

# The role of green innovation in the relationship between green HRM practices and sustainable business performance; evidence from the mining industry

GHRMPs in the  
mining  
industry

Abdul-Razak Suleman

*School of Business and Law, Centre for People, Place and Planet,  
Edith Cowan University, Joondalup, Australia, and*

Michael Kyei-Frimpong and Bridget Akwetey-Siaw  
*Department of Organisation and Human Resource Management,  
University of Ghana Business School, Accra, Ghana*

Received 24 September 2023

Revised 3 January 2024

17 February 2024

Accepted 3 March 2024

## Abstract

**Purpose** – Drawing on the natural resource-based view (NRBV) theory, the study aimed to examine the mediating role of green innovation (GI) in the nexus between green human resource management practices (Green HRMPs) and sustainable business performance (SBP).

**Design/methodology/approach** – This study adopted the descriptive time-lagged research design. Data were collected from 278 managerial staff of five mining companies in Ghana at different waves within a 3-month interval. Descriptive and inferential statistics were used to analyse the data received using the statistical package for the social sciences (SPSS) statistics (V. 26.0) and Smart PLS (V.4.0).

**Findings** – The study found that Green HRMPs significantly related more to economic performance (EP) than social performance (SP) but did not significantly relate to environmental performance (EnP). Moreover, the results revealed that GI partially mediated the nexus between Green HRMPs and both SP and EP but fully mediated the link between Green HRMPs and EnP.

**Originality/value** – The relevance of Green HRMPs in ensuring corporate sustainability has been largely established in the extant literature. However, there is an evidential dearth of studies in the literature concerning the mediating role of GI in the nexus between Green HRMPs and SBP, especially in developing economies context. Hence, this study serves as a significant contributing card from Ghana by advancing the NRBV theory.

**Keywords** Green human resource management practices, Green innovation, Sustainable business performance, Mining industry, Ghana

**Paper type** Research paper

## Introduction

Can you envisage what the world would be like without mining activities? The mining industry is an important contributor to the gross domestic product (GDP) of many countries, hence the global economy (Amponsah-Tawiah and Mensah, 2016; Singh and Kalirajan, 2003; Sorensen, 2011). Thus, the proceeds from mining have significantly improved the livelihood of individuals and countries that engage in these various mining activities. Also, products from mining are the backbone of many other industries globally, including aviation, steel manufacturing, power production, computers, cement manufacturing, agribusiness and even health (Carvalho, 2017; Mutti *et al.*, 2012). In Ghana, the mining industry is the leading contributor to the country's economy in terms of jobs, earnings (direct and indirect), exports and investments (Stemn, 2019; Taabazuing *et al.*, 2012). However, despite all these positive economic contributions and opportunities offered by the industry, it is regarded as one of the



---

world's most hazardous industries so far as environmental pollution and depletion are concerned (Appiah and Osman, 2014; Litvinenko, 2020).

Increasing concerns about the changes in climate due to firms' activities and its subsequent adverse impact, as witnessed in some major regions of the world such as the Middle East and Africa, have brought about the concept of "green" among individuals, groups and organisations in the early years of the 21st century (Suleman *et al.*, 2022a; Zubair and Khan, 2019). The concept of going green seems to dominate the affairs of the present generation as it continues to be featured in political, ecological, social, technological and business, right down to personal conversations and debates (El-Kassar and Singh, 2018; Saeed *et al.*, 2018). International bodies such as the European Union have established several environmental laws, directives and policies aimed at regulating the activities that contribute significantly to the depletion of the environment's health that sustains us (Kyriakopoulos, 2021). Apart from using these legislative apparatuses to conserve the world's ecology, the past 2 decades have been filled with active engagement of stakeholders to advance the cause of the ecological concerns raised to step up the fight for our planet. This is evidenced by conferences such as the conference of the parties (COP) 26 U N Climate Summit, which saw more than 100 world leaders gather to resolve climate change issues, and the recent one ocean summit for a similar purpose (Gołębiewska *et al.*, 2021). At the centre of this change is the call on organisations whose activities significantly impact the environment to amend their ways and find sustainable solutions to reduce the harm they cause to the environment (Anaman *et al.*, 2023; Anlesinya and Susomrith, 2020).

The industrial revolution, which symbolised a leap in the development of the world's economy, is becoming a root cause of the battle with environmental pollution. As per the observation of Mousa and Othman (2020), the surge in pollution and the decline of natural resources can be linked to the rapid industrialisation practices, which have led to the call for corporate bodies to integrate green practices in their activities. According to Al-Minhas *et al.* (2020), the advocacy for sustainable environmental development in green literature is to achieve the needed equilibrium between the continuous craving for industrial growth as a mechanism for wealth creation at the expense of the need to preserve the natural environment for posterity's sake. The challenge for organisations embracing this concept is that the idea of sustainable "anything" implies limiting "something" to achieve "something better" in the long run (Brundtland, 1987).

Furthermore, Wagner and Blom (2011) assert that the challenge of implementing such a system can be approached through spreading green ideologies in a cross-functional manner in organisations, and Green HRM has been adjudged as one of the best starting points. Jayabalan *et al.* (2020) define Green HRM as eco-friendly policies and practices implemented by the HRM function of the organisation that influence the entire organisation and its business practices. Traditional HRM has been linked to economic performance (EP), while strategic HRM expands EP by implementing sustainable (green) practices to cover both SP and environmental performance (EnP) (Tseng *et al.*, 2013). Thus, the result is a bundle of HRM practices that bring about sustainable business performance (SBP), touching the organisation's three pillars of profit, people and the planet. More so, organisations in developing countries are faced with several challenges that underscore their EP; as Sharma and Gupta (2015) observe the concept of sustainability to be limited in this context because businesses in these countries do not fully integrate green practices in their several functional areas.

