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Intelligent Eco-Tourism: How AI Transforms Human Resource Practices and Environmental Sustainability

Ray Octafian[1*], Nina Mistriani[2], Noorsidi Aizuddin Hj. Mat Noor[3], Arvy N. Osma[4], Ayyappan P[5]

[1] STIEPARI Semarang, Indonesia; e-mail : rayoctafian@stiepari.ac.id
[2] STIEPARI Semarang, Indonesia; e-mail : ninamistriani@stiepari.ac.id
[3] Universiti Teknologi Malaysia, Malaysia; e-mail : noorsidi@utm.my
[4] Mariners' Polytechnic Colleges Foundation of Canaman Inc, Phillipines; e-mail : arvysecond@gmail.com
[5] Hindustan Institute of Technology and Science, India; e-mail : appusun2000@gmail.com
* Corresponding Author : Ray Octafian

Abstract: This research examines the role of Artificial Intelligence (AI) technology in supporting eco-tourism and its implications for change management and human resource performance in the green economy era. Using a sequential explanatory mixed-method approach, data were collected from 500 survey respondents and 25 interview participants across five Asian countries (Indonesia, Thailand, Malaysia, Vietnam, and the Philippines). The theoretical framework integrates Ability-Motivation-Opportunity (AMO) theory and Technology Acceptance Model (TAM) to explain the adoption and impact of AI technology in Green Human Resource Management (GHRM) practices. The results show that the adoption of AI technology in GHRM practices has a positive and significant effect on HR performance ($\beta = 0.423$, $p < 0.001$) and eco-tourism sustainability ($\beta = 0.387$, $p < 0.001$). Perceived ease of use and usefulness prove to be significant predictors of AI technology adoption, while organizational readiness and cultural context serve as important moderators. Multi-group analysis reveals significant variations across countries, with Indonesia and Malaysia showing stronger impacts compared to Vietnam and the Philippines. Qualitative findings identify specific mechanisms of AI integration in GHRM practices as well as implementation challenges and success factors. This research contributes to the literature by integrating three domains (AI technology, GHRM, and eco-tourism) and providing a framework for AI technology adoption in supporting GHRM practices and eco-tourism sustainability in the Asian context.

Keywords: Artificial Intelligence; Green Human Resource Management; Eco-Tourism; Change Management; Sustainability

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1. Introduction

The green economy era has become a major driver of transformation across various industrial sectors, including tourism, which is currently undergoing a paradigm shift towards more sustainable practices [1]. Eco-tourism, a form of tourism that emphasizes environmental conservation, community empowerment, and responsible travel experiences, is gaining increasing importance amidst growing global awareness of climate change and environmental degradation [2]. Simultaneously, advancements in Artificial Intelligence (AI) technology present new opportunities to enhance operational efficiency, visitor experiences, and sustainability within the tourism sector [3]. This study focuses on the role of AI technology in supporting the development of eco-tourism and its implications for change management and

human resource management (HRM) performance in the green economy era across several Asian countries, including Indonesia, Thailand, Malaysia, Vietnam, and the Philippines.

Tourism is one of the largest economic sectors globally, contributing significantly to national income and employment generation in many Asian countries. However, conventional tourism has often been criticized for its negative environmental impacts, such as increased carbon emissions, ecosystem degradation, and unsustainable resource use [4]. According to the World Tourism Organization (UNWTO), the tourism sector accounts for approximately 8% of total global greenhouse gas emissions and is expected to continue increasing without significant intervention [4].

In Asia, countries with popular eco-tourism destinations such as Indonesia, Thailand, and the Philippines face serious challenges in balancing economic growth through tourism with environmental conservation and local community welfare. Although eco-tourism has been promoted as a solution, its implementation is often hindered by inadequate infrastructure, limited human resource capacity, and gaps in environmental impact monitoring and management [5].

In recent years, AI technology has emerged as a transformative tool for addressing these challenges. As outlined by Wang et al. (2023), AI can be utilized to optimize resource management, monitor environmental carrying capacities in real-time, enhance energy efficiency, and provide personalized tourist experiences without compromising sustainability[6]. Nevertheless, the adoption of AI technology in the eco-tourism sector in Asia remains limited and uneven, with significant disparities between major tourist destinations and underdeveloped rural areas [7].

Meanwhile, transitioning towards more sustainable tourism practices with AI support necessitates fundamental transformations in human resource management. Green Human Resource Management (GHRM) has emerged as a strategic approach that integrates HRM practices with environmental sustainability goals [8]. Research by Kim et al. (2019) indicates that GHRM practices, such as sustainability training and incentives for environmentally friendly behavior, can enhance employees' pro-environmental behaviors and improve organizational environmental performance within the hospitality sector[9].

