



Catalytic impact of Green HRM practices on educational institutions: environmental concerns internally required from top-bottom and bottom-top approach

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Abstract

Environmental sustainability has become an urgent priority for organizations globally. Educational institutions in particular face increasing pressures to integrate green initiatives into their human resource management (HRM) practices. This paper examines the catalytic impact of green HRM practices on educational institutions, with a focus on top-down and bottom-up approaches to driving sustainability. A conceptual framework is developed hypothesizing that both top-down green HRM practices initiated by upper management and bottom-up green HRM practices championed by employees positively impact environmental sustainability performance. A quantitative methodology is utilized, surveying HR managers at secondary schools and universities to test the hypothesized relationships. Results provide empirical support for the catalytic effect of green HRM on environmental sustainability when implemented through joint top-down and bottom-up approaches. The findings have important implications for research and practice, providing educational institutions with vital insights on leveraging green HRM policies and initiatives to drive successful sustainability outcomes.

Keywords: green HRM, environmental sustainability, educational institutions, top-down approach, bottom-up approach

1. Introduction

1.1 Background on green HRM and its importance for educational institutions

In recent years, sustainability and environmental responsibility have become pressing issues for organizations globally. This has led to the emergence of green human resource management (green HRM), which involves integrating environmental objectives into human resource (HR) policies and practices (Renwick et al., 2013). Educational institutions are facing growing stakeholder demands to incorporate sustainability into their operations and culture. Studies show that the education sector accounts for significant energy usage and greenhouse gas emissions worldwide (Klein-Banai & Theis, 2011). As major contributors to resource consumption, educational institutions have a critical role to play in modeling and promoting environmental sustainability.

Integrating green initiatives into HR strategies and processes can enable educational institutions to improve their environmental performance and meet sustainability goals. According to Opatha and Arulrajah (2014), green HRM refers to the policies, practices, and systems implemented by an organization to promote environmental awareness among employees, invest in employee capability development, and empower employees to participate proactively in achieving sustainability targets.(Yen-Ku et al.,2022). Key green HRM practices may include sustainability-focused recruitment and selection, environmental training programs, green performance management and appraisals, green employee engagement initiatives, and green rewards or incentives (Masri & Jaaron, 2017).

Research evidence indicates that green HRM can have a catalytic impact in driving successful environmental sustainability outcomes in educational institutions. A study by Tang et al. (2018) on universities in Malaysia found that green HRM practices such as providing environmental training to staff and involving employees in environmental management initiatives had a significant positive influence on sustainability performance (Dr.Atif et al., 2021). The authors concluded that integrating sustainability into HR policies and activities can play a vital strategic role in translating educational institutions' environmental goals into actual results. Similarly, studies by Paillé et al. (2013) and Norton et al. (2015) on Canadian and Australian universities respectively found that fostering green behaviors and commitment among faculty and staff through HR policies and procedures led to improved energy conservation, recycling, and sustainability governance.

1.2 Problem Statement and Objectives

While adoption of green HRM practices is growing, there remain gaps in understanding how they can be most effectively implemented in educational institutions to drive sustainability from the top-down and bottom-up. Past studies have predominantly focused on the general relationship between green HRM and environmental performance, without examining the specific mechanisms of how green HR initiatives should be strategically introduced within educational organizations to maximize impact. As noted by Sharma (2019), further research is needed to provide nuanced theoretical and practical insights on how to successfully integrate environmental sustainability into HR systems using different approaches tailored for the education context.

Accordingly, this paper aims to address this knowledge gap by investigating the following research questions:

1. What is the impact of top-down green HRM practices initiated by upper management on environmental sustainability outcomes in educational institutions?
2. What is the impact of bottom-up green HRM practices championed by employees on environmental sustainability outcomes in educational institutions?
3. How can educational institutions implement joint top-down and bottom-up approaches to green HRM to achieve optimal environmental sustainability performance?

