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DETERMINANTS OF ENVIRONMENTALLY FRIENDLY HR PRACTICES AMONG MSMES THROUGH GHRM UNDERSTANDING AND DIGITAL INFORMATION LITERACY WITH DIGITAL PLATFORM MODERATION

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Abstract

The increasing emphasis on green economic development and digital transformation requires Micro, Small, and Medium Enterprises (MSMEs) to strengthen environmentally oriented human resource practices. However, the implementation of Green Human Resource Management (GHRM) in MSMEs may be influenced by managerial understanding, digital information capabilities, and the extent to which digital platforms are utilized. This study aims to examine the effects of GHRM understanding and digital information literacy on environmentally friendly human resource practices among creative-industry MSMEs in Cirebon and to test the moderating role of digital platform utilization. A quantitative explanatory approach was employed using purposive sampling. Data were collected through a five-point Likert-scale questionnaire from 372 MSME owners or managers who had operated their businesses for at least two years and utilized digital platforms. The data were analyzed using Partial Least Squares–Structural Equation Modeling (PLS-SEM) with SmartPLS 4. The results show that GHRM understanding has a positive and significant effect on environmentally friendly HR practices ($\beta = 0.452$; $t = 14.384$; $p < 0.001$), while digital information literacy also has a positive and significant effect ($\beta = 0.383$; $t = 12.203$; $p < 0.001$). Digital platform utilization has a positive and significant direct effect on environmentally friendly HR practices ($\beta = 0.252$; $t = 7.251$; $p < 0.001$). The interaction between digital platform utilization and GHRM understanding is positive and significant ($\beta = 0.225$; $t = 6.522$; $p < 0.001$), as is the interaction between digital platform utilization and digital information literacy ($\beta = 0.189$; $t = 6.823$; $p < 0.001$). These findings indicate that digital platform utilization strengthens the positive relationships between GHRM understanding, digital information literacy, and environmentally friendly HR practices. The study contributes empirical evidence for integrating environmental human resource management and digital capabilities within the context of creative-industry MSMEs. The structural model also produced an R^2 value of 0.708, indicating that the predictors and interaction terms explain 70.8% of the variance in environmentally friendly HR practices.

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INTRODUCTION

The transition toward a green economy and accelerated digital transformation

has increased the pressure on Micro, Small, and Medium Enterprises (MSMEs) to integrate sustainability into their business activities, including human resource management (Renwick et al., 2012). MSMEs play an important role in economic development and employment creation (Chowdhury et al., 2025). However, their adoption of environmentally oriented management practices remains constrained by limited resources, managerial capacity, and relatively informal organizational systems (Jackson et al., 2011). Recent reviews indicate that research on Green Human Resource Management (GHRM) in SMEs is still developing, with evidence remaining fragmented due to the specific characteristics and resource limitations of SMEs (Jindal et al., 2024).

Green Human Resource Management provides an approach for integrating environmental considerations into human resource management through practices such as green recruitment and selection, green training and development, green performance management, green rewards, and employee involvement (C. J. C. Jabbour et al., 2010) (C. Jabbour & Jabbour, 2015). Recent systematic reviews confirm that GHRM has become an important mechanism for supporting environmental and organizational sustainability (Chowdhury et al., 2025). In the Indonesian context, a review of GHRM implementation in MSMEs also indicates that GHRM can contribute to environmental performance and business sustainability, while its implementation remains influenced by the characteristics and capabilities of MSMEs (Alfianto Emir Rifky; Andriyani, Andriyani, 2024). Therefore, unlike large organizations with relatively formal HR systems, the implementation of GHRM in MSMEs may initially depend on the extent to which owners or managers understand and internalize environmentally oriented HR principles (Kim et al., 2019).

This issue becomes particularly important because environmentally friendly HR practices are not solely determined by the availability of formal policies but also by the knowledge and capabilities of the individuals managing the business (Jay Barney, 1991) (Wernerfelt, 2007). Recent empirical evidence from SMEs demonstrates that GHRM practices are associated with green innovation and sustainable performance, while the role of employee-oriented capabilities and organizational conditions remains important in translating GHRM into sustainability outcomes (Alshuaibi et al., 2024). Thus, examining GHRM understanding at the MSME level is important for determining whether environmentally oriented HR practices have sufficient cognitive and managerial foundations to be implemented in daily business activities (Roscoe et al., 2019).

