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THE ROLE OF GREEN ORGANIZATIONAL CULTURE AND GREEN WORK ENGAGEMENT MEDIATION IN THE INFLUENCE OF GREEN HUMAN RESOURCE MANAGEMENT ON ENVIRONMENTAL PERFORMANCE IN PRIVATE UNIVERSITIES IN BATAM CITY

Evi Silvana Muchsimati[1]
Universitas Internasional Batam, Batam, Indonesia
evi@uib.ac.id

Wanda Pramitha Sari[2]
Universitas Internasional Batam, Batam, Indonesia
2241220.wanda@uib.edu

Ridhayati Farid[3]
Universitas Internasional Batam, Batam, Indonesia
ridhayati@uib.ac.id

Abstract

Industrial and educational growth in Batam City has increased energy consumption, carbon emissions, and waste, including at private universities (PTS) that have not yet fully implemented environmentally friendly practices. The gap between green policies and campus environmental performance still exists due to the low contribution of human resources in supporting sustainability, particularly through green organizational culture (GOC) and green work engagement (GWE). This study aims to analyze the influence of green human resource management (GHRM) on environmental performance (EP) at PTS in Batam and to examine the mediating role of GOC and GWE. A total of 260 respondents from UIB, UPB, and UIS were involved through an online questionnaire in December 2024–March 2025, with 26 measurement items on the variables of GHRM, GWE, GOC, and EP using a five-point Likert scale. The analysis was conducted using PLS-SEM through SmartPLS 4.0. The results showed that all indicators were valid and reliable, with outer loading values above 0.7, AVE exceeding 0.5, and reliability above 0.9. The main findings show that GHRM has a positive effect on GWE, GOC, and EP, while GWE and GOC also have a significant effect on EP. This confirms that green work culture and engagement are important mechanisms that bridge the implementation of GHRM in improving campus environmental performance. Overall, this study shows that effective GHRM integration can strengthen environmentally oriented organizational behavior and culture, thereby promoting improved environmental performance at private universities in Batam City.

Keywords: Green Human Resource Management (GHRM), Green Work Engagement (GWE), Green Organizational Culture (GOC), Environmental Performance (EP)

INTRODUCTION

The city of Batam, as a strategic industrial and educational area in Indonesia, faces serious challenges in environmental management due to rapid economic growth. Intensive industrial activity and urbanization increase carbon emissions and environmental degradation, including in the private higher education sector (PTS), which contributes to energy consumption and waste. However, environmentally friendly practices in educational institutions are still limited, raising concerns about future environmental sustainability. The issue currently faced is the low role of human resources (HR) in supporting the global environmental agenda related to sustainable development goals (SDGs). Although various sectors, especially in the fields of human resource management, sustainability management, and higher education, are increasingly discussing the importance of integrating green practices into organizations, actual implementation at the educational institution level is still not optimal (Sulej et al. 2023). This shows a gap between the global discourse on sustainable development and the real contribution of human resources (HR) in managing environmentally friendly practices (Kramar. 2022). Good organizational governance plays a role in promoting openness and environmental responsibility within companies (Intan et al. 2023). According to (Dirjo. 2025), green human resource management (GHRM) practices such as recruitment, training, and performance management based on the environment have been proven to increase green work engagement (GWE), which in turn mediates an increase in environmentally-conscious innovative behavior. This condition requires the active role of the higher education sector in implementing policies and practices that support environmental sustainability.

Higher education institutions in the LLDIKTI XVII region are now beginning to implement the green campus concept, which is measured through the UI Greenmetric World University Rankings, an evaluation system developed by the University of Indonesia since 2010 with six assessment categories: Setting & Infrastructure, Energy & Climate Change, Waste, Water, Transportation, and Education & Research (Greenmetric. 2019). As part of this effort, private universities (PTS) in Batam City not only compete nationally and globally, but also play a strategic role in supporting sustainable development through various environmentally friendly initiatives. One example is Batam International University (UIB), which has demonstrated its commitment to environmental sustainability by successfully entering the UI Greenmetric World University Rankings. According to (University. 2023), in 2023, Batam International University (UIB) ranked 83rd nationally, showing an improvement from the previous year, and there was an increase in 2024, confirming the consistency of this campus in ui greenmetric indicators such as green space management, energy efficiency, waste management, environmentally friendly transportation, and the integration of education and sustainability research (UIB. 2025; University. 2024). Ibnu Sina University (UIS) has also adopted a green campus approach with open spaces and a beautiful environment, reflecting its potential to transform into a sustainable campus (UIS, 2023). This private university (PTS) reflects an initial commitment to realizing an environmentally-friendly higher education system, but further steps are needed in energy, water, and waste management, as well as the integration of education and sustainability research in order to compete in green campus rankings such as UI GreenMetric.