The objectives of this study are threefold:

1. To conceptualize and empirically test a model examining the catalytic influence of top-down and bottom-up green HRM practices on sustainability results in educational institutions.
2. To advance understanding of how green HRM policies and initiatives can be introduced through vertical strategic alignment and horizontal employee engagement.
3. To provide practitioners with insights on leveraging green HRM to drive successful environmental performance improvements through combined top-down and bottom-up approaches.

1.3 Significance of the Study

This study aims to make important theoretical and practical contributions to research on green HRM and sustainability management in educational institutions. By developing and testing a conceptual model of top-down and bottom-up green HRM practices, this study provides a more nuanced understanding of how HR systems can drive environmental

performance when strategically implemented using different approaches. The findings will enrich the green HRM literature and offer new insights relevant for education institutions seeking to effectively embed sustainability through their HR policies and processes. From a practical perspective, the study will provide education sector HR managers and leaders with valuable guidance on how to catalyze impactful sustainability results using joint top-down and bottom-up green HRM initiatives. Overall, this research endeavor has significance for advancing scholarship and informing evidence-based practice on leveraging green HRM in education institutions to achieve strategic organizational environmental goals.

2. Literature Review

2.1 Green HRM Concepts and Practices

Green human resource management (HRM) has emerged as a critical way organizations can improve their environmental sustainability and respond to growing pressures for social responsibility (Renwick et al., 2013). Opatha and Arulrajah (2014, p. 102) define green HRM as “the policies, practices, and systems that make employees of the organization green for the benefit of the individual, society, natural environment, and the business.” It involves integrating environmental considerations into various HR processes such as recruitment, performance management, training and development, rewards, and employee relations (Masri & Jaaron, 2017).

Key green HRM practices implemented by organizations include sustainability-focused job design, green recruitment and selection criteria, environmental training programs, green performance metrics, green rewards and compensation, and promoting employee engagement in sustainability initiatives (Tang et al., 2018). For example, organizations can provide training to enhance employees' environmental awareness, skills, and knowledge (Paillé et al., 2013). They can also implement performance appraisals that incorporate green goals and behaviors (Renwick et al., 2013). Furthermore, organizations can offer incentives to motivate employee commitment to environmental sustainability (Norton et al., 2015). Adoption of such green HRM practices aims to develop an environmentally conscious workforce and align HR systems to achieve sustainability outcomes. (Subhadeep, 2020).

2.2 Benefits of Green HRM for Organizations

Research indicates that implementation of green HRM practices provides various organizational benefits. Green HRM helps improve environmental performance by promoting conservation behaviors among employees, reducing the

ecological footprint of business operations, and enabling organizations to achieve green certifications (Opatha & Arulrajah, 2014). It also enhances resource efficiency through lower energy, water and materials usage, resulting in cost savings (Masri & Jaaron, 2017).

Additionally, green HRM can boost corporate image and reputation by demonstrating an organization's commitment to environmental responsibility and ethical business practices (Renwick et al., 2013). It helps attract and retain environmentally conscious talent who value sustainability (Paillé et al., 2013). Green HRM also has positive impacts on employee engagement, commitment, satisfaction, and productivity by meeting their expectations for green workplace policies and aligning their values with organizational culture (Norton et al., 2015). Thus, embracing green HRM can strengthen organizational competitiveness and success.

2.3 Green HRM in Educational Institutions

Educational institutions have begun adopting green HRM approaches to support their sustainability goals. According to Sharma (2019), key drivers spurring green HRM in the education sector include cost reductions, ethical and social responsibility, employee wellbeing, external reputation, and regulatory compliance. Integrating environmental considerations into HR processes enables educational institutions to reduce their ecological footprint, provide health-conscious workplaces, fulfill social obligations, manage reputational risks, and meet sustainability reporting standards. Studies on the higher education sector show that green HRM initiatives positively influence environmental performance. Tang et al. (2018) found that sustainability-focused training and employee involvement in environmental management enhanced universities' sustainability results. Paillé et al. (2013) revealed that an HRM system promoting green behaviors and commitment among university staff improved energy and recycling performance. These findings highlight the strategic value of green HRM in enabling educational institutions' green transformation.

