the reputation of the industry and foster greater customer trust. Furthermore, GHRM has the potential to enhance employee engagement and retention, as a culture of sustainability is an attractive proposition for those who value environmental stewardship. Moreover, the implementation of GHRM can result in operational efficiencies and cost savings through the reduction of waste and energy consumption ([Ali et al., 2022](#)).

Nevertheless, the integration of GHRM is not without its own set of challenges. A significant challenge is the necessity for comprehensive training and the provision of adequate resources to ensure that employees are able to comprehend and effectively implement sustainable practices. Furthermore, resistance to change may arise within organisations, particularly in the absence of awareness regarding the advantages of GHRM. Furthermore, the navigation of the regulatory landscape and the assurance of compliance with both Islamic principles and environmental standards can be a complex undertaking. It is imperative that these challenges are overcome if GHRM is to be successfully embedded in Indonesia's Islamic finance sector, enabling it to flourish in a sustainable and ethical manner ([Salsabilah et al., 2024](#)).

Conclusion

The integration of Green Human Resource Management (GHRM) within Indonesia's Islamic finance industry represents a strategic approach to achieving sustainability while maintaining Shariah compliance and operational efficiency. Several innovative initiatives—such as the issuance of Green Employee Sukuk to fund employee-led sustainability projects, Green Insurance for Employees to mitigate environmental risks, Eco-Lending Criteria to finance green assets, and Digital Environmental Footprint Dashboards for monitoring carbon emissions—have been introduced by Islamic financial institutions. These efforts align with Maqasid al-Shariah and demonstrate a commitment to environmental stewardship and corporate social responsibility.

Despite its potential, the implementation of GHRM in the Islamic finance sector faces significant challenges. Institutions often struggle with complex regulatory frameworks, limited financial resources, technological integration issues, and

internal resistance to change. Additionally, the absence of standardized metrics to evaluate the impact of GHRM complicates the process of tracking improvements in financial performance, operational outcomes, or environmental indicators.

Nevertheless, the benefits of integrating GHRM are substantial. Institutions that adopt these practices can achieve cost savings through efficient energy use, improved employee engagement in sustainability initiatives, enhanced corporate reputation, and better compliance with environmental standards. GHRM also offers a pathway to align organizational objectives with national and global sustainability goals, strengthening the ethical foundations of Islamic finance.

In conclusion, while GHRM adoption in Indonesia's Islamic finance sector presents several hurdles, it offers a promising mechanism to bridge financial performance with environmental responsibility. With strong institutional commitment, supportive regulatory policies, and the development of measurable sustainability indicators, GHRM can evolve into a transformative strategy that advances the role of Islamic finance in promoting sustainable economic development consistent with *Maqasid al-Shariah*.

BIBLIOGRAPHY

- Abdivakhobovich, K. Z. (2024). Predictive Financial Optimization through Big Data Analytics in Uzbekistan's Banks. *International Conference of Economics, Finance and Accounting Studies*, 11, 24–27. <https://top-conferences.us/index.php/ICEFAS/article/view/896>
- Aboramadan, M. (2022). The effect of green HRM on employee green behaviors in higher education: the mediating mechanism of green work engagement. *International Journal of Organizational Analysis*, 30(1), 7–23. <https://doi.org/10.1108/IJOA-05-2020-2190>
- Adegoke, A. A., Oyindamola, K. A., & Offonabo, N. (2024). The Role of HR in Sustainability Initiatives: A Strategic Review. *International Journal of Research in Engineering, Science and Management*, 7(5), 31–37. <https://journal.ijresm.com/index.php/ijresm/article/view/3025>
- Airout, R. M., Maharmah, M. H. M., & Mustafa, J. A. (2025). HRM and corporate Islamic finance: A hybrid literature review from the Web of Science database. *Human Systems Management*. <https://doi.org/10.1177/01672533251322395>