The research issue is that although many studies at universities have discussed green human resource management (GHRM) practices such as green recruitment, green training &

development, and green performance management, many private universities (PTS) in Batam pay attention to the integrity of green human resource management (GHRM) in green organization culture (GOC) and green work engagement (GWE) involvement, which ultimately has an impact on improving environmental performance Empirical studies in higher education institutions show that management support and green organizational culture are crucial to the effectiveness of green human resource management (GHRM) in improving environmental performance (EP) (Al-Alawneh et al. 2024). The implementation of green human resource management (GHRM) is often hampered by a lack of supportive organizational culture and low employee participation in sustainability activities. The gap between policy, organizational behavior, and environmental outcomes remains a challenge that needs to be bridged. Therefore, the novelty of this research lies in its attempt to examine the role of green human resource management (GHRM) comprehensively by considering two mediating variables, namely green work engagement (GWE) and green organization culture (GOC), in improving environmental performance (EP) (He et al. 2024) . In addition, this study bridges the gap between human resource management systems and environmental outcomes through a behavioral and organizational culture approach (Pham et al. 2019). Increasingly alarming environmental issues have prompted the higher education sector to play a role in sustainability, one of which is through the implementation of green human resource management (GHRM), namely the integration of environmentally friendly human resource management practices such as green recruitment, environmental training, and sustainability-based evaluation (Renwick et al. 2013).

Employees are the most valuable asset because they are a factor that cannot be imitated by competitors (Sentoso & Muchsinati, 2024). When engaged, employees are more sensitive to responsibility, able to motivate colleagues, and support the achievement of company goals (Jagannathan, 2014). To increase engagement, organizations need to build employee ownership through positive working conditions, constructive feedback, and an environment that supports the expression of ideas and skill improvement. Transformational leadership styles play a role in creating trusting team relationships (Makera et al. 2019), while training and career development open up growth opportunities that increase job satisfaction (Rijal & Sesario. 2024). Engagement also stems from rewards that are commensurate with contributions (Hoque et al. 2018) and organizational policy support for company strategy (Nwachukwu et al. 2020). The level of attention companies pay to employee welfare strengthens engagement, builds loyalty, and encourages the completion of work in line with company goals.

In Batam City, private universities (PTS) play a strategic role in shaping a green organization culture (GOC) that has an impact on increasing green work engagement (GWE), such as energy efficiency and waste management (Yusuf & Fajri. 2022). Previous research states that green human resource management (GHRM) has a positive effect on environmental performance (EP), especially in encouraging employee involvement and commitment to sustainability (Adeel et al. 2022). However, research on the implementation of green human resource management (GHRM) in the private education sector in Batam is still limited. Within the framework of sustainable development goals (SDGs), higher education has a strategic role in SDG 4 (Quality Education) and SDG 13 (Climate Action), particularly through the development of environmentally-based sustainability practices on campus, such as management systems energy, waste, and environmentally conscious

curriculum (Machado & Davim. 2022). Under the coordination of LLDIKTI 17, private universities (PTS) in Batam City are expected to translate national policies into practical campus practices, in line with the spirit of independent learning and independent campuses (MBKM) (Kemendikbudristek. 2024). Research on private universities in Jakarta shows that green management and internal innovation significantly increase green work engagement (GWE) and green organization culture (GOC), which are relevant for adaptation in Batam (Awatara et al. 2024). With the support of LLDIKTI 17 in capacity building, accreditation, and curriculum development, private universities (PTS) in Batam City have great potential to implement green human resource management (GHRM) as a commitment to environmental sustainable development goals (SDGs) and quality education.

This study aims to analyze the effect of green human resource management (GHRM) implementation on environmental performance in private universities (PTS) in Batam City. This study is expected to provide new insights into how green human resource management (GHRM) practices can be adapted and implemented effectively in the higher education sector, as well as how this can improve institutional environmental performance.

REVIEW OF LITERATURE

The influence of green human resource management (GHRM) on green work engagement (GWE)

According to (Tang et al. 2018), green human resource management (GHRM) is a company implementation that leads to development, maintenance, and management by applying environmentally friendly systems in human resource management (HRM) practices. Employee engagement is the skill and desire of workers for the prosperity of the company, as well as their willingness to give their best effort, beyond what is required to achieve the company's goals. Employee engagement is a multidimensional concept that involves emotional, cognitive, and physical aspects. Engagement occurs when an individual consciously recognizes and connects emotionally with others. When employees feel engaged, they become aware of the purpose of providing service, prompting them to give their best effort.