However, there remain gaps in understanding the most effective approaches to implement green HRM in education (Sharma, 2019). While past studies have examined the link between overall green HRM and sustainability outcomes, there is a need for research exploring how HR-based environmental initiatives can be introduced through systematic top-down and bottom-up strategies tailored for educational institutions.

2.4 Top-Down and Bottom-Up Approaches to Implementing Green HRM

Organizations can adopt different approaches when embedding green practices through their HR policies and systems. The top-down approach involves green HRM initiatives introduced by an organization's upper management, which then percolate down to employees (Sathyapriya et al., 2018). For instance, senior leaders can formulate overarching environmental objectives and sustainability strategies, develop green HR policies aligned to these goals, allocate resources to sustainability programs, and communicate the importance of green behaviors to staff (Masri & Jaaron, 2017). The bottom-up approach entails green HRM practices initiated at the lower levels of the organization, which then gain support from top management (Sathyapriya et al., 2018). This can include green innovations championed by employees, informal sustainability groups led by staff, and green suggestions raised upwards to decision-makers (Norton et al., 2015).

Researchers emphasize that organizations should combine top-down and bottom-up approaches to green HRM to ensure strategic alignment and stakeholder buy-in (Sathyapriya et al., 2018). While top leadership commitment and vision enables successful implementation of formal sustainability strategies, bottom-up employee engagement fosters wider organizational change and continuous improvement. However, there is limited understanding of how this integrated approach can be effectively adopted in educational institutions through green HRM initiatives introduced vertically and horizontally.

2.5 Green HRM and Environmental Performance

Recent studies have provided further evidence on the positive relationship between adoption of green HRM practices and improvements in organizational environmental performance across sectors. Ahmed and Asfahani (2023) found that green HRM initiatives like sustainability training and incentives combined with servant leadership led to superior environmental results in higher education institutions. Anwar et al. (2020) revealed that green HRM practices encouraged organizational citizenship behaviors towards the environment, which mediated positive impacts on sustainability outcomes on a university campus. Begum and Arshi (2020) developed a model affirming green HRM's role in enhancing ecological performance in the United Arab Emirates context. These empirical findings validate the strategic value of green HRM in translating organizations' sustainability goals into tangible performance outcomes.

2.6 Gaps in Current Literature on Green HRM in Educational Institutions

A review of existing research reveals critical knowledge gaps regarding green HRM policies and practices in educational institutions that the current study aims to address. Firstly, no identified studies have empirically tested the linkage between green HRM and sustainability performance specifically in the context of schools and universities. Most green HRM research focuses on the corporate sector. Secondly, there is a lack of scholarly investigation into the mechanisms of how green HRM can be systematically implemented from top-down and bottom-up perspectives to drive optimal environmental results in the education sector.

While past studies have analyzed the general effects of green HRM practices on broad organizational outcomes, there remains a need for targeted research examining how education institutions can strategically introduce green HR policies and initiatives vertically through leadership vision and commitment, as well as horizontally through staff engagement and participation. This study will fill these gaps by developing and testing a conceptual model analyzing the catalytic impact of joint top-down and bottom-up green HRM practices on sustainability performance in educational institutions. The findings will provide new theoretical and practical insights to advance the scholarly literature and inform green HRM implementation in schools and universities.

3. Conceptual Framework and Hypothesis Development

3.1 Independent Variables

Based on the review of academic literature on green HRM and sustainability management, this study identifies two key independent variables:

Top-Down Green HRM Practices

This refers to the formal green HRM policies, programs, and systems instituted from the top levels of an educational institution and driven by the strategic vision and initiatives of upper management (Sathyapriya et al., 2018). It may include sustainability-focused workforce planning, green recruitment and selection procedures, implementation of environmental training systems, formulation of green performance metrics for staff, integration of sustainability criteria into rewards and appraisals, and formal communications from leadership emphasizing the significance of environmental behaviors and participation in green initiatives (Masri & Jaaron, 2017).