Alongside environmental management, digital transformation has become an increasingly important component of MSME development (Vial, 2019). Digital technologies and platforms provide opportunities for MSMEs to access information, learning resources, business networks, and knowledge that can support organizational development (Verhoef et al., 2021). However, access to digital platforms does not necessarily result in effective utilization (Warner & Wäger, 2018). The ability of MSME actors to search, understand, evaluate, and utilize digital information is an important capability in transforming digital access into meaningful business practices. Recent research in Indonesia shows that digital literacy, knowledge sharing, human capital, and digital transformation are associated with MSME business sustainability, indicating that human capabilities remain an important component of digital transformation (Noerchoidah et al., 2025).

Digital platforms may also provide a pathway for MSMEs to connect digital transformation with sustainability (Gregori et al., 2024). Recent research on SMEs

shows that digital platforms can contribute to sustainable development when digitalization is supported by appropriate organizational capabilities and sustainability-oriented practices (Isensee et al., 2025). Similarly, research on digital enablers among SMEs indicates that digital technologies and platforms can be relevant to sustainability outcomes, although their effects depend on organizational and contextual conditions (Abdelwahed et al., 2025). These findings suggest that the utilization of digital platforms should not merely be understood as an operational or marketing tool, but also as a contextual factor that may influence how knowledge and capabilities are translated into sustainable organizational practices (Zaki et al., 2024).

Despite the growing literature on GHRM and digital transformation, an important research gap remains (Nengsih & Jusdienar, 2025). First, GHRM research has historically focused more heavily on formal organizations and larger firms, while empirical studies specifically examining GHRM within MSMEs remain comparatively limited. Recent systematic reviews confirm that SME-focused GHRM research is still at an emerging stage and that resource constraints, managerial capacity, digital transformation, and other contextual factors require further investigation (Jindal et al., 2024). Second, research on digital literacy among MSMEs has generally emphasized digital adoption, marketing, business performance, and business sustainability, rather than its relationship with environmentally oriented human resource practices (Noerchoidah et al., 2025). Third, limited empirical attention has been given to whether the utilization of digital platforms can strengthen the relationship between GHRM understanding and environmentally friendly HR practices, as well as between digital information literacy and environmentally friendly HR practices (Alfianto Emir Rifky; Andriyani, Andriyani, 2024).

The Cirebon context adds substantive relevance to this investigation. Creative-industry MSMEs in the region may include culinary businesses, fashion and craft producers, creative services, design activities, and other enterprises whose competitiveness depends heavily on creativity, owner-manager decisions, informal work arrangements, and digital market access (Ayu et al., 2023). These businesses often combine production, promotion, customer interaction, and workforce coordination within relatively small organizational structures (Faezah et al., 2024). Consequently, environmental practices may be implemented through everyday routines such as material selection, waste handling, energy use, employee guidance, and digital communication, rather than through formal corporate policies (Nur & Made, 2024). Digital platforms are relevant not only for marketing but also for accessing tutorials, peer learning, supplier information, regulatory information, and examples of environmentally responsible practices (Suyanto et al., 2023).

Official local statistics help make this context more concrete, although the administrative boundaries and statistical categories must be distinguished. In Cirebon City, the local government's UMKM dataset records 5,353 MSMEs for 2025, compared with 2,687 in 2024; this is a count of MSMEs overall, not exclusively creative-industry businesses (Dinas Koperasi, Usaha Kecil, Menengah, 2025). For Cirebon Regency, BPS reports substantial concentrations in several potentially creative or craft-related industrial commodities in 2024, including rattan furniture 1,519 businesses, 1,437 wooden furniture, 1,450 bread and snacks, 597 batik, and 701 garment production (Badan Pusat Statistik Kabupaten Cirebon, 2025). These figures illustrate the diversity of production and market settings in the wider Cirebon area, but they should not be interpreted as a count of the 372 creative MSMEs sampled in this study.