However, the implementation of AI technology in GHRM practices to support eco-tourism introduces new challenges in change management. Research by Zhang et al. (2022) identifies employee resistance, digital skills gaps, and job security concerns as major barriers to AI adoption in the tourism sector[10]. Moreover, within Asia's diverse cultural context, factors such as social hierarchy, collectivist values, and varying levels of technological readiness significantly influence how AI technology is accepted and implemented in GHRM practices [11].

Research on the integration of AI technology into eco-tourism and GHRM practices is becoming increasingly urgent for several reasons. First, the COVID-19 pandemic has accelerated digitalization within the tourism sector and shifted tourist preferences toward more sustainable and less crowded destinations [10]. Second, global commitments to the Sustainable Development Goals (SDGs) and the Paris Agreement on climate change are pressuring the tourism industry to reduce its carbon footprint and enhance sustainable practices [5].

Third, rapid advancements in AI technology create new opportunities to enhance efficiency, sustainability, and competitiveness in the eco-tourism sector [6].

In Asia, this urgency is further amplified by increasing environmental pressures from over-tourism at popular destinations, growing awareness of biodiversity conservation, and the need to empower local communities through sustainable tourism [12]. According to Tandon et al. (2023), Asian countries with vulnerable ecosystems, such as Indonesia with its tropical rainforests and the Philippines with its coral reefs, must urgently adopt innovative eco-tourism management approaches to prevent irreversible environmental damage[13].

Despite significant growth in research on GHRM and eco-tourism separately, important gaps remain in understanding how AI technology can be integrated into both areas to create effective synergies. The identified research gaps include:

1. Most studies on AI technology in tourism focus on marketing aspects and tourist experiences, with limited attention to the role of AI in enhancing environmental sustainability and HRM practices [9]. Scholtz and Matunhu (2023) highlight that research linking AI technology and eco-tourism remains at an early stage, with limited empirical evidence regarding its impact on sustainability indicators[14].

2. While research on GHRM has expanded in recent years, it largely focuses on the manufacturing and general service sectors, with limited contributions in the eco-tourism context [15]. Nisar et al. (2021) note that although GHRM practices are increasingly adopted in the hospitality industry, research on how these practices can be tailored for eco-tourism remains scarce[16].

3. There is a geographical gap in research on AI technology and GHRM within eco-tourism, with most studies conducted in developed countries and limited attention to developing countries in Asia [17]. Research by Siyambalapitiya et al. (2018) shows that the unique cultural and institutional factors in Asian countries require customized approaches in implementing GHRM practices[17].

4. Research on change management in the context of AI adoption for eco-tourism is still limited, with little understanding of how tourism organizations can effectively manage the transition towards AI-supported practices while maintaining a focus on sustainability [6]. Lu et al. (2021) note that research on factors facilitating or hindering AI adoption in eco-tourism in Asia remains in its early stages[7].

5. Although the Ability-Motivation-Opportunity (AMO) theory has been applied in GHRM research [8], there is still a gap in understanding how AI technology affects the AMO components within the eco-tourism context. As explained by Pham et al. (2020), further research is needed to identify how AI technology can enhance employees' abilities, motivations, and opportunities to engage in eco-tourism practices[18].

Based on the background and the identified research gaps, this study aims to address the following research questions:

1. How can AI technology be effectively integrated into GHRM practices to support the development of eco-tourism in Asian countries?

2. What are the impacts of implementing AI technology within GHRM practices on HRM performance and environmental sustainability in the eco-tourism context?
3. How do cultural and institutional differences across Asian countries influence the adoption and effectiveness of AI technology in GHRM practices for eco-tourism?
4. What are the main challenges in change management associated with implementing AI technology in GHRM practices for eco-tourism, and how can these challenges be effectively addressed?
5. What is the optimal model for integrating AI technology, GHRM, and eco-tourism to enhance HRM performance and environmental sustainability in the green economy era?

This research will adopt a mixed-methods approach with an explanatory sequential design, combining quantitative surveys and in-depth interviews across several Asian countries to answer these questions. As suggested by Li et al. (2021), the mixed-methods approach is particularly suitable for investigating the complex interactions between technology, HRM practices, and sustainability in the tourism context[19]. The quantitative survey will apply a conceptual framework that integrates the Ability-Motivation-Opportunity (AMO) theory and the Technology Acceptance Model (TAM) to analyze the factors influencing the adoption and effectiveness of AI technology within GHRM practices for eco-tourism.

The results of this study are expected to make significant contributions to the literature on AI technology, GHRM, and eco-tourism, and to provide practical guidance for managers and policymakers seeking to integrate AI technology into eco-tourism strategies and GHRM practices within the green economy era. As emphasized by Tandon et al. (2023), an integrated approach to technology, HRM, and sustainability is key to maximizing the potential of eco-tourism in contributing to sustainable development in Asia[13].