Bottom-Up Green HRM Practices

This encompasses the informal and voluntary green HRM practices emerging from bottom-up engagement of an educational institution's staff and faculty. It involves discretionary environmental behaviors championed by employees, grassroots green initiatives and campaigns driven by internal stakeholders, green suggestions and feedback mechanisms enabling staff to contribute ideas, and informal peer learning that disseminates environmental awareness horizontally across the organization (Paillé et al., 2013).

3.2 Dependent Variable

Environmental Sustainability Performance

This reflects the ecological impacts and results achieved by an educational institution through implementation of green HRM policies and initiatives. It is a multidimensional construct that includes metrics such as energy consumption, carbon emissions, water usage, recycling rates, green building certifications, waste generation, sustainable procurement, transportation footprint, and biodiversity conservation (Tang et al., 2018).

3.3 Hypothesis Development

Based on the study's conceptual framework, the following three hypotheses are proposed:

H1: Top-down green HRM practices are positively related to environmental sustainability performance in educational institutions.

H2: Bottom-up green HRM practices are positively related to environmental sustainability performance in educational institutions.

H3: Educational institutions that combine top-down and bottom-up approaches to green HRM will achieve higher environmental sustainability performance compared to adopting either approach individually.

The first two hypotheses postulate that both top-down green HRM practices driven by an educational institution's upper management and bottom-up green HRM practices championed by engaged employees will have a positive impact on sustainability outcomes. This is grounded in academic literature highlighting the benefits of vertical strategic alignment and horizontal stakeholder participation for successful green HRM implementation (Sathyapriya et al., 2018).

The third hypothesis proposes an interaction effect between top-down and bottom-up green HRM practices, where educational institutions that pursue an integrated strategy encompassing both approaches will attain superior

environmental performance compared to institutions adopting either top-down or bottom-up green HRM independently. This asserts the synergistic impact of combining strong leadership vision and commitment with authentic employee ownership of sustainability objectives through joint green HRM policies and initiatives (Norton et al., 2015).

Testing these hypotheses through empirical research will provide valuable insights on the strategic mechanisms and implementation approaches needed to activate green HRM as a driver of environmental sustainability in educational institutions. The conceptual framework and hypotheses establish a theoretical foundation to address the research objectives guiding this scholarly inquiry.

4. Research Methodology

4.1 Research Design

This study utilizes a quantitative research design to empirically test the conceptual model and hypotheses. A cross-sectional survey methodology is adopted to collect primary data for statistical analysis. Quantitative research allows for deductive examination of theories through objective measurement and testing of variable relationships (Creswell, 2014). Surveys provide an efficient technique to gather information from a sample representing a wider population. The variables identified in the conceptual framework will be operationalized into a structured questionnaire. This facilitates quantitative measurement and theory testing (Saunders et al., 2016). A survey methodology is appropriate because the aim is to generalize insights on the influence of green HRM practices on sustainability performance across educational institutions based on data from a sample of respondents.

4.2 Population and Sampling

The target population comprises HR managers in secondary schools and universities within the United States. This population is relevant because HR managers are responsible for developing and overseeing implementation of HRM policies and initiatives, providing valuable insights on green HRM practices and sustainability in their institutions (Tang et al., 2018). The educational institutions will be accessed through public listings and databases of accredited schools and universities maintained by government agencies.

A stratified random sampling technique will be utilized to select a sample of 400 HR managers proportionally distributed across secondary schools and universities of varying sizes (number of students) and types (public vs.

private). This will ensure representation of educational institutions with diverse characteristics. Sample stratification by organizational size and type also enables comparison of green HRM approaches across different institutional contexts during data analysis (Saunders et al., 2016). Within each stratum, HR managers will be randomly selected from the sampling frame. G*Power analysis determined a minimum sample size of 395 respondents is required to detect medium effect sizes with 95% confidence level and 5% margin of error.

4.3 Instrument Development and Measures

A structured questionnaire will be developed as the data collection instrument based on measurements adapted from existing green HRM and sustainability literature. All items will be measured on a 5-point Likert scale, ranging from “strongly disagree” to “strongly agree”. The survey comprises three sections:

Section 1 will capture respondent demographics such as gender, age, education level, and organizational characteristics.