Market conditions also include the need to reach customers beyond local markets. BPS data for 2022 show that 1,119 of 4,335 micro- and small-industry businesses in Cirebon Regency marketed outside the regency but within the same province, while 273 marketed outside the province and six reported overseas marketing (Badan Pusat Statistik Kota Cirebon, 2025). Such variation in market reach makes digital information and platform capabilities potentially valuable for disseminating environmental knowledge, coordinating workers, and adapting production routines (Gregori et al., 2024). These local figures provide context rather than causal evidence; the present study tests the hypothesized relationships using its own respondent data.

To provide a coherent theoretical explanation, this study is grounded primarily in the Resource-Based View (RBV). RBV argues that organizational outcomes depend not only on the possession of resources but also on the ability to develop and deploy valuable organizational capabilities (Jay Barney, 1991). In this study, GHRM understanding and digital information literacy are conceptualized as knowledge-based and human capabilities, while digital platform utilization represents a complementary digital capability that facilitates access to information, learning resources, communication, and coordination (J. B. Barney et al., 2011). Accordingly, digital platforms may strengthen the conversion of GHRM knowledge and digital information capabilities into environmentally friendly HR practices (Yong et al., 2019). This capability-based explanation is consistent with recent SME studies linking digital capabilities and sustainability-oriented outcomes (Teece, 2007).

This gap is particularly relevant in the context of creative-industry MSMEs, where human capital, creativity, information access, and digital technologies are closely interconnected with business activities (Noerchoidah et al., 2025). Unlike large enterprises, creative MSMEs may rely heavily on owners and managers to determine work practices, acquire knowledge, and introduce new approaches to resource and employee management (Alshuaibi et al., 2024). Therefore, understanding the interaction between managerial knowledge, digital information capability, and platform utilization is important for explaining the formation of environmentally friendly HR practices in this context (Novela QA, et al., 2024).

Based on this research gap, this study examines the influence of GHRM understanding and digital information literacy on environmentally friendly HR practices among creative-industry MSMEs in Cirebon, with digital platform utilization tested as a moderator. The hypotheses are: H1, GHRM understanding positively affects environmentally friendly HR practices; H2, digital information literacy positively affects environmentally friendly HR practices; H3, digital platform utilization positively affects environmentally friendly HR practices; H4, digital platform utilization positively moderates the relationship between GHRM understanding and environmentally friendly HR practices; and H5, digital platform utilization positively moderates the relationship between digital information literacy and environmentally friendly HR practices.