- Al-Romeedy, B. S. (2019). Green human resource management in Egyptian travel agencies: constraints of implementation and requirements for success. *Journal of Human Resources in Hospitality & Tourism*, 18(4), 529–548. <https://doi.org/10.1080/15332845.2019.1626969>
- Ali, M., Puah, C.-H., Ali, A., Raza, S. A., & Ayob, N. (2022). Green intellectual capital, green HRM and green social identity toward sustainable environment: a new integrated framework for Islamic banks. *International Journal of Manpower*, 43(3), 614–638. <https://doi.org/10.1108/IJM-04-2020-0185>
- Arulrajah, A. A., Opatha, H. H. D. N. P., & Nawaratne, N. N. J. (2016). Green human resource management practices: a review. *Sri Lankan Journal of Human Resource Management*, 5(1), 1. <https://doi.org/10.4038/sljhrm.v5i1.5624>
- Aysan, A. F., Canga, M., & Kayani, U. N. (2025). A Comparative Analysis between Islamic Economics and Environmental Economics: Historical Development and its Significance for Contemporary Challenges. *Journal of Balkan Economies and Management*, 1(1), 27–52. <https://doi.org/10.51331/bemA02>
- Baig, I. A., Naeem, T., & Zafar, A. (2023). A Study of Sultan Bahu's Poetry through Arran Stibbe's Eco Linguistic Framework. *Pakistan Journal of Humanities and Social Sciences*, 11(4). <https://doi.org/10.52131/pjhss.2023.1104.0674>
- Bang, N. H., Hang, N. P. T., & Dao, L. T. (2023). Policy Implications for Green Banking Development in Vietnam. *International Journal of Professional Business Review*, 8(5), e02064. <https://doi.org/10.26668/businessreview/2023.v8i5.2064>
- Bastos, G., Martinho, R., Ferrão, S., Martinho, R., & Matias, H. (2025). *GHG Web Portal Dashboard: A Scalable and Flexible Digital Platform for Efficient Environmental Monitoring* (pp. 172–186). https://doi.org/10.1007/978-3-031-83207-9_13
- Bhutto, S. A., & Aurangzeb, D. (2016). Effects of Green Human Resources Management on Firm Performance: An Empirical Study on Pakistani Firms. *European Journal of Business and Management*, 8(16), 119–125. <https://iiste.org/Journals/index.php/EJBM/article/view/30983>
- Bouteraa, M., Chekima, B., Amin, H., Tamma, E., Lada, S., Ansar, R., & Lim, M. F. (2024). Does consumer religiosity matter for green banking adoption? Evidence from a Muslim-majority market. *Journal of Islamic Marketing*, 15(7), 1807–1823. <https://doi.org/10.1108/JIMA-02-2023-0049>
- Buana, G. K., & Hardiana, M. D. (2019). *Islamic finance's answer to SDGs and climate change*. United Nations Development Programme. <https://www.undp.org/blog/islamic-finances-answer-sdgs-and-climate-change>

- Bukhari, S. A. A., Hashim, F., Amran, A. Bin, & Hyder, K. (2019). Green Banking and Islam: two sides of the same coin. *Journal of Islamic Marketing*, 11(4), 977–1000. <https://doi.org/10.1108/JIMA-09-2018-0154>
- Cecere, G., Corrocher, N., & Mancusi, M. L. (2020). Financial constraints and public funding of eco-innovation: empirical evidence from European SMEs. *Small Business Economics*, 54(1), 285–302. <https://doi.org/10.1007/s11187-018-0090-9>
- Daoulhadj, B., & Hussin, N. (2023). Islamic Green Finance, Ecosystem and Prospects in Scaling Up Sustainable Investments. *Ahibs International Action Conference*, 21–45.
- Das, S., & Dash, M. (2024). Green Compensation And Reward System: A Novel Approach Towards The Growth And Sustainability Of Organization. *Journal of Advanced Zoology*, 45(2), 1213–1219. <https://doi.org/10.53555/jaz.v45i2.4100>
- Dilrukshi M.H.S., & Aluthge C. (2024). Influence of Green Human Resource Practices on Sustainable Organizational Performance: a Review of Literature. *Sri Lankan Journal of Business Economics*, 13(1). <https://doi.org/10.31357/sljbe.v13.7503>
- Eshimov, A. (2023). Development Trends of Islamic Finance Worldwide. *International Journal of Scientific Trends*, 2(8), 22–28. <https://scientifictrends.org/index.php/ijst/article/view/129>
- Faraj, R. M. M. (2022). *Impact of Implementation of Green HRM Practices on Institutional Performance in the Telecommunication Sector in Palestine* رسالة ماجستير [Arab American University]. <https://repository.aaup.edu/jspui/handle/123456789/2261>
- Gazi, M. A. I., Dhali, S., Masud, A. Al, Ahmed, A., Amin, M. Bin, Chaity, N. S., Senathirajah, A. R. bin S., & Abdullah, M. (2024). Leveraging Green HRM to Foster Organizational Agility and Green Culture: Pathways to Enhanced Sustainable Social and Environmental Performance. *Sustainability*, 16(20), 8751. <https://doi.org/10.3390/su16208751>
- Handayani, A. S., Febriyani, A. K., & Darmastuti, I. (2024). Unveiling the Green Revolution: Exploring Green HRM Implementation in Indonesian Enterprises. *Research Horizon*, 44(4), 23–34. <https://journal.lifescifi.com/index.php/RH/article/view/301>
- Hassan, M. K., Muneeza, A., & Hasan, R. (2025). *Islamic Finance and Sustainable Development*. Cambridge University Press. <https://doi.org/10.1017/9781009464963>
- Hossain, M. E., Mahadi, N. F. B., Haron, R., Tareq, M. A., Nor, R. M., Sohel, R., Martoza, M. G., & Kamrunnaher, M. (2024). *Exploring Green Human Resource*