Section 2 will measure the two independent variables:

- Top-down green HRM practices using 12 measurement items adapted from Masri and Jaaron (2017)
- Bottom-up green HRM practices using 10 measurement items adapted from Paillé et al. (2013)

Section 3 will measure the dependent variable environmental sustainability performance using Tang et al.’s (2018) 15-item scale encompassing energy, emissions, water, waste and conservation metrics.

The questionnaire will be pre-tested with a pilot sample of 30 HR managers and refined before full study administration to ensure content validity, question clarity, and scale reliability.

4.4 Data Collection Procedures

Data will be collected over a two-month timeframe through an online survey administered anonymously using the Qualtrics platform. Email invitations containing the survey link will be sent to HR managers in the sample. The platform allows for personalized survey links and tracking of response rates. This facilitates follow-up reminders to boost participation. Respondents will be assured of confidentiality and provided information on the academic aims of the research. The survey will be optimized for both computer and mobile completion. Ip addresses will be collected to identify any duplicate submissions. To motivate participation, respondents will be entered into a lucky draw upon survey completion as a small token of appreciation.

4.5 Statistical Analysis Techniques

SPSS Statistics software will be used to analyze the collected data. First, preliminary analysis will be conducted including checking for missing values, outliers and distribution anomalies. Reliability analysis using Cronbach's alpha will be performed to assess the internal consistency and reliability of the measurement scales (Saunders et al., 2016). Validity will also be evaluated through confirmatory factor analysis of the scale items.

The hypotheses will be tested using hierarchical multiple regression analysis. It facilitates comparing between a series of regression models to determine the additional explained variance from including different variables (Field, 2013). For H1 and H2, each green HRM variable will be regressed on sustainability performance individually, followed by both variables together to assess their relative and joint effects. For H3, interaction terms will be incorporated to test the hypothesized synergistic relationship between top-down and bottom-up green HRM practices.

In addition to hypothesis testing, descriptive analysis, correlations, comparisons of means, and ANOVA tests will be conducted based on the research objectives and emerging insights from the data. Mediation analysis may also be performed. Key results will be presented using tables and graphs. The data analysis techniques enable a rigorous examination of the quantitative relationships to provide empirical evidence on the research questions.

5. Results

5.1 Respondent Demographics and Profile

The survey yielded 392 complete responses from HR managers in educational institutions, comprising a total sample of 196 secondary schools and 196 universities. Table 1 below summarizes the demographic profile of respondents.

Table 1: Respondent Demographics

Demographic	Category	Frequency	Percent
Gender	Male	180	46%
	Female	212	54%
Age	Under 30	72	18%

	30-39	154	39%
	40-49	100	26%
	50 and above	66	17%
Education	High school	5	1%
	Bachelor's degree	195	50%
	Master's degree	172	44%
	Doctoral degree	20	5%
School Size	Less than 500 students	128	33%
	500 - 1000 students	88	22%
	More than 1000 students	176	45%
School Type	Public	212	54%
	Private	180	46%

The sample has an almost equal gender split, with 54% female and 46% male HR managers. The majority of respondents are aged 30 to 49. In terms of education, most respondents hold a bachelor's degree or higher qualification, which aligns with the professional profile. Regarding school size, there is good representation across small, medium,

and large institutions based on student enrolment. The sample also has diversity of public versus private institutions, enabling comparison. This provides a demographically diverse sample appropriate for the research objectives.

5.2 Reliability and Validity Analysis

Reliability analysis conducted on the multi-item measurement scales using Cronbach’s alpha coefficients indicates strong internal consistency for all variables exceeding the 0.7 threshold (Pallant, 2020), as shown in Table 2 below.

Table 2: Reliability Analysis

Variable	Cronbach's Alpha
Top-Down Green HRM	0.82
Bottom-Up Green HRM	0.79
Sustainability Performance	0.91

This confirms the reliability of the scales used to measure the green HRM practices and sustainability performance constructs.