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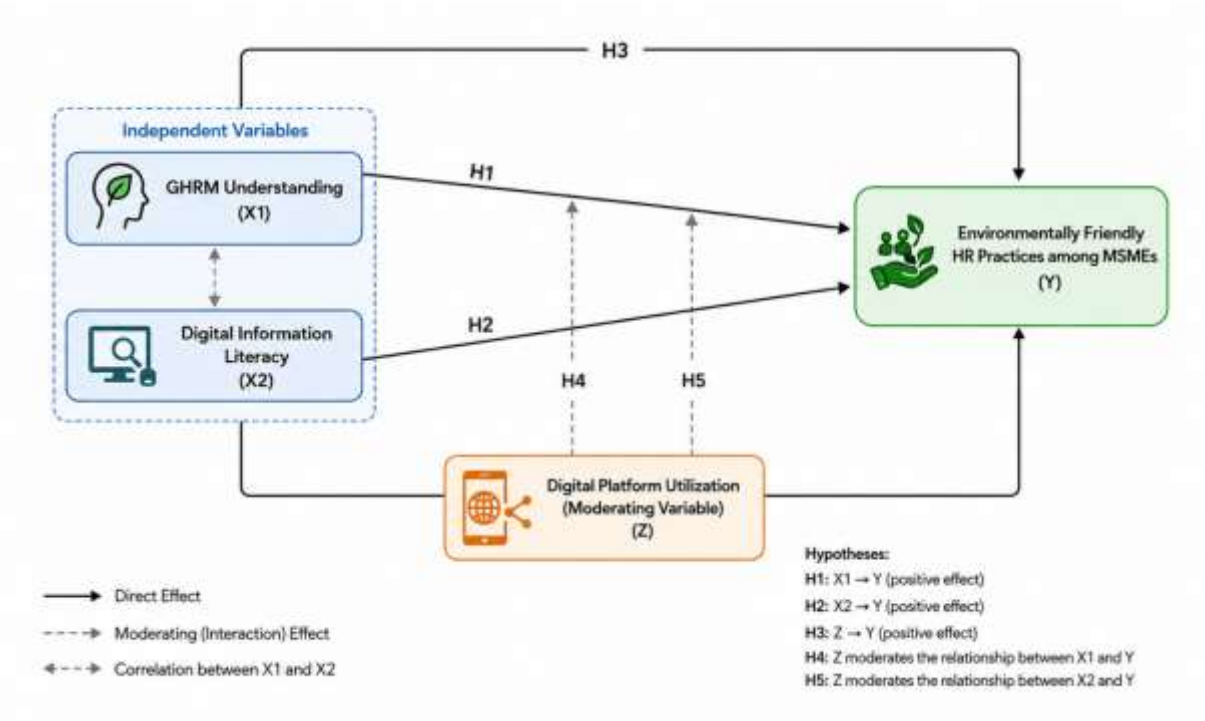


Figure 1. Research model and hypothesized moderation relationships, 2026

RESEARCH METHODS

This study employed a quantitative explanatory approach to examine the relationships among Green Human Resource Management (GHRM) understanding, digital information literacy, digital platform utilization, and environmentally friendly HR practices among MSMEs (Alajmi, 2026). The population comprised MSME owners or managers in the creative-industry sector in Cirebon. Samples were selected using purposive sampling based on the following criteria MSMEs had operated for at least two years, remained active, and utilized digital platforms in their business activities. A total of 372 respondents participated in the study. Primary data were collected through a five-point Likert-scale questionnaire. The research model consisted of four constructs: GHRM understanding (X1), digital information literacy (X2), digital platform utilization (Z), and environmentally friendly MSME HR practices (Y). X1 and X2 each consisted of 12 indicators, Z consisted of 12 indicators, and Y consisted of 10 indicators. Data were analyzed using Partial Least Squares–Structural Equation Modeling (PLS-SEM) with SmartPLS 4. The measurement model was evaluated using outer loading, Cronbach's Alpha, Composite Reliability, Average Variance Extracted (AVE), and Heterotrait-Monotrait Ratio (HTMT). The structural model was evaluated using R^2 and bootstrapping. Hypotheses were assessed using path coefficients, t-statistics, and p-values at a 5% significance level. Moderation was tested through the interaction terms X1×Z and X2×Z predicting Y (Hair, J. F., Hult, G. T. M., Ringle, C. M., Sarstedt, M., Danks, N. P., & Ray, 2022)

For transparency, the operationalization of each construct is presented in Table 1A. All items were measured using a five-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree. The final indicator composition follows the constructs and item codes used in the SmartPLS dataset analyzed in this study.