Green work engagement (GWE) itself reflects the extent of employee commitment and involvement in green work practices that are in line with the company's vision. Thus, it can be assumed that the better the implementation of green human resource management (GHRM) in a company, the higher the level of green work engagement (GWE). According to (Elshaer et al. 2021), employee engagement is considered the most powerful factor in measuring a company's success. According to (Susanto. 2023), employees are also a factor that cannot be duplicated or imitated by competitors and are considered the most valuable asset if managed and involved properly. Employee engagement itself is defined as positive treatment by employees towards the organization and its values, and employees who are involved in their work are aware of the organization's goals, work, and work environment to improve work performance. For example, environmentally friendly training programs and environmentally friendly policies can improve employee performance because employees can be motivated to contribute to achieving company goals, making employees a valuable asset that cannot be imitated by competitors.

H1: Green human resources management (GHRM) has a significant effect on green work engagement (GWE).

The Influence of Green Human Resource Management (GHRM) on Green Organizational Culture (GOC)

Green human resource management (GHRM) is defined as a workforce that understands, appreciates, and practices environmentally friendly initiatives and maintains objectives throughout the human resource process, which includes recruitment, training, talent management, compensation, and segregation, among others. This alignment strategy creates a culture that not only encourages creativity but also applies it consistently, resulting in a sustainable innovative environment throughout the company (Hien. 2025). According to (Roscoe et al. 2019), green organizational culture (GOC) helps organizations achieve better environmental performance due to internal commitment to carrying out environmentally friendly activities. The work environment greatly affects employees' ability to work comfortably (Rasmussen et al. 2024). Examples of implementing an environmentally friendly work culture include reducing paper use through administrative digitization or using recycled paper.

Green organizational culture (GOC) is a source of competitive advantage for organizations because it develops intangible assets that are difficult for competitors to imitate. A positive organizational culture can serve as a reference for employees in completing their assigned tasks and function as a motivator to increase motivation (Fatyandri & Jovina. 2023). According to (Susanto. 2023), an organization's culture can be considered "green" when employees go beyond the goal of seeking profit to minimize negative impacts and maximize positive impacts of the organization's activities on the environment, so this hypothesis has a positive influence.

H2: Green human resources management has a significant effect on green organizational culture (GOC).

The Effect of Green Work Engagement (GWE) on Environmental Performance (EP)

Based on research (Ansari et al. 2020), when employees have high green work engagement (GWE), they tend to show commitment and active participation in supporting various environmentally friendly initiatives launched by the organization. This commitment is reflected in concrete actions such as waste reduction, energy efficiency, and work practices that consider ecological impacts. In the context of private universities (PTS) in Batam City, which are currently facing challenges in managing energy consumption and waste, the level of green engagement of teaching and non-teaching staff is an important factor in driving improvements in environmental performance (EP). When lecturers and staff show high enthusiasm for programs such as the use of energy-saving technology, paper reuse, or campus waste management, their contributions have a direct impact on improving the institution's environmental performance (EP).

Recent research also reinforces this positive relationship. This indicates that the higher the green engagement of employees, the more effective the institution's efforts in achieving environmental efficiency. According to (Aboramadan. 2022), green work engagement (GWE) can encourage employees to change their behavior from simply following procedures to becoming agents of environmental change. In higher education

institutions, this change is evident through green campus activities, energy audits, and the integration of environmental values into academic activities. Therefore, strengthening green work engagement (GWE) among the academic community of private universities (PTS) in Batam City is an important strategy for creating an ecologically sustainable campus.

H3: Green work engagement (GWE) has a significant effect on environmental performance (EP)

The Influence of Green Organizational Culture (GOC) on Environmental Performance (EP)

Green organizational culture (GOC) that supports environmental sustainability encourages the creation of environmentally friendly and consistent work behaviors at all levels of the organization. According to (Awatara et al. 2024) employees who are trained and given incentives for their involvement in pro-environmental activities will shape and strengthen green organizational culture (GOC) within the institution. Furthermore, according to (Shah et al. 2021), organizations with a strong green organizational culture (GOC) significantly demonstrate better environmental performance due to the active participation of all members in environmentally friendly work practices. In the context of private universities (PTS) in Batam City, the implementation of green organizational culture (GOC) is reflected in internal policies such as reducing plastic use, energy efficiency, and environmental education in campus activities, which directly support the improvement of environmental performance (EP).