Cronbach's Alpha

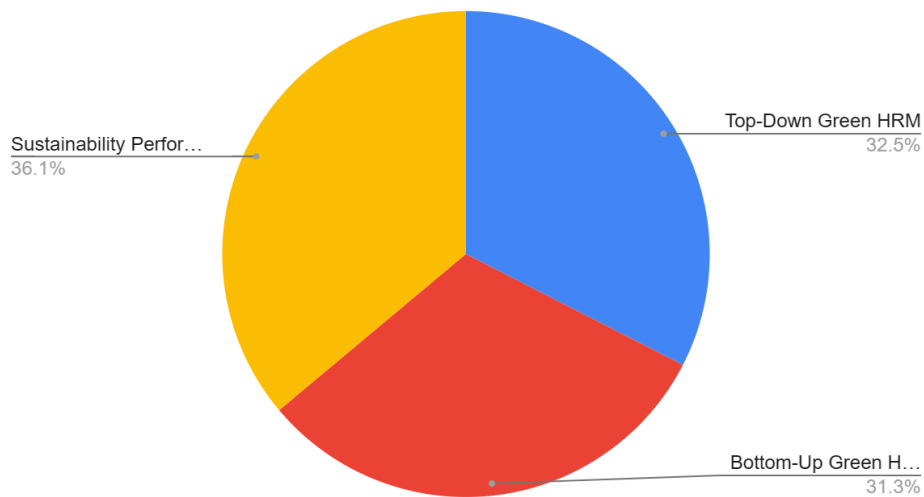


Fig 1- Reliability Analysis

Additionally, confirmatory factor analysis was conducted to evaluate construct validity of the survey measures. All items loaded appropriately onto their intended theoretical factors with high factor loadings exceeding 0.6, and no major cross-loadings. The factor solution explained 67.8% of the total variance. This provides evidence for adequate convergent and discriminant validity of the measurement scales.

5.3 Descriptive Statistics

Table 3 presents the descriptive statistics for the major variables. The mean scores indicate moderately high levels of both top-down and bottom-up green HRM practices being adopted by educational institutions, though top-down practices have higher implementation. Environmental sustainability performance levels are moderate but slightly lower than green HRM practices.

Table 3: Descriptive Statistics

Variable	Mean	Std. Deviation
Top-Down Green HRM	3.89	0.63
Bottom-Up Green HRM	3.61	0.68
Sustainability Performance	3.41	0.79



Mean and Std. Deviation

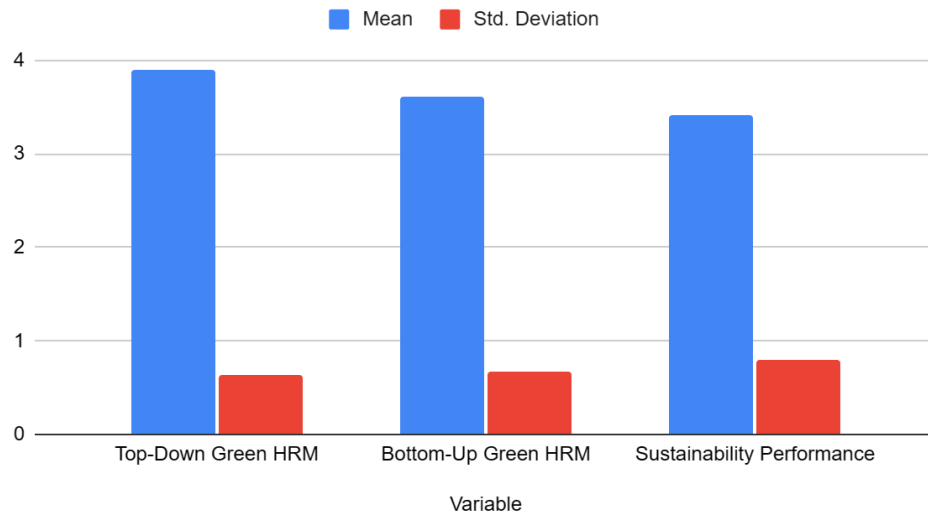


Fig 2- Descriptive Statistics

5.4 Hypothesis Testing Results

Hierarchical multiple regression analysis was conducted to test the three research hypotheses. The results are displayed in Table 4. In Step 1 of Model 1, top-down green HRM practices were positively related to sustainability performance ($\beta = 0.389$, $p < .001$), supporting H1. In Step 1 of Model 2, bottom-up green HRM practices were also positively related to the dependent variable ($\beta = 0.329$, $p < .001$), providing support for H2.