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Table 1. Items Measurement

Construct	Operational definition	Indicator focus	Questionnaire item
GHRM Understanding (X1)	Understanding of environmental principles in HR management.	Green recruitment, training, performance, rewards, involvement, awareness.	1. I understand that human resource management can be conducted while maintaining environmental sustainability. 2. I understand that every employee has a responsibility to protect the work environment. 3. I understand that environmentally friendly work behavior is part of good human resource management. 4. I understand that implementing environmentally friendly HR practices aims to support business sustainability. 5. I understand that environmentally conscious human resource management can improve business image. 6. I understand that good human resource management is oriented not only toward profit but also toward environmental sustainability. 7. I understand that environmentally friendly HR practices can improve the efficiency of business resource use. 8. I understand that environmentally friendly work behavior can help reduce waste in business operations. 9. I understand that implementing GHRM principles can provide long-term benefits for MSME sustainability. 10. I know examples of simple activities that can be implemented to support environmentally friendly HR practices in MSMEs. 11. I understand that providing employees with guidance on environmentally friendly behavior is part of human resource management. 12. I understand that developing environmentally conscious work habits can begin with simple activities at the workplace.
Digital Information Literacy (X2)	Ability to search, evaluate, interpret, and apply digital information.	Searching, source evaluation, interpretation, ethical use, application, sharing.	1. I am able to search for information related to business management through the internet. 2. I am familiar with various digital platforms that can be used to obtain business information. 3. I can find information about HR management or environmentally friendly business practices through digital media. 4. I understand the digital information I obtain about business management. 5. I can understand information about environmentally friendly business practices available through digital media. 6. I understand digital information related to human resource management in MSMEs. 7. I can distinguish trustworthy digital information from information whose accuracy is unclear. 8. I consider the source of information before applying it in my business. 9. I compare information from several digital sources before making a decision. 10. I use digital information as a basis for making business decisions. 11. I use digital information to improve my ability to manage human resources in my business. 12. I apply relevant digital information to support more environmentally friendly business practices.
Digital Platform Utilization (Z)	Use of digital platforms for information, learning, communication,	Frequency, learning use, communication, networking, information	1. Digital platforms help me obtain useful information for developing my business. 2. Digital platforms help me obtain information about human resource management.

	coordination, and business activities.	exchange, application.	1. Digital platforms are easy for me to use to find information needed to operate my business. 2. I do not experience difficulties using digital platforms to obtain business information. 3. I use digital platforms to learn how to manage my business more effectively. 4. I use digital platforms to gain knowledge about environmentally friendly business practices or HR management. 5. Digital platforms help me improve my ability to manage my business. 6. Digital platforms help me obtain ideas or solutions to improve human resource management in my business. 7. I regularly use digital platforms to obtain information that supports business development 8. Digital platforms are one of my main sources of business-related information and knowledge. 9. I use digital platforms to share information or guidance about environmentally friendly work practices with employees. 10. I use digital platforms to support employee training and coordination in implementing environmentally friendly HR practices.
Environmentally Friendly HR Practices (Y)	Application of environmentally oriented practices in managing and directing employees.	Environmental guidance, resource efficiency, waste practices, participation, monitoring.	1. I encourage employees to use materials or equipment wisely to avoid waste. 2. I promote efficient electricity use in business activities. 3. I promote efficient water use during work processes. 4. I reduce the use of unnecessary materials to minimize business waste. 5. I remind employees when they engage in actions that may harm the work environment. 6. I provide employees with guidance on the importance of protecting the environment while working. 7. I share information about environmentally friendly work practices with employees. 8. I encourage employees to learn ways of working that are more environmentally friendly. 9. I involve employees in maintaining the cleanliness and tidiness of the work environment. 10. I encourage employees to participate in efforts to reduce the environmental impact of business activities.

RESULTS AND DISCUSSION

Evaluation of Measurement Model

The measurement model was evaluated to ensure that the research instrument adequately measured the constructs in terms of convergent validity, internal consistency reliability, and discriminant validity. The assessment included outer loading, Cronbach's Alpha, Composite Reliability, AVE, and HTMT (Hair, 2019).

Table 2. Measurement Model Evaluation Results

Construct	Indicators	Outer Loading Range	Cronbach's Alpha	Composite Reliability	AVE
GHRM Understanding (X1)	12	0.722–0.831	0.946	0.953	0.627
Digital Information Literacy (X2)	12	0.737–0.840	0.943	0.951	0.617

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Construct	Indicators	Outer Loading Range	Cronbach's Alpha	Composite Reliability	AVE
Digital Platform Utilization (Z)	12	0.736–0.830	0.944	0.951	0.620
Environmentally Friendly MSME HR Practices (Y)	10	0.730–0.803	0.922	0.934	0.588

Source: Primary data processed using SmartPLS 4, 2026.