2. Literature Review

2.1 Integration of AI Technology in Eco-Tourism

AI technology has become a catalyst for change across various industries, including the tourism sector. In the context of eco-tourism, AI can help create a balance between economic growth and environmental sustainability [20]. Kim et al. (2022) identified several applications of AI in sustainable tourism, including intelligent recommendation systems to mitigate over-tourism, visitor pattern analysis to optimize environmental carrying capacities, and real-time monitoring of vulnerable ecosystems[21].

Gretzel et al. (2020) emphasized that the implementation of AI technology in smart tourism destinations can enhance resource management efficiency, reduce energy consumption, and provide more personalized visitor experiences[22]. Their research indicated that AI technologies, such as visit pattern prediction systems and smart transportation solutions, could reduce the carbon footprint of tourism by up to 30% in popular tourist destinations.

Despite its significant potential, Scholtz and Matunhu (2023) found that the adoption of AI technology in eco-tourism in developing countries, including those in Asia, remains hampered by infrastructure limitations, digital divides, and a shortage of technical expertise. This

creates a research gap that must be addressed through approaches that consider local contexts and institutional capacities[14].

2.2 Green Human Resource Management in the Tourism Industry

Green Human Resource Management (GHRM) has emerged as a strategic approach to integrating HRM practices with sustainability goals. Nisar et al. (2021) found that GHRM practices, such as green recruitment, sustainability training, and rewards for pro-environmental behavior, positively influence environmental performance in green hotels in Malaysia[16]. Their study also revealed that green intellectual capital and pro-environmental behavior mediate the relationship between GHRM and environmental performance.

Meanwhile, Palupiningtyas et al. (2025) analyzed the impact of GHRM practices on young employee retention and performance in Indonesia's hospitality industry[8]. Using a Structural Equation Modeling (SEM) approach, their research showed that GHRM practices improve talent retention and employee performance, with green training and environment-based performance evaluations having the most significant impact.

Although research on GHRM in tourism has developed, Yong et al. (2020), through a systematic literature review, found that most studies focus on conventional tourism destinations, with limited attention to the eco-tourism context[15]. This indicates a need for research specifically analyzing how GHRM practices can be adapted to support eco-tourism.

2.3 Change Management in the Adoption of AI Technology for Eco-Tourism

Digital transformation in eco-tourism requires an effective change management approach. Li et al. (2021) explored factors influencing the adoption of AI technology in sustainable tourism and found that transformational leadership, an innovative organizational culture, and absorptive capacity are key elements for successful implementation[19]. However, their study did not specifically address how these factors could be integrated into GHRM strategies.

Buhalis and Leung (2018) explained that change management in tourism digitalization requires the development of employees' digital skills and the reconfiguration of business processes[23]. Their study highlighted the importance of a holistic approach that aligns technology, processes, and people. Nonetheless, this research did not specifically examine the eco-tourism context or GHRM integration.

Challenges in digital change management in Asia were examined by Sun et al. (2020), who found that cultural values such as social hierarchy, uncertainty avoidance, and collectivism significantly influence how hotel employees perceive and accept technology adoption[11]. Their study emphasized the importance of considering cultural contexts when designing change management strategies, although it did not incorporate the perspectives of GHRM and eco-tourism.

2.4 The Ability-Motivation-Opportunity (AMO) Theoretical Model in the Eco-Tourism Context

The AMO theory has been widely used to explain how HRM practices influence employee performance [18]. In the context of GHRM, this theory posits that HRM practices should

enhance employees' abilities to perform pro-environmental behaviors, motivate them to participate in sustainability initiatives, and provide opportunities to contribute to the organization's environmental goals.

Research by Palupiningtyas et al. (2025) applied the AMO framework to analyze the impact of GHRM practices on employee performance in Indonesia's hospitality industry[8]. However, the study did not explore how AI technology could be integrated into the AMO model for eco-tourism.

Kim et al. (2019) applied the AMO theory to analyze the influence of GHRM practices on hotel employees' pro-environmental behaviors[24]. Their research demonstrated that GHRM practices enhancing ability (through training), motivation (through reward systems), and opportunity (through participation) positively affect employees' pro-environmental behaviors. However, the study did not consider the role of AI technology in enhancing AMO components.

2.5 Research Gaps

Based on the literature review, several research gaps have been identified that this study aims to address. First, although AI technology and GHRM have been individually studied within the tourism context, there remains a limited understanding of how they can be integrated to support eco-tourism [6]. Second, research on change management related to AI technology adoption for eco-tourism remains limited, particularly within the context of Asian countries with diverse cultural values [11]. Third, the application of the AMO theory in analyzing the integration of AI technology, GHRM, and eco-tourism is still in its early stages and requires further development [18].