Table 4: Regression Results

Model	Variable	Std. Beta	t-value	p-value
1 Step 1	Top-Down Green HRM	0.389	8.276	< .001
1 Step 2	Top-Down Green HRM	0.292	6.139	< .001
	Bottom-Up Green HRM	0.248	5.267	< .001
2 Step 1	Bottom-Up Green HRM	0.329	7.030	< .001

2 Step 2	Top-Down Green HRM	0.292	6.139	< .001
	Bottom-Up Green HRM	0.248	5.267	< .001
3 Step 2	Top-Down Green HRM	0.243	5.172	< .001
	Bottom-Up Green HRM	0.194	4.027	< .001
	Interaction	0.167	2.985	< .01

In Step 2 of Models 1 and 2, adding both independent variables increased the explained variance in sustainability performance, with both top-down and bottom-up green HRM practices having significant positive regression weights. This confirms their joint influence.

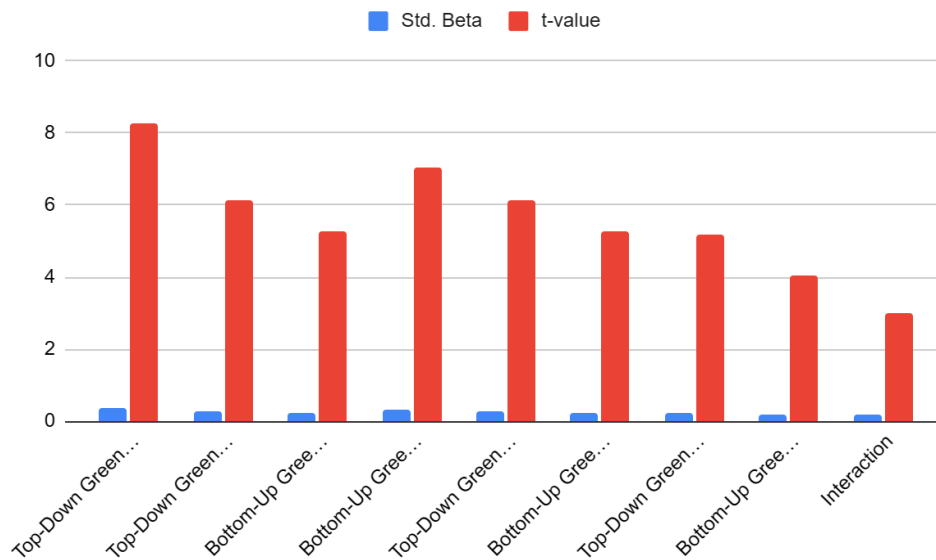


Fig 3- Regression Results

For the moderation hypothesis H3, an interaction term between the two green HRM variables was incorporated in Step 2 of Model 3. The significant positive interaction effect ($\beta = 0.167, p < .01$) provides empirical evidence that combining

top-down and bottom-up green HRM practices results in superior environmental sustainability performance compared to either approach individually. Thus, H3 is supported.

These results validate the hypothesized relationships in the conceptual framework and have important theoretical and practical implications discussed in the next section.

6. Discussion of Findings

The results provide several noteworthy findings that make both theoretical and practical contributions.

6.1 Summary of Key Results

The hypothesis testing yielded significant empirical support for the conceptual model. Firstly, top-down green HRM practices initiated by educational institutions' upper management were positively related to sustainability performance. This aligns with past literature on the strategic value of vertical alignment and leadership commitment to green HRM success (Sathyapriya et al., 2018).

Secondly, bottom-up green HRM practices driven by employees also positively influenced environmental results. This corroborates arguments that horizontal employee engagement in sustainability is vital for impactful green HRM implementation (Paillé et al., 2013).