Based on Table 2, all reflective indicators have outer loading values above 0.70. The values range from 0.722 to 0.840 across the four constructs, indicating that the indicators adequately represent their respective latent variables. The AVE values range from 0.588 to 0.627, exceeding the minimum criterion of 0.50, thereby supporting convergent validity.

The reliability results also indicate strong internal consistency. Cronbach's Alpha values range from 0.922 to 0.946, while Composite Reliability values range from 0.934 to 0.953. All values exceed commonly applied minimum thresholds, indicating that the constructs are reliable for subsequent structural analysis.

Discriminant validity was assessed using HTMT. The highest HTMT value among the principal constructs was 0.643, which remains below the 0.90 threshold. The interaction constructs also showed low HTMT values in the SmartPLS output. Overall, the measurement model demonstrates acceptable discriminant validity (Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, 2022)

Structural Model Evaluation

After the measurement model met the validity and reliability criteria, the structural model was evaluated to assess the explanatory power of the model and the significance of the hypothesized relationships. The R^2 result for environmentally friendly MSME HR practices is presented below.

Table 3. Structural Model Assessment

Endogenous Construct	R^2	R^2 Adjusted
Environmentally Friendly MSME HR Practices (Y)	0.708	0.704

Source: Primary data processed using SmartPLS 4, 2026.

The R^2 value of 0.708 indicates that GHRM understanding, digital information literacy, digital platform utilization, and the two interaction terms collectively explain 70.81% of the variance in environmentally friendly MSME HR practices. The remaining 29.19% is attributable to factors outside the research model. The adjusted R^2 of 0.704 indicates that the explanatory power remains stable after adjustment for the predictors included in the model.

Hypothesis Testing

Hypothesis testing was conducted using the bootstrapping procedure in SmartPLS 4. The decision criterion was a p-value below 0.05. For the moderation hypotheses, the significance and direction of the interaction terms were examined (Stone, 1974).

Table 4. Results of Hypothesis Testing

Hypothesis	Relationship	β	T-statistic	P-value	Decision
H1	X1 → Y	0.452	14.384	<0.001	Accepted
H2	X2 → Y	0.383	12.203	<0.001	Accepted
H3	Z → Y	0.252	7.251	<0.001	Accepted
H4	X1 × Z → Y	0.225	6.522	<0.001	Accepted
H5	X2 × Z → Y	0.189	6.823	<0.001	Accepted

Source: Primary data processed using SmartPLS 4, 2026.

DISCUSSION

The Effect of GHRM Understanding on Environmentally Friendly MSME HR Practices

The results support H1: GHRM understanding positively predicts environmentally friendly HR practices (β = 0.452; t = 14.384; p < 0.001). From an RBV perspective, GHRM understanding is a knowledge-based resource that helps owners/managers recognize and embed environmental considerations into employee guidance, training, and daily routines (Roscoe et al., 2019) (Barney, 1991; Renwick et al., 2013; Chowdhury et al., 2025).

The Effect of Digital Information Literacy on Environmentally Friendly MSME HR Practices

The results support H2: digital information literacy has a positive effect on environmentally friendly HR practices (β = 0.383; t = 12.203; p < 0.001). This capability enables owners/managers to locate, evaluate, and apply information rather than merely access it. In resource-constrained MSMEs, that ability can help translate external knowledge into feasible work routines (Li et al., 2018; Vial, 2019; Noerchoidah et al., 2025).

The Effect of Digital Platform Utilization on Environmentally Friendly MSME HR Practices

The results support H3: digital platform utilization has a positive direct effect on environmentally friendly HR practices (β = 0.252; t = 7.251; p < 0.001). Platforms can make environmental information, learning resources, and peer examples more accessible, but their contribution depends on purposeful use rather than access alone (Isensee et al., 2025; Gregori & Holzmann, 2024).

The Moderating Effect of Digital Platform Utilization on the Relationship between GHRM Understanding and Environmentally Friendly MSME HR Practices

The results support H4: the interaction between GHRM understanding and digital platform utilization is positive and significant (β = 0.225; t = 6.522; p < 0.001). This indicates that platform utilization strengthens the positive relationship between GHRM understanding and environmentally friendly HR practices. In RBV terms, the value of GHRM knowledge is greater when complemented by a digital capability that supports learning, communication, and implementation (Barney et al., 2011; Warner & Wäger, 2019).