Strengthening green organizational culture (GOC) in the education sector greatly contributes to improving institutional environmental performance (EP), especially when supported by visionary leadership and collaboration between work units (Prasetyo et al. 2024). According to (Muchsinati et al. 2025), it also proves that an organizational culture that supports sustainability values strengthens the positive impact of green human resource management (GHRM) practices on environmental performance. This means that the development of green organizational culture (GOC) on campus not only shapes the behavior of individuals who care about the environment, but also encourages the achievement of institutional environmental targets, such as energy efficiency, waste management, and compliance with applicable environmental regulations.

H4: Green Organizational Culture (GOC) has a significant effect on environmental performance (EP)

The Effect of Green Human Resource Management (GHRM) on Environmental Performance (EP) Mediated by Green Work Engagement (GWE)

Green human resource management (GHRM) strategically implemented in educational institutions, particularly private universities, can create ecological awareness in employee work practices. In Batam City, which is a center of industrial and educational growth, the implementation of green human resource management (GHRM) is important to ensure that educational institutions contribute not only to the quality of human resources but also to environmental sustainability. Green human resource management (GHRM) practices such as environment-based training, employee selection based on sustainability values, and reward systems for green behavior have been proven to increase employee awareness and involvement in environmentally friendly organizational goals. According to (Islam et al.

2025), green human resource management (GHRM) has a significant impact on environmental performance (EP) by increasing employee motivation and engagement with environmental issues.

Green work engagement (GWE) acts as a mediating mechanism in strengthening the relationship between green human resource management (GHRM) and environmental performance (EP). When green human resource management (GHRM) is implemented properly, employees feel morally and structurally supported to engage in sustainable work practices, which ultimately has a positive impact on the organization's environmental performance. In the context of private universities in Batam, green work engagement (GWE) is important to encourage the active participation of lecturers, staff, and educators in environmentally friendly activities such as waste reduction, energy efficiency, and the integration of sustainable curricula. Green work engagement (GWE) plays an important role in encouraging pro-environmental behavior among employees, which ultimately improves overall environmental performance (EP) (Adeel et al. 2022).

H5: Green human resource management (GHRM) has a significant effect on environmental performance (EP) with green work engagement (GWE) as a mediator.

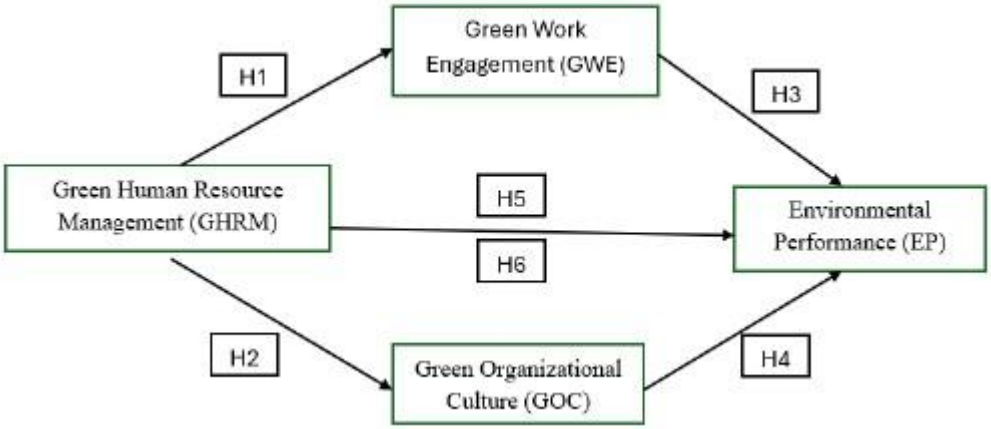
The Effect of Green Human Resource Management (GHRM) on Environmental Performance (EP) Mediated by Green Organizational Culture (GOC).

Green human resource management (GHRM) not only focuses on environmentally conscious human resource management (HRM), but also plays an important role in shaping a sustainability-oriented organizational culture. In the context of private universities (PTS) in Batam City, which are facing global pressure to contribute to sustainable development, the implementation of green human resource management (GHRM) can be the foundation for building a green organizational culture (GOC). This culture includes values, norms, and collective practices that support pro-environmental behavior across all organizational units. According to (Anwar et al. 2024), green human resource management (GHRM) contributes directly to the creation of a green organizational culture (GOC), which in turn strengthens employee engagement in environmental activities and helps institutions achieve sustainability goals.

Green organizational culture (GOC) acts as a significant mediator in the relationship between green human resource management (GHRM) and environmental performance (EP). When green organizational culture (GOC) is strongly established through green policies such as environmentally friendly training, recruitment based on environmental values, and sustainable evaluation systems, employees will be more encouraged to behave ecologically. In private universities (PTS), an organizational culture that internalizes green practices will influence campus operations such as waste management, energy efficiency, and the integration of green values into the learning process. According to (Pham et al. 2020), green organizational culture (GOC) plays an important role as a bridge in strengthening the influence of green human resource management (GHRM) on environmental performance (EP) because this culture facilitates awareness and active participation of all elements of the organization in green initiatives.