3. Research Methodology

This study adopts a **sequential explanatory mixed-methods approach** to investigate the role of AI technology in supporting eco-tourism and its implications for change management and HRM performance. This approach sequentially combines quantitative and qualitative methods, where the results from the quantitative phase inform the data collection and analysis in the qualitative phase [25]. This method was chosen due to its ability to provide a comprehensive understanding of complex phenomena, such as the integration of AI technology into GHRM practices for eco-tourism [19].

The conceptual framework of this study integrates the **Ability-Motivation-Opportunity (AMO) theory** with the **Technology Acceptance Model (TAM)** to explain how the adoption of AI technology in GHRM practices influences HRM performance and eco-tourism sustainability. Based on this framework, several hypotheses are developed:

- **H1**: The adoption of AI technology in GHRM practices has a positive effect on HRM performance at eco-tourism destinations.
- **H2**: The adoption of AI technology in GHRM practices has a positive effect on eco-tourism sustainability performance.
- **H3**: The perceived ease of use of AI technology positively influences the adoption of AI technology in GHRM practices.

- **H4**: The perceived usefulness of AI technology positively influences the adoption of AI technology in GHRM practices.
- **H5**: Organizational readiness moderates the relationship between the adoption of AI technology in GHRM practices and HRM performance.
- **H6**: Cultural context moderates the relationship between the adoption of AI technology in GHRM practices and HRM performance.

This study will be conducted in two main phases:

Phase 1: Quantitative Study

This phase involves an online survey of managers and employees at eco-tourism destinations across five Asian countries (Indonesia, Thailand, Malaysia, Vietnam, and the Philippines). The survey is designed to test the research hypotheses and identify patterns and relationships among the main variables. The questionnaire is developed based on validated instruments from previous research, adjusted to the eco-tourism context [21]; [16].

Phase 2: Qualitative Study

Based on the results of the quantitative analysis, semi-structured interviews will be conducted with eco-tourism destination managers, HRM practitioners, and AI technology experts to gain an in-depth understanding of the mechanisms and contexts of AI technology implementation within GHRM practices. This approach enables the exploration of nuances and complexities that might not be captured through quantitative analysis [18].

The sample for the quantitative phase will be selected using **stratified random sampling** from eco-tourism destinations that have implemented AI technology and GHRM practices across the five countries. A total of **500 respondents** (100 from each country) will be recruited, including HR managers, IT managers, and operational employees. For the qualitative phase, **purposive sampling** will be used to select **25 participants** (5 from each country) based on their roles and experiences with the implementation of AI technology and GHRM practices [6].

The questionnaire for the quantitative phase consists of validated scales measuring AI technology adoption, GHRM practices, HRM performance, and eco-tourism sustainability. All items will be measured using a 5-point Likert scale. The interview protocol for the qualitative phase will be developed based on the quantitative analysis results, focusing on areas requiring further exploration [12].

Quantitative Analysis: Quantitative data will be analyzed using **Structural Equation Modeling (SEM)** with a **Partial Least Squares (PLS)** approach to test the research hypotheses. PLS-SEM is selected due to its capability to handle complex models with relatively small sample sizes [26]. The analysis will include the evaluation of both the measurement model and the structural model, with tests for mediation and moderation effects.

The structural equation model can be formulated as follows:

$$\mathbf{KS} = \beta_0 + \beta_1\mathbf{AI} + \beta_2\mathbf{GHRM} + \beta_3(\mathbf{AI}\times\mathbf{GHRM}) + \beta_4\mathbf{KO} + \beta_5\mathbf{KB} + \varepsilon$$

Where: KSKS = HRM Performance; AIAI = Adoption of AI Technology; GHRMGHRM = Green HRM Practices; KOKO = Organizational Readiness; KBKB = Cultural Context; ε = Error Term

Qualitative Analysis: Qualitative data from interviews will be analyzed using **thematic analysis** with an **abductive approach**, allowing themes to emerge from the data while being guided by the theoretical framework [27]. NVivo software will be used to identify patterns, themes, and relationships within the data.

In the quantitative phase, validity and reliability will be ensured through the use of previously validated instruments, pilot testing, and internal consistency reliability analysis using Cronbach's alpha. In the qualitative phase, **trustworthiness** will be maintained through **member checking**, **thick description**, and **data triangulation** [28]