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The Moderating Effect of Digital Platform Utilization on the Relationship between Digital Information Literacy and Environmentally Friendly MSME HR Practices

The results support H5: the interaction between digital information literacy and digital platform utilization is positive and significant ($\beta = 0.189$; $t = 6.823$; $p < 0.001$). Digital literacy is more strongly associated with environmentally friendly HR practices when platform utilization provides channels through which information can be shared and acted upon. This is consistent with a capability-complementarity explanation: information evaluation skills and platform use can jointly support the translation of knowledge into routines (Adu et al., 2024).

Critical Synthesis of Findings

Taken together, the results indicate that environmentally friendly HR practices among creative-industry MSMEs are shaped by a complementary configuration of knowledge, information capability, and digital utilization. GHRM understanding provides the substantive direction for environmentally oriented HR decisions, while digital information literacy enables owners and managers to locate, assess, interpret, and apply relevant knowledge (Makumbe et al., 2024).

Digital platform utilization contributes both directly and contingently, it provides access to learning and communication resources and strengthens the extent to which GHRM understanding and digital information literacy are translated into actual HR practices (Linh, T. D. T., My, H. T. H., & Van, 2023). The significant interaction terms therefore suggest that digital platforms should not be interpreted merely as technological infrastructure.

Their value depends on how effectively MSME owners and managers use them to activate knowledge, exchange experience, and coordinate environmentally responsible routines (Fuad et al., 2025). This integrated explanation is particularly relevant to creative MSMEs in Cirebon, where owners and managers frequently perform multiple roles and digital channels may simultaneously function as marketing tools, learning spaces, networking mechanisms, and sources of operational knowledge (Qi et al., 2024).

CONCLUSION

Main Conclusions

The findings demonstrate that GHRM understanding, digital information literacy, and digital platform utilization each have positive and significant direct effects on environmentally friendly HR practices. The positive interaction effects further confirm that digital platform utilization strengthens the relationships between GHRM understanding, digital information literacy, and environmentally friendly HR practice.

Theoretical Contribution

The study contributes to the GHRM and MSME literature by applying a Resource-Based View perspective to explain how knowledge-based resources and digital capabilities jointly shape environmentally oriented HR practices. The findings extend the discussion beyond direct effects by demonstrating that the value of GHRM understanding and digital information literacy is contingent on digital platform utilization.

Practical Implications

For creative MSME actors, digital platforms can be used to distribute short environmental training materials; share tutorials on waste reduction, material

efficiency, and energy-saving routines; create internal groups for discussing environmental work practices; document employee participation; exchange responsible production practices; and evaluate environmental HR routines through digital checklists or periodic reporting.

Limitations and Future Research Directions

This study is limited by its cross-sectional quantitative design, purposive sample, and focus on creative-industry MSMEs in Cirebon. Future studies should include other sectors and regions and use qualitative methods, such as interviews or case studies, to explore how owners and employees interpret and implement GHRM in daily practice. Experimental or quasi-experimental designs may also test whether digital environmental training or platform-based learning produces measurable changes over time.

Statement On The Use Of Artificial Intelligence

We used artificial intelligence tools solely to assist with language improvement, grammar checking, editing for clarity and readability, and make visual figure of the research. We are remain fully responsible for the accuracy, originality, integrity, and academic content of the manuscript. All AI-assisted content was reviewed and verified before submission.

Conflicts Of Interest

We have no conflicts of interest to disclose.

Author Contributions

Muthia Fariza: Conceptualization, Data curation, Formal analysis, Methodology, Investigation, Writing – original draft, Writing–review & editing. Oryz Agnu D.W: Conceptualization, Supervision, Methodology, Writing – review & editing. Ratih Damayanti: Conceptualization, Supervision, Methodology. Lutfiya Masitoh: Writing – original draft, Project administration. Gea Nurul S.: Writing – original draft, Project Administration.

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