H6: Green human resource management (GHRM) has a significant effect on environmental performance (EP) with green organizational culture (GOC) as a mediator.

Figure 1.
Conceptual Research Model



RESEARCH METHOD

This study involved 260 respondents obtained from three private universities (PTS) in Batam City, namely Batam International University (UIB), Putera Batam University (UPB), and Ibnu Sina University. The selection of these three universities was based on data from LLDIKTI Region XVII (Kemendikbudristek. 2024), which shows that the three represent the characteristics of PTS with different focuses, namely technology, business, and health. Thus, these three universities are considered capable of representing the conditions of green human resource management (GHRM), green work engagement (GWE), green organizational culture (GOC), and environmental performance (EP) more comprehensively. The sample size was determined based on (Hair et al. 2021), which recommends that the sample size be multiplied by 10 times the number of questions in the questionnaire. With 26 questions, the required sample size was 260 respondents.

The questionnaire used included respondent identity and 26 questions representing four research variables: green human resource management (GHRM), green work engagement (GWE), green organizational culture (GOC), and environmental performance (EP). Data collection was conducted online using Google Forms from December 2024 to March 2025. All items were measured using a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). The data was then processed using SmartPLS 4.0 software and partial least squares-structural equation modeling (PLS-SEM) to test the relationships between variables.

Operational Definition of Variables and Their Measurement

Operational variables are a detailed understanding of the variables in a study that aims to ensure clarity before the study is conducted, so that valid data can be obtained. The green human resource management (GHRM) variable consists of 7 questions from the research by Aboramadan. (2022) and Tang et al. (2018). The green work engagement (GWE) variable includes 6 questions from the research by Suliman et al. (2023) and Aboramadan. (2022). The green organization culture (GOC) variable consists of 6 questions compiled based on the

research by (Yusuf & Fajri. 2022). Meanwhile, the environmental performance (EP) variable consists of 7 questions from the research by He et al. (2024) and Elshaer et al (2021). All variables are measured using a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree)

RESULTS AND DISCUSSION

Table 1.
Respondent demographics

Description	*Type*	*n*	*Presentation*
Gender	Male	150	58.6%
	Female	110	41.9%
Highest Level of Education	High School/Vocational School	110	34.1%
	Bachelor's Degree	90	30.2%
	Diploma	50	25.8%
	Master's Degree	10	9.9%
Employment Status	Temporary Employee	170	69.8%
	Permanent Employee	90	30.2%
Length of Service	1-3 Years	140	48.2%
	4-5 Years	110	41.9%
	>5 Years	10	9.9%

Source : Results by data (2025)

Based on the demographic data of respondents, in this study, men accounted for 58.6%, indicating that the male group was more dominant than women. In terms of highest level of education, high school/vocational school graduates were the most dominant at 34.1%, indicating that the workforce was still dominated by secondary school graduates. In terms of employment status, most respondents were permanent employees with a percentage of 69.8%, indicating that long-term employment relationships are stronger than temporary employees. Meanwhile, based on length of service, the majority of respondents were in the 1-3 year length of service group with a percentage of 48.2%, illustrating that most respondents are still in the early to mid stages of their work experience. This demographic analysis is important for understanding the background of employees because factors such as gender, education, and employment status can influence their perceptions of organizational policies, work engagement, and environmental performance. This is in line with (Hanafi & Syah. 2021), which states that demographic data provides An overview of the structure of respondents whose data influences research variables, particularly organizational behavior and employee performance. According to (Nurmadani & Waskito. 2025), employment status and length of service are often distinguishing factors in the level of employee commitment to organizational policies, including environmentally friendly practices. The status of employees, whether permanent or contract, has a different impact on loyalty and work engagement.

Table 2.
Outer Loading and AVE

Variable	*Code*	*Loading*	*AVE*
GHRM	GM 1	0.913	0.799

	GM 2	0.896	
	GM 3	0.895	
	GM 4	0.890	
	GM 5	0.870	
	GM 6	0.924	
	GM 7	0.866	
	GE 1	0.857	
	GE 2	0.871	
GWE	GE 3	0.908	0.799
	GE 4	0.902	
	GE 5	0.873	
	GE 6	0.891	
	GC 1	0.890	
	GC 2	0.815	
GOC	GC 3	0.820	0.744
	GC 4	0.848	
	GC 5	0.927	
	GC 6	0.869	
	EP 1	0.850	
	EP 2	0.895	
	EP 3	0.868	
EP	EP 4	0.903	0.787
	EP 5	0.881	
	EP 6	0.912	
	EP 7	0.900	