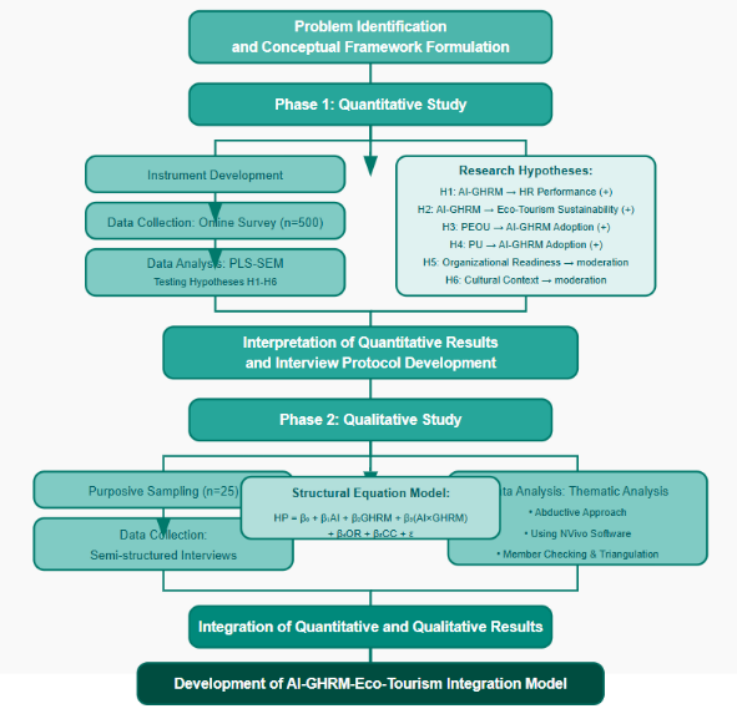

Figure 1. Research Flow Diagram

Conceptual Definitions of Research Variables

The following table presents the conceptual definitions of each research variable, along with their dimensions and indicators:

Table 1. Conceptual Definitions of Research Variables

Variable	Conceptual Definition	Dimension	Indicator
Adoption of AI Technology in GHRM Practices	The degree of implementation and integration of artificial intelligence technology into human resource management practices oriented toward environmental sustainability [6].	1. AI-Based Green Recruitment and Selection	1. Use of AI to screen candidates based on environmental values2. Automated recruitment systems with sustain-

			ability criteria3. Predictive analytics for candidate alignment with eco-tourism values
		2. AI-Based Green Training and Development	4. AI-powered e-learning platforms for sustainability materials5. Personalized environmental training programs using AI6. Virtual reality simulations for eco-tourism training
		3. AI-Based Green Performance Appraisal	7. Automated evaluation systems for pro-environmental behaviors8. AI dashboards for monitoring environmental KPIs9. Real-time analytics of sustainability performance
		4. AI-Based Green Compensation and Reward Systems	10. Automated reward systems for sustainability initiatives11. Predictive analytics for green incentive effectiveness12. Personalized benefits based on sustainability preferences
HRM Performance	The effectiveness of employees in performing tasks and responsibilities, including their contribution to organizational goals, sustainability, and customer service [8]	1. Task Performance	13. Quality of service to eco-tourism customers14. Operational efficiency in sustainable practices15. Accuracy in implementing eco-tourism SOPs

		2. Contextual Performance	16. Voluntary pro-environmental behavior17. Initiatives for sustainable innovation18. Collaboration in sustainability projects
		3. Adaptive Performance	19. Ability to adapt to new green technologies20. Flexibility in responding to environmental regulation changes21. Ability to learn new eco-tourism practices
Eco-Tourism Sustainability	The degree to which a tourism destination successfully balances economic, social, and environmental objectives by minimizing negative environmental impacts and maximizing benefits for local communities [14].	1. Environmental Sustainability	22. Carbon emission reduction23. Biodiversity conservation24. Resource efficiency
		2. Economic Sustainability	25. Long-term profitability26. Local job creation27. Revenue diversification from eco-tourism
		3. Social Sustainability	28. Preservation of local culture29. Community empowerment30. Fair distribution of benefits
Perceived Ease of Use (PEOU)	The extent to which employees believe that using AI technology in GHRM practices will require minimal effort [29].	1. Usability	31. Ease of learning the AI system32. Intuitiveness of the user interface33. Accessibility of AI features

		2. Complexity	34. Difficulty of operation35. Time required to master the system36. Need for technical support
		3. Integration	37. Compatibility with existing systems38. Ease of transition from manual systems39. Workflow alignment
Perceived Usefulness (PU)	The extent to which employees believe that using AI technology in GHRM practices will enhance their performance and effectiveness [29].	1. Task Effectiveness	40. Increased productivity41. Reduced task completion time42. Improved decision-making accuracy
		2. Strategic Benefits	43. Contribution to sustainability goals44. Enhanced competitive advantage45. Support for eco-tourism strategies
		3. Added Value	46. Improved analytical capabilities47. Access to better insights48. Enhanced service personalization
Organizational Readiness	The degree to which an organization is prepared in terms of infrastructure, resources, and culture to adopt AI technology within GHRM practices (Wang et al., 2023).	1. Technological Readiness	49. Adequate digital infrastructure50. Sufficient computing and data storage capabilities51. Data security and privacy measures
		2. HR Readiness	52. Employees' digital competencies53. Availability of AI ex-

			perts54. Skill development programs related to AI
		3. Managerial Readiness	55. Leadership support56. Adequate resource allocation57. Digital transformation planning
Cultural Context	Aspects of values, norms, and social practices influencing the acceptance and implementation of AI technology within GHRM practices across Asian countries [11].	1. Power Distance	58. Decision-making hierarchy59. Distribution of authority60. Acceptance of power inequalities
		2. Uncertainty Avoidance	61. Tolerance for ambiguity62. Preference for formal rules63. Resistance to change
		3. Individualism vs Collectivism	64. Prioritization of group vs individual goals65. Social cohesion within organizations66. Communication and collaboration patterns
		4. Long-Term Orientation	67. Perspective on technology investment68. Decision-making based on sustainability69. Strategic versus tactical planning