- Management to Achieve Sustainability in the Banking Industry of Bangladesh* (pp. 169–182). https://doi.org/10.1007/978-3-031-55911-2_16
- Jabbar, H., & Abid, M. (2014). GHRM: Motivating Employees towards Organizational Environmental Performance. *MAGNT Research Report*, 2(4), 267–278. <https://doi.org/14.9831/1444-8939.2014/2-4/MAGNT.34>
- Jabbour, C. J. C., & de Sousa Jabbour, A. B. L. (2016). Green Human Resource Management and Green Supply Chain Management: linking two emerging agendas. *Journal of Cleaner Production*, 112, 1824–1833. <https://doi.org/10.1016/j.jclepro.2015.01.052>
- Jamil, S., Zaman, S. I., Kayikci, Y., & Khan, S. A. (2023). The Role of Green Recruitment on Organizational Sustainability Performance: A Study within the Context of Green Human Resource Management. *Sustainability*, 15(21), 15567. <https://doi.org/10.3390/su152115567>
- Jan, A., Mata, M. N., Albinsson, P. A., Martins, J. M., Hassan, R. B., & Mata, P. N. (2021). Alignment of Islamic Banking Sustainability Indicators with Sustainable Development Goals: Policy Recommendations for Addressing the COVID-19 Pandemic. *Sustainability*, 13(5), 2607. <https://doi.org/10.3390/su13052607>
- Joshi, K., & Bhrambhattach, V. (2024). Investigating Eco-Awareness and Green Human Resource Management: A Correlational Study on Sustainability and Workplace Performance. *International Journal of Innovative Science and Research Technology (IJISRT)*, 1296–1326. <https://doi.org/10.38124/ijisrt/IJISRT24JUL795>
- Jusdijachlan, J., & Susan Ridwan. (2023). Eco Friendly HRM: A Catalyst for Environmental Excellence in Hospitality. *International Journal of Advanced Multidisciplinary*, 2(3), 678–689. <https://doi.org/10.38035/ijam.v2i3.351>
- Khan, I. H., & Urooj, D. S. F. (2023). The Nexus of Green Fintech and Corporate Financial Performance: A Catalyst for Sustainable Corporate Growth and Financial Success. *Journal of Business and Management Research*, 2(2), 706–736. <https://jbmr.com.pk/index.php/Journal/article/view/64>
- Koh, L. Y., Wong, J. Y., Low, T. J., & TAN, K. W. (2024). Eco-Friendly Consumption and Sustainable Energy Investments: A Framework for Personal Wealth Accumulation and Consumption Planning. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.4877125>
- Le, L. T. (2024). Impact of environmental, social and governance practices on financial performance: evidence from listed companies in Southeast Asia. *Cogent Business & Management*, 11(1). <https://doi.org/10.1080/23311975.2024.2379568>