Source : Results by data (2025)

Outer loading and average variance extracted (AVE) are two important indicators in evaluating measurement models in PLS-SEM to ensure convergent validity. Outer loading shows how strongly the indicator (item) reflects the latent variable being measured. The requirement for outer loading is that a value above 0.6 is considered valid for the indikator (Henseler et al. 2020). Please replace the following citation with a journal that can be accessed from 2019-2025. Please let me know your recommendations for suitable and relevant journals. The requirement for average variance extracted (AVE) is above 0.5. From the results of the convergent validity test in Table 3, the values of outer loading and average variance extracted (AVE) meet the convergent validity requirements or can be considered valid.

Table 3
Discriminant Validity (Cross Loading)

Code	**GM**	**GE**	**GC**	**EP**
GM 1	0.913	0.077	0.017	0.068
GM 2	0.896	0.023	0.045	0.030
GM 3	0.895	0.085	0.009	0.009
GM 4	0.890	0.107	0.027	0.030
GM 5	0.870	0.053	0.049	0.065
GM 6	0.924	0.061	0.002	0.023
GM 7	0.866	0.015	0.047	0.293
GE 1	0.471	0.857	0.008	0.401

GE 2	0.386	0.871	0.001	0.383
GE 3	0.450	0.908	0.007	0.336
GE 4	0.452	0.902	0.079	0.372
GE 5	0.446	0.873	0.007	0.410
GE 6	0.415	0.891	0.023	0.423
GC 1	0.431	0.279	0.890	0.445
GC 2	0.007	0.447	0.815	0.433
GC 3	0.006	0.335	0.820	0.429
GC 4	0.032	0.414	0.848	0.429
GC 5	0.030	0.374	0.927	0.477
GC 6	0.037	0.371	0.869	0.430
EP 1	0.018	0.399	0.045	0.850
EP 2	0.075	0.001	0.016	0.895
EP 3	0.086	0.020	0.067	0.868
EP 4	0.104	0.022	0.035	0.903
EP 5	0.013	0.024	0.013	0.881
EP 6	0.073	0.048	0.097	0.912
EP 7	0.030	0.029	0.092	0.900

Source : Results by data (2025)

The results of the discriminant validity test using the cross-loading approach aim to ensure that each indicator has a higher correlation with the latent construct it measures than with other constructs. The requirement is that the cross-loading be greater than 0.7 for each variable. Based on Table 4, the cross loading values of each variable are as follows: GM has the highest value in indicator GM6, which is 0.924; GE has the highest value in indicator GE3, which is 0.908; GC has the highest value in indicator GC5, which is 0.927; and EP has the highest value in indicator EP6, which is 0.912. From these results, it can be concluded that all indicators have values above 0.7, thus meeting the discriminant validity test requirements and can proceed to the next stage of testing (Tofighi & Kelly. 2020).

Table 4.
Cronbach Alpa and Composite Reliability (CR)

Variable	*Cronbach's Alpha*	*Composite Reliability*	*Description*
GHRM	0.958	0.965	Reliable
GWE	0.944	0.955	Reliable
GOC	0.934	0.946	Reliable
EP	0.955	0.963	Reliable

Source : Results by data (2025)

In the reliability testing stage, this can be seen through Cronbach's alpha and composite reliability values. In this test, the rule of thumb value must be above 0.6. Based on Table 5, the Cronbach's alpha and composite reliability values of each variable are above 0.9, which means that all variabel are reliable.

Table 5.
Path Coefficient

Hypothesis	*Variable*	*Sample Mean*	*T-statistic*	*P-Value*	*Result*
H1	GHRM->GWE	0.147	1,987	0.047	Significant
H2	GHRM->GOC	0.057	4.825	0.000	Significant

H3	GWE->EP	0.464	9.635	0.000	Significant
H4	GOC->EP	0.314	4.437	0.000	Significant
H5	GHRM->EP	0.525	11.604	0.000	Significant

Source : Results by data (2025)

Based on Table 5, which presents the results of the path coefficient test for all variables in this research model, the results are significant, as indicated by a T-statistic value > 1.96 and a P-Value < 0.05, which meets the general rule of thumb in PLS-SEM analysis (Kock & Hadaya. 2016). Green human resource management (GHRM) was proven to have a direct and significant effect on green work engagement (GWE) with a T-statistic value of 1.987 and a P-Value of 0.047, which was also followed by the significant effect of green human resource management (GHRM) on green organization culture (GOC) with a T-statistic value of 4.825 and a P-Value of 0.000 -Value of 0.000, followed by green work engagement (GWE) on environmental performance (EP) with a T-statistic value of 9.635 and a P-Value of 0.000, which is significantly influential, followed by the significant influence of green organization culture (GOC) on environmental performance (EP) with a T-statistic value of 4.437 and a P -Value of 0.000, and green human resource management (GHRM) was proven to have a direct and significant effect on environmental performance (EP) with a T-statistic value of 11.604 and a P-Value of 0.000. This supports the implementation of green human resource management (GHRM) practices to encourage the creation of a green organization culture (GOC) that cares about the environment and improves green work engagement (GWE), which ultimately affects environmental performance (EP) (Permadi & Agustina. 2025).