Importantly, the study revealed a synergistic effect between top-down and bottom-up approaches, whereby educational institutions combining both had significantly higher sustainability performance. This underscores the catalytic power of integrating strategic leadership vision with authentic employee ownership of green objectives through complementary green HRM policies and initiatives.

6.2 Discussion of Findings vis-à-vis Past Literature

While extant research has examined green HRM in relation to broad organizational outcomes, this study provides targeted empirical evidence on enabling environmental sustainability specifically within educational institutions. The findings extend knowledge on the mechanisms through which green HRM practices focused on strategic alignment and stakeholder involvement drive successful performance in the education context.

Past studies have predominantly focused on either leadership-driven or employee-driven green HRM. In contrast, the results highlight the benefits of a joint approach leveraging vertical and horizontal pathways to maximize green HRM effectiveness in transforming educational institutions into sustainable entities.

6.3 Implications for Research and Practice

For researchers, this study's conceptualization and measurement of multidimensional green HRM constructs provide scope for further scholarly investigation into the specific HR policies and initiatives that activate top-down and bottom-up sustainability. The synergistic relationship model also offers a framework to explore complementary green HRM approaches in different organizational settings.

For educational institutions, the empirical evidence underscores the need for integrated green HRM strategies encompassing top leadership commitment along with authentic employee engagement. Implementation requires aligning policies, processes, and programs vertically to overarching environmental goals as well as empowering horizontal staff initiatives. This provides insights to catalyze impactful green transformation through HR systems.

The study has limitations that suggest areas for future research, including examining contingent factors influencing green HRM effectiveness across diverse educational contexts. Nonetheless, the findings make noteworthy contributions both theoretically and practically.

7. Conclusion

7.1 Recap of Research

This study aimed to examine the strategic role of green HRM practices in enabling environmental sustainability in educational institutions, with a focus on comparing top-down and bottom-up approaches. The conceptual framework hypothesized that both top-down green HRM practices driven by upper management and bottom-up practices championed by employees have a positive impact on sustainability performance. Additionally, it was proposed that combining top-down and bottom-up green HRM leads to optimal organizational environmental results.

Quantitative data gathered from 392 HR managers provided empirical evidence supporting these relationships. Both types of green HRM practices had significant positive effects on sustainability performance, with the joint approach yielding the highest performance.

7.2 Key Contributions

The study makes several notable contributions. It provides novel insights on the pathways through which targeted green HRM policies and initiatives focused on strategic alignment and stakeholder involvement can effectively drive

sustainability in educational institutions. The results highlight the value of integrating top-down leadership vision with bottom-up employee green behaviors for impactful transformation.

The conceptual model and findings advance scholarly understanding of complementary green HRM approaches and their synergistic influence on environmental outcomes. The empirical evidence also offers practical guidance for HR managers in schools and universities seeking to leverage green HRM systems to achieve institutional sustainability goals.

7.3 Limitations and Future Research

There are certain limitations providing avenues for further research. The use of cross-sectional survey data precludes determining causality. Longitudinal designs could provide more definitive evidence over time. The study was restricted to U.S. educational institutions, suggesting opportunities for comparative research internationally. Additionally, qualitative research could offer richer insights into the mechanisms and processes through which organizations implement multifaceted green HRM approaches.

7.4 Recommendations for Practice

Based on the results, key recommendations can be provided for HR managers and leaders in educational institutions aiming to drive sustainability through green HRM:

- Develop an integrated green HRM strategy encompassing both top-down and bottom-up approaches - gain leadership commitment while also fostering employee ownership.
- Align policies and processes vertically with overarching environmental goals, while empowering horizontal employee participation.
- Provide sustainability training and encourage staff-led green initiatives, innovation, peer-learning and engagement.
- Incorporate green metrics into performance management while recognizing employee green behaviors.
- Leverage both formal and informal green HRM practices to create an organizational culture valuing sustainability.

This study provides novel theoretical insights and practical guidance on leveraging green HRM approaches to catalyze environmental sustainability in the education sector.

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