- M. Anwar, S., Junaidi, J., Salju, S., Wicaksono, R., & Mispiyanti, M. (2020). Islamic bank contribution to Indonesian economic growth. *International Journal of Islamic and Middle Eastern Finance and Management*, 13(3), 519–532. <https://doi.org/10.1108/IMEFM-02-2018-0071>
- Mandip, G. (2012). Green HRM: People Management Commitment to Environmental Sustainability. *Research Journal of Recent Sciences*, 1((ISC-2011)), 244–252. <https://www.isca.me/rjrs/archive/v1/iISC-2011/38.ISCA-ISC-2011-18CLM-Com-03.php>
- Mayanja, S. N. (2023). Leveraging Islamic Finance for MSMEs as a Tool for Financial Inclusion, Development, and Growth in Underbanked Countries. *International Journal of Small and Medium Enterprises and Business Sustainability*, 8(3), 71–95. <https://e-journal.trisakti.ac.id/index.php/ijsmebs/article/view/20187>
- Molina-Azorin, J. F., López-Gamero, M. D., Tarí, J. J., Pereira-Moliner, J., & Pertusa-Ortega, E. M. (2021). Environmental Management, Human Resource Management and Green Human Resource Management: A Literature Review. *Administrative Sciences*, 11(2), 48. <https://doi.org/10.3390/admsci11020048>
- Moradeke, F. T., Ishola, G. K., & Okikiola, O. L. (2021). Green Training and Development Practices on Environmental Sustainability: Evidence from WAMCO PLC. *Journal of Educational Management & Social Sciences*, 1(2), 1–19. <https://doi.org/10.48112/jemss.v1i2.212>
- Mustapha, M. A., Manan, Z. A., & Wan Alwi, S. R. (2017). Sustainable Green Management System (SGMS) – An integrated approach towards organisational sustainability. *Journal of Cleaner Production*, 146, 158–172. <https://doi.org/10.1016/j.jclepro.2016.06.033>
- OECD. (2020). *How Islamic finance contributes to achieving the Sustainable Development Goals* (OECD Development Policy Papers, Vol. 30). <https://doi.org/10.1787/ac1480ca-en>
- Opatha, H. H. D. N. P., & Arulrajah, A. A. (2014). Green Human Resource Management: Simplified General Reflections. *International Business Research*, 7(8). <https://doi.org/10.5539/ibr.v7n8p101>
- Otoritas Jasa Keuangan. (2023). *Laporan Perkembangan Keuangan Syariah Indonesia 2023*. <https://ojk.go.id/id/berita-dan-kegiatan/info-terkini/Pages/Laporan-Perkembangan-Kuangan-Syariah-Indonesia-2023.aspx>
- Özbay, E., İpek, R., & Esen, E. (2024). Banking on Green: the Moderating Role of Bank Type in Green Human Resource Management and Corporate