The effect of green human resource management (GHRM) on green work engagement (GWE)

In the first hypothesis, there is a significant relationship between green human resource management (GHRM) and green work engagement (GWE), with a value of 0.047, which is below 0.05. This shows that green human resource management (GHRM) practices implemented in organizations, such as environmental training, green-based recruitment, and sustainability-based performance appraisals, can encourage employees, especially the younger generation, to become more involved in environmentally friendly work activities. Green work engagement (GWE) itself reflects the level of energy, dedication, and absorption of employees in work that contributes to the organization's sustainability goals. According to (Permadi & Agustina. 2025), green human resource management (GHRM) has a strategic role in increasing employee work engagement in green activities, as it supports the creation of values and commitment to environmental preservation in the workplace. Organizational support for green initiatives also strengthens employees' perception that their participation in pro-environmental activities is valued, thereby significantly increasing their level of engagement (Amrutha & Geetha. 2020).

The influence of green human resource management (GHRM) on green organization culture (GOC)

The second hypothesis posits that there is a significant relationship between green human resource management (GHRM) and green organization culture (GOC), because environmentally oriented human resource (HR) practices such as green training, green recruitment, and sustainability-based performance evaluations can shape pro-environmental values, norms, and behaviors within the organization. When organizations consistently

integrate sustainability principles into their human resource management (HRM) systems, an organizational culture that emphasizes the importance of ecological responsibility at all employee levels will be created. According to (Gazi et al. 2024), the implementation of green human resource management (GHRM) plays an important role in creating a green organization culture (GOC) that supports active employee involvement in environmental initiatives, because sustainability values are instilled in daily management practices. According to research (Fang et al. 2022), green human resource management (GHRM) is a determining factor in forming a strong green organization culture (GOC), as it creates a work environment that encourages employees to prioritize environmentally friendly practices as part of the organization's identity.

The effect of green work engagement (GWE) on environmental performance (EP)

In the third hypothesis, there is a significant relationship between green work engagement (GWE) and environmental performance (EP) because green work engagement reflects employees' dedication, enthusiasm, and attention to environmentally friendly work practices. Employees with high levels of GWE tend to consistently exhibit pro-environmental behaviors, such as conserving energy, managing waste wisely, and actively participating in organizational sustainability programs. Green work engagement (GWE) encourages individuals to be more responsible for their environmental performance (EP), which ultimately has an impact on improving the overall environmental performance of the organization (Adeel et al. 2022).

The influence of green organization culture (GOC) on environmental performance (EP)

In the fourth hypothesis, there is a significant relationship between green organization culture (GOC) and environmental performance (EP). This is because green organization culture (GOC) shapes values, beliefs, and norms that support collective environmentally friendly behavior. When green culture is strongly embedded in an organization, employees will be more motivated to contribute to sustainability initiatives, such as waste reduction, energy efficiency, and responsible resource management. Green organization culture (GOC) also creates a work environment that facilitates green actions and encourages sustainable innovation oriented towards improving environmental performance (EP) (Al-Swidi et al. 2021). According to (Ahmad et al. 2023), the success of environmental strategy implementation is greatly influenced by the extent to which the organizational culture supports and internalizes sustainability values at all levels. Therefore, green organization culture (GOC) not only reinforces individual green behavior but also serves as a collective foundation for achieving superior environmental performance.

The influence of green human resource management (GHRM) on environmental performance (EP)

There is a significant relationship between green human resource management (GHRM) and environmental performance (EP). Environment-based human resource (HR) practices such as green recruitment, pro-environmental training, green performance evaluations, and reward systems that support sustainability can shape employee behavior that is more environmentally conscious. In private universities, the implementation of green human resource management (GHRM) not only promotes ecological awareness among staff and lecturers, but also shapes a work culture that supports energy efficiency, waste reduction, and responsible use of resources. The application of GHRM has been proven to improve an organization's environmental performance through the active involvement of employees in

green work practices (Laia & Palupiningtyas. 2025). According to research (Kuo et al. 2022), organizations that adopt green human resource management (GHRM) policies tend to be better able to achieve environmental goals, including educational institutions that have begun to integrate sustainability values into their operational management. In the context of Batam City, which is both an industrial and educational area, green human resource management (GHRM) in private universities (PTS) is an important strategy to ensure that academic and administrative activities contribute positively to environmental preservation.