Source: Developed from Kim et al. (2022), Palupiningtyas et al. (2025), Scholtz & Matunhu (2023), Venkatesh et al. (2016), Wang et al. (2023), and Sun et al. (2020).

Research Ethics : This study adheres to fundamental research ethics principles, including **informed consent**, **confidentiality**, and **participant data protection**. Ethical approval was obtained from the institutional ethics committee prior to the commencement of data collection [12]

4. Research Findings and Discussion

4.1 Research Findings

4.1.1 Quantitative Analysis Results

Respondent Characteristics

Table 2 presents the demographic characteristics of the 500 respondents who participated in the survey across five Asian countries.

Table 2. Demographic Characteristics of Respondents

Characteristic	Category	Frequency	Percentage (%)
Country	Indonesia	100	20
	Thailand	100	20
	Malaysia	100	20
	Vietnam	100	20
	Philippines	100	20
Gender	Male	245	49
	Female	255	51
Age	20–30 years	175	35
	31–40 years	205	41
	41–50 years	98	19.6
	>50 years	22	4.4
Position	HR Manager	125	25
	IT Manager	115	23
	Operational Manager	130	26
	Employee	130	26
Work Tenure	1–3 years	135	27
	4–6 years	215	43
	7–10 years	110	22
	>10 years	40	8

Descriptive Analysis of Research Variables

Table 3 presents descriptive statistics for all research variables measured using a 5-point Likert scale.

Table 3. Descriptive Statistics of Research Variables

Measurement Model Assessment

Table 4 presents the validity and reliability assessment results for the measurement model using PLS-SEM.

Table 4. Measurement Model Assessment Results

Note: CR = Composite Reliability; AVE = Average Variance Extracted.

The results show that all constructs meet the threshold for composite reliability (>0.7) and AVE (>0.5), indicating good reliability and convergent validity (Hair et al., 2019).

Hypotheses Testing Results

Table 5 summarizes the hypotheses testing results using PLS-SEM.

Variable	Mean	SD	Min	Max
Adoption of AI Technology in GHRM	3.68	0.82	1.25	5.00
- AI-Based Green Recruitment and Selection	3.45	0.94	1.00	5.00
- AI-Based Green Training and Development	3.82	0.87	1.33	5.00
- AI-Based Green Performance Appraisal	3.73	0.91	1.00	5.00
- AI-Based Green Compensation and Rewards	3.56	0.96	1.00	5.00
HRM Performance	3.92	0.75	1.67	5.00
- Task Performance	4.12	0.68	2.00	5.00
- Contextual Performance	3.87	0.81	1.33	5.00
- Adaptive Performance	3.78	0.85	1.67	5.00
Eco-Tourism Sustainability	3.81	0.79	1.33	5.00
- Environmental Sustainability	3.90	0.82	1.00	5.00
- Economic Sustainability	3.76	0.84	1.67	5.00
- Social Sustainability	3.78	0.83	1.00	5.00
Perceived Ease of Use	3.56	0.92	1.00	5.00
Perceived Usefulness	3.94	0.77	1.33	5.00
Organizational Readiness	3.48	0.98	1.00	5.00
Cultural Context	—	—	—	—
- Power Distance	3.65	0.87	1.00	5.00
- Uncertainty Avoidance	3.78	0.83	1.33	5.00
- Individualism vs Collectivism	3.45	0.96	1.00	5.00
- Long-Term Orientation	3.82	0.80	1.67	5.00

Table 5. Hypotheses Testing Results

Hypothesis	Relationship	Path Coefficient	t-value	p-value	Conclusion

Construct	Item	Outer Loading	CR	AVE
Adoption of AI Technology in GHRM	AIHR1–AIHR8	>0.80	0.937	0.712
HRM Performance	KIN1–KIN7	>0.84	0.945	0.739
Eco-Tourism Sustainability	ECO1–ECO7	>0.82	0.934	0.701
Perceived Ease of Use	PEOU1–PEOU4	>0.86	0.929	0.767
Perceived Usefulness	PU1–PU5	>0.85	0.942	0.764