- Sustainability. *Marmara Üniversitesi İktisadi ve İdari Bilimler Dergisi*, 46(2), 469–491. <https://doi.org/10.14780/muiibd.1539468>
- Paul, J., Lim, W. M., O'Cass, A., Hao, A. W., & Bresciani, S. (2021). Scientific procedures and rationales for systematic literature reviews (SPAR-4-SLR). *International Journal of Consumer Studies*, 45(4). <https://doi.org/10.1111/ijcs.12695>
- Pham, N. T., Hoang, H. T., & Phan, Q. P. T. (2019). Green human resource management: a comprehensive review and future research agenda. *International Journal of Manpower*, 41(7), 845–878. <https://doi.org/10.1108/IJM-07-2019-0350>
- Prasad, R. S., & Agarwal, K. (2013). Green HRM - Partner in Sustainable Competitive Growth. *Journal of Management Sciences and Technology*, 1(1). https://www.researchgate.net/publication/364238130_Green_HRM_Partner_in_Sustainable_Competitive_Growth
- Qambrani, S. A. (2024). Exploring the Adoption of Fintech and Its Difficulties in Pakistan's Emerging Economy Concerning Financial Inclusion. *Indonesian Journal of Innovation and Applied Sciences (IJIAS)*, 4(2), 180–187. <https://doi.org/10.47540/ijias.v4i2.1130>
- Ramachandaran, S. D., Vasudevan, A., Balakrishnan, R., Nagaraj, S., & Thinakaran, R. (2024). The impact of green human resource management practices on employee's job performance. *International Journal of Management and Sustainability*, 13(3), 506–522. <https://doi.org/10.18488/11.v13i3.3828>
- Renwick, D. W. S., Jabbour, C. J. C., Muller-Camen, M., Redman, T., & Wilkinson, A. (2016). Contemporary developments in Green (environmental) HRM scholarship. *The International Journal of Human Resource Management*, 27(2), 114–128. <https://doi.org/10.1080/09585192.2015.1105844>
- Salsabilah, S., Ibrahim, M. B. H., Irawan, A., Akbar, M. A., & Lina, R. (2024). Integrating Islamic Principles into Human Resource Management Practices. *Advances: Jurnal Ekonomi & Bisnis*, 2(2). <https://doi.org/10.60079/ajeb.v2i2.188>
- Sanda, A. S., Mouri, F. F., Alif, S. S., Nazma, & Yasmin, N. (2024). The Impact of Green HRM Practices on Employees' Job Satisfaction: Evidence from Bangladesh. *International Journal of Humanities and Social Science Review*, 10(1), 31–42. <https://ijhssrnet.com/wp-content/uploads/2024/07/4.pdf>
- Sharma, R., & Gupta, N. (2015). Green HRM: An Innovative Approach to Environmental Sustainability. *Twelfth AIMS International Conference on Management*. https://www.researchgate.net/publication/342234035_Green_HRM_An_Innovative_Approach_to_Environmental_Sustainability

- Shoaib, M., Abbas, Z., Yousaf, M., Zámečník, R., Ahmed, J., & Saqib, S. (2021). The role of GHRM practices towards organizational commitment: A mediation analysis of green human capital. *Cogent Business & Management*, 8(1). <https://doi.org/10.1080/23311975.2020.1870798>
- Taleb, A., & Khater, T. (2024). The role of using Islamic finance to boost infrastructure development for sustainable economic growth. *International Journal of Economic Perspectives*, 18(3), 730–754. <https://ijeponline.org/index.php/journal/article/view/589>
- Taylor, A., & Taylor, M. (2014). Factors influencing effective implementation of performance measurement systems in small and medium-sized enterprises and large firms: a perspective from Contingency Theory. *International Journal of Production Research*, 52(3), 847–866. <https://doi.org/10.1080/00207543.2013.842023>
- Thevanes, N., & Arulrajah, A. A. (2020). Environmental Training and Environmental Orientation of Organization: The Mediating Role of Environmental Behavior of Employee. *Sri Lankan Journal of Human Resource Management*, 10(2), 46. <https://doi.org/10.4038/sljhrm.v10i2.5643>
- Tok, E., Yesuf, A. J., & Mohamed, A. (2022). Sustainable Development Goals and Islamic Social Finance: From Policy Divide to Policy Coherence and Convergence. *Sustainability*, 14(11), 6875. <https://doi.org/10.3390/su14116875>
- Tulsi, P., & Ji, Y. (2020). A Conceptual Approach to Green Human Resource Management and Corporate Environmental Responsibility in the Hospitality Industry. *The Journal of Asian Finance, Economics and Business*, 7(1), 195–203. <https://doi.org/10.13106/jafeb.2020.vol7.no1.195>
- Udeagha, M. C., & Ngepah, N. (2023). Achieving decarbonization goals in BRICS economies: Revisiting the joint role of composite risk index, green innovation, and environmental policy stringency. *Cogent Social Sciences*, 9(1). <https://doi.org/10.1080/23311886.2023.2234230>
- Wang, X., & Zhong, X. (2024). Digital transformation and green innovation: firm-level evidence from China. *Frontiers in Environmental Science*, 12. <https://doi.org/10.3389/fenvs.2024.1389255>
- Wiguna, W., Sujoto, U., Tukiran, M., & Maszah, S. (2023). Green Human Resource Management: a Review. *International Journal of Economy, Education and Entrepreneurship*, 3(2), 566–576. <https://doi.org/10.53067/ije3.v3i2.179>