Table 6 shows the results of the indirect effect hypothesis test, which has significant requirements with T-statistic > 1.96 and P-Value < 0.05 criteria, meaning that it has a significant effect (Tofighi & Kelly. 2020).

Table 6.
Indirect Effect Results

Hypothesis	*Variable*	*Sample Mean*	*T-Statistics*	*P-Value*	*Results*
H5	GHRM->GWE->EP	0.173	3.594	0.000	Significant
H6	GHRM->GOC->EP	0.092	2.971	0.003	Significant

Source : Results by data (2025)

The Effect of Green Human Resource Management (GHRM) on Environmental Performance (EP) Mediated by Green Work Engagement (GWE)

In hypothesis five, the results of the indirect effect test of the green work engagement (GWE) variable significantly mediated the relationship between green human resource management (GHRM) and environmental performance (EP), with a T-statistic value of 3.594 and a P-value of 0.000, which means that the effect is significant. This indicates that in private universities in Batam City, the implementation of green human resource management (GHRM) practices such as environmental training, green recruitment, and sustainability-based evaluation not only has a direct impact on improving environmental performance but also indirectly through increasing employee engagement in environmentally friendly work activities. Employees who are actively involved in pro-environmental activities tend to be more concerned about environmental preservation and contribute positively to resource efficiency and waste reduction in the institution. According to (Alfadel et al. 2025), green work engagement is an important mechanism that bridges green human resource management (GHRM) policies with organizational environmental performance outcomes. Consistently implemented green human resource management (GHRM) can increase employee motivation and environmental awareness, making green work engagement (GWE) an effective channel for improving environmental performance (EP), especially in the context of higher education institutions that are beginning to integrate sustainability values into their organizational management.

The Effect of Green Human Resource Management (GHRM) on Environmental Performance (EP) Mediated by Green Organization Culture (GOC).

In hypothesis six, the results of the indirect effect test showed that the green organization culture (GOC) variable significantly mediated the relationship between green human resource management (GHRM) and environmental performance (EP) with a T-statistic value of 2.971 and a P-value of 0.003, which means that the relationship is statistically significant. This proves that the effective implementation of green human resource management (GHRM) can shape an environmentally conscious organizational

culture, which ultimately drives improved environmental performance. According to (Al-Swidi et al. 2021), green organization culture (GOC) is an important link between green policies and environmental outcomes, as green culture reinforces pro-environmental behavior throughout the organization. Green organization culture (GOC) creates a collective commitment to sustainability that directly influences improved environmental performance (Shah et al. 2021).

CONCLUSION

This study aims to analyze the effect of green human resource management (GHRM) on environmental performance (EP) with the mediation of green work engagement (GWE) and green organizational culture (GOC) in private universities (PTS) in Batam City. The results show that GHRM has a positive effect, both directly and indirectly, on environmental performance. This proves that the implementation of environmentally-based human resource practices, such as green recruitment, sustainability training, and pro-environmental incentives, can increase employee engagement while shaping an organizational culture that supports sustainability. Thus, the research objective was achieved, namely to provide empirical evidence of the importance of green human resource management (GHRM) strategies in increasing the contribution of universities to sustainable development. Furthermore, this research opens up opportunities for the wider application and development of green human resource management (GHRM) policies in the higher education sector and other organizations. Universities can utilize these findings to strengthen sustainability policies, integrate green principles into the curriculum and campus operations, and build closer collaboration with the academic community to create an ecologically-minded learning environment.

This study provides several recommendations for future research. First, it is recommended that future studies add other variables that may influence Environmental Performance (EP), such as green leadership, green innovation, and individual environmental awareness, in order to provide a more comprehensive picture of the factors that influence environmental performance. Second, research can be expanded to other sectors and regions outside private universities (PTS) in Batam City, such as the manufacturing, service, and government sectors, to enrich perspectives and increase the generalization of results. In addition, future research can also use mixed methods to gain a deeper understanding, not only quantitatively but also qualitatively through interviews or case studies. Longitudinal research is also recommended in order to observe the long-term impact of the implementation of Green Human Resource Management (GHRM), Green Work Engagement (GWE), and Green Organizational Culture (GOC) on Environmental Performance (EP). Thus, the results obtained are expected to make a stronger contribution to the development of environmentally-based human resource management (HRM) theory and practice in Indonesia.

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