Organizational Readiness	KO1–KO5		>0.83	0.927	0.717
H1	Adoption of AI Technology in GHRM → HRM Performance	0.423	8.256	0.000	Supported
H2	Adoption of AI Technology in GHRM → Eco-Tourism Sustainability	0.387	7.439	0.000	Supported
H3	Perceived Ease of Use → Adoption of AI Technology in GHRM	0.345	6.872	0.000	Supported
H4	Perceived Usefulness → Adoption of AI Technology in GHRM	0.412	8.134	0.000	Supported
H5	Organizational Readiness*Adoption of AI → HRM Performance	0.186	3.542	0.000	Supported
H6	Cultural Context*Adoption of AI → HRM Performance	0.165	3.214	0.001	Supported

The results reveal that all proposed hypotheses are supported by empirical data.

Multi-Group Analysis (MGA)

Table 6 presents the results of the multi-group analysis comparing the effects across five Asian countries.

Table 6. Multi-Group Analysis Results

Relationship	Indonesia	Thailand	Malaysia	Vietnam	Philippines	p-diff
Adoption of AI Technology in GHRM → HRM Performance	0.458	0.432	0.446	0.387	0.392	0.039*
Adoption of AI Technology in GHRM → Eco-Tourism Sustainability	0.412	0.398	0.405	0.362	0.358	0.047*
Organizational Readiness*Adoption of AI → HRM Performance	0.223	0.197	0.216	0.154	0.142	0.028*
Cultural Context*Adoption of AI → HRM Performance	0.198	0.187	0.173	0.142	0.128	0.019*

$p < 0.05$.

The MGA results indicate significant differences across countries, with Indonesia demonstrating the strongest effects, followed by Malaysia and Thailand, while Vietnam and the Philippines show relatively weaker effects.

4.1.2 Qualitative Analysis Results

Thematic analysis of interview data from 25 participants (5 from each country) generated four major themes, as presented in Table 7.

Table 7. Main Themes from Qualitative Analysis

Theme	Description	Example Quote
Integration of AI in GHRM Practices	Diverse approaches to integrating AI technology into GHRM practices to support eco-tourism.	"We use AI to analyze sustainability performance data and personalize green training recommendations for employees." (HR Manager, Malaysia)
Implementation Challenges	Technical, cultural, and organizational barriers to adopting AI technology for GHRM practices.	"Our main challenge is the digital skill gap among employees and resistance to change, especially from senior staff." (IT Manager, Indonesia)
Success Factors	Key factors supporting the successful implementation of AI technology in GHRM practices.	"Leadership support, adequate training, and a phased implementation approach have been critical to our success." (Operations Manager, Thailand)
Cultural Context and Adaptation	How local cultural contexts influence the adoption and adaptation of AI technology in GHRM practices.	"Our strong collectivist culture influences how we design AI systems to support collaboration and shared decision-making." (HR Manager, Vietnam)

Integration of AI in GHRM Practices

Interview findings reveal a variety of approaches to integrating AI technology into GHRM practices at eco-tourism destinations. Innovative practices identified include:

1. AI-based recruitment systems evaluating environmental awareness and alignment with eco-tourism values.
2. Adaptive training platforms that personalize sustainability training content based on employee roles, performance, and learning preferences.
3. Real-time performance appraisal systems integrating environmental KPIs and providing continuous feedback.
4. AI-based reward systems that identify and incentivize sustainability initiatives and innovations.

Implementation Challenges

Participants identified several major challenges in implementing AI technology in GHRM practices for eco-tourism:

1. Digital skill gaps among employees and limited access to adequate AI training programs.
2. Resistance to change, particularly concerning data privacy concerns and fears of workforce reductions.
3. Limitations in technological infrastructure, especially in rural eco-tourism destinations.
4. Difficulties integrating AI systems with existing HRM and sustainability systems.

Success Factors

Key factors enabling the successful implementation of AI technology in GHRM practices include:

1. Strong leadership support and managerial commitment to sustainability and digital transformation.
2. A phased implementation approach allowing gradual learning and adaptation.
3. Comprehensive training and capacity-building programs to develop employees' digital competencies.
4. Cross-departmental collaboration among HR, IT, and sustainability teams.

Cultural Context and Adaptation

The findings illustrate how cultural contexts across the five Asian countries influence the adoption and adaptation of AI technology in GHRM practices:

1. In high power distance societies like Indonesia and Thailand, senior management support is crucial for legitimizing innovation initiatives.
2. In collectivist societies like Vietnam and the Philippines, collaborative and participatory approaches to AI implementation are preferred.
3. In high uncertainty avoidance cultures, clear communication and transparency about AI's goals and benefits are essential.
4. In Malaysia, a strong long-term orientation supports sustained investment in AI technologies for GHRM.

Integration of Quantitative and Qualitative Results

The integration of findings from both the quantitative and qualitative phases reveals several key insights:

1. Quantitative results indicated a positive relationship between the adoption of AI technology in GHRM practices and HRM performance, corroborated by qualitative evidence showing how AI assists employees in executing sustainability-related tasks more effectively.
2. Quantitative analysis identified organizational readiness as a significant moderator, further explained by qualitative findings highlighting the importance of infrastructure, leadership support, and capacity-building initiatives.

3. Country-level differences revealed in the MGA analysis were elaborated through interview data, showing how cultural and contextual factors influence AI adoption and effectiveness.
4. Qualitative data identified specific mechanisms by which AI enhances GHRM practices, such as personalized training and real-time feedback systems, which were not captured in the quantitative analysis.

5. Comparison

This study makes a significant contribution by integrating three domains that have previously been examined separately: AI technology, Green Human Resource Management (Green HRM), and eco-tourism. Compared to prior research, this study demonstrates several important advantages:

First, unlike Kim et al. (2022), who focused solely on the application of AI in tourism in general, this study specifically analyzes the use of AI within GHRM practices to support eco-tourism[21]. It also extends the research of Yong et al. (2020) on GHRM by identifying the role of AI as a strategic enabler, an aspect not addressed in previous studies[15].

Second, this study adopts a multi-country approach, distinguishing it from the work of Sun et al. (2020), which focused only on China[11]. Comparative analysis across five Asian countries reveals how different cultural dimensions influence the adoption of AI technology within GHRM practices.

Third, in terms of methodology, the mixed-methods approach used in this study is more comprehensive than prior studies, which typically relied on a single method. The integration of quantitative (SEM and MGA) and qualitative techniques provides a richer and more contextualized understanding.

Fourth, the theoretical framework developed in this study combines the Ability-Motivation-Opportunity (AMO) Theory, the Technology Acceptance Model (TAM), and a contextual perspective, offering a more integrated model compared to studies such as Pham et al. (2020)[18], which relied solely on AMO, or Venkatesh et al. (2016)[29], which focused only on TAM.

Fifth, the practical implications derived from this study are more specific and context-sensitive compared to the generic recommendations offered by Scholtz and Matunhu (2023)[14], providing culturally and organizationally tailored strategies for AI adoption in eco-tourism HRM practices.

6. Conclusion

This study reveals that the adoption of AI technology within GHRM practices has a positive effect on HRM performance ($\beta = 0.423$) and eco-tourism sustainability ($\beta = 0.387$). Perceived ease of use and perceived usefulness emerged as significant predictors of AI technology adoption, while organizational readiness and cultural context were identified as important moderating factors.

Significant cross-country variations were observed, with Indonesia and Malaysia demonstrating stronger impacts compared to Vietnam and the Philippines. Qualitative findings identified specific mechanisms for integrating AI into GHRM, such as AI-based recruitment systems that assess environmental awareness and adaptive training platforms.

The theoretical contribution of this research lies in the development of an integrative framework that combines AMO and TAM theories within the eco-tourism context. Its practical implications include providing guidance for developing AI adoption strategies that are tailored to cultural contexts.

The study's limitations include its cross-sectional design, which restricts causal inference, and its focus on five Asian countries. Future research is recommended to adopt longitudinal designs, expand geographic coverage, and explore specific AI mechanisms such as machine learning to further support GHRM practices in eco-tourism.

Author Contributions: A short paragraph specifying their individual contributions must be provided for research articles with several authors **(mandatory for more than 1 author)**. The following statements should be used "Conceptualization: X.X. and Y.Y.; Methodology: X.X.; Software: X.X.; Validation: X.X., Y.Y. and Z.Z.; Formal analysis: X.X.; Investigation: X.X.; Resources: X.X.; Data curation: X.X.; Writing—original draft preparation: X.X.; Writing—review and editing: X.X.; Visualization: X.X.; Supervision: X.X.; Project administration: X.X.; Funding acquisition: Y.Y."

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Data Availability Statement: We encourage all authors of articles published in FAITH journals to share their research data. This section provides details regarding where data supporting reported results can be found, including links to publicly archived datasets analyzed or generated during the study. Where no new data were created or data unavailable due to privacy or ethical restrictions, a statement is still required.

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Conflicts of Interest: Declare conflicts of interest or state **(mandatory)**, "The authors declare no conflict of interest." Authors must identify and declare any personal circumstances or interests that may be perceived as inappropriately influencing the representation or interpretation of reported research results. Any role of the funders in the study's design; in the collection, analysis, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results must be declared in this section. If there is no role, please state, "The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results".

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References must follow the IEEE style. We recommend preparing references with a bibliography software package like Mendeley, EndNote, or Zotero to avoid typos and duplicate references. **Digital object identifiers (DOIs) must be included for all available references. It is important to do a lookup-based DOI (if any) on the reference manager, see Figure 5.**

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