Moreover, as an important industry of the Ghanaian economy and a leading generator of direct domestic revenue as of 2020 per the Ghana revenue authority (The Ghana Chamber of Mines, 2020), the mining industry depends on the continuous exploitation of the natural environment to continue its survival as an artificial entity and remain profitable. However, Rehman *et al.* (2016) assert that organisations facing pressure from regulatory bodies,

---

stakeholders, competitors and society are increasingly focused on establishing balance in their EP with SP and EnP. As a worldwide challenge, sustainability is becoming progressively essential in HRM, making it imperative to examine the relationship between green human resource management practices (Green HRMPs) and the SBP of firms.

In addition, there is a growing concern about the impact mining organisations have on the environment, especially in Ghana, leading to the call for more sustainable practices (Appiah and Osman, 2014; Carvalho, 2017). However, the obligation for such organisations to strive to balance their EP with SP and EnP has been adjudged difficult and, in some cases, controversial. Tseng *et al.* (2013) assert that firms that are mindful of their EnP and are innovatively green through corporate activities have a competitive advantage. As such, organisations have attempted to develop and incorporate some form of eco-friendly novelty in their practices, services, procedures and products defined as GI (Albort-Morant *et al.*, 2018). According to Tietze *et al.* (2011), the object of innovation in green literature can be an advancement in product development and packaging, a process, a service or a model that satisfies a need and warrant competitive advantage. Song *et al.* (2020) assert that the implementation of Green HRMPs tend to enhance employees' competencies and expose them to innovative ways of carrying out their duties and responsibilities. Likewise, Muisyo *et al.* (2022) affirm that employees are likely to be innovative in their roles when their employers are green-oriented. Moreover, Küçükoğlu and Pinar (2015) indicate that GI is a matter of global interest that attracts companies who aim at a high market ratio and a competitive advantage as such offers several gains to the entities. Therefore, our study examines the mediating role of GI in the relationship between Green HRMPs and SBP in the mining industry.

This study contributes to the growing literature on Green HRMPs, especially in developing countries like Ghana. It offers a unique perspective on how these practices can be applied in a resource-intensive industry like mining. Furthermore, the contribution of our study extends beyond the Ghanaian mining industry, as it addresses critical issues related to environmental sustainability, corporate responsibility and innovation that resonate with industries worldwide. By shedding light on the interconnections between Green HRMPs, GI and SBP, our study offers a roadmap for mining companies seeking to navigate the complex terrain of economic growth without sacrificing their social and environmental stewardship in the 21st century.

## Literature review and hypotheses development

### *Natural resource-based view (NRBV) theory*

The NRBV theory is Hart's (1995) extension of the resource-based view (RBV) by integrating the interaction between the firm and its environment in the competitive advantage equation. The fundamental RBV theory by Barney (1991) emphasises the firm's internal factors such as its own decisions, resources, capabilities and competencies as its primary source of sustained competitive advantage as opposed to its external environment (Hart and Dowell, 2011). The resource in question should be qualified as valuable, rare, inimitable and non-substitutable (Barney, 1991). In the wake of pressure and calls from various stakeholders for organisations to reduce their environmental footprint, a firm's interaction with its natural environment can constrain its goal to attain a sustained competitive advantage (Suleman *et al.*, 2023). According to Hart (1995), the quest for competitive advantage is no longer limited to EP as the current challenge of the biophysical environment lingers on, hence the birth of NRBV theory (an extension of the RBV theory). The NRBV theory rests on three interconnected strategic pillars for addressing the environmental constraints faced by firms: pollution prevention, product stewardship and sustainable development. The fundamental aim of pollution prevention is to reduce emissions, effluents and waste from the operations of firms; product stewardship provides firms with the opportunity to redesign their existing product systems

---

to reduce liability and lower life cycle costs with new product development whereas sustainable development aims to use ecologically friendly technology and products to develop markets over the long-term.

From the NRBV perspective, firms can secure a competitive advantage and improve their performance based on their relationship with the natural environment. The study adopts the NRBV to provide a theoretical foundation for explaining how Green HRMPs can bring about the SBP of a firm through GI. Thus, when firms adopt environmental strategies such as Green HRMPs, they develop strategic capabilities that are aligned with pollution prevention mechanisms, thus proactively preventing waste of resources as opposed to having to clean them “at the end of the pipe”. This approach improves operational efficiencies by reducing the number of inputs required, simplifying processes and in some instances, reducing compliance and liability costs (Hart, 1995). The mutual gain for the organisation and environment is that it essentially lowers operational costs and waste, which has implications for the firm’s SBP (i.e. EP, SP and EnP). This strategy is people-intensive, decentralised and works best in “green” teams (Hart and Dowell, 2011). Accordingly, through Green HRMPs such as green recruitment and selection, green training, green performance management and involvement, among others (Likhitkar and Verma, 2017), organisations can secure for themselves a “green” employee base that can implement pollution prevention strategies. Moreover, due to the level of employee engagement needed and the decentralised nature of such mechanisms, there will be much room for green innovative solutions and green ideologies. Once Green HRMPs and spreading green ideologies are in place, the workforce becomes innovative in their approaches to work, seeking ways to engage in their daily activities to reduce waste and cost to the environment; the result of such innovativeness eventually adds value to the organisation, which ultimately sustains the firm’s SBP.

#### *Green HRMPs and sustainable business practices*

Green HRM emerged from the “Green Movement”, a political movement that advocates for four underlying and basic principles: sustainability, environmentalism, non-violence and social justice. Against this backdrop, it can be highlighted that at the core of Green HRM is the idea of sustainability, and in the context of an organisation, SBP becomes the focus. Stakeholders advancing the green or sustainable cause can make a case and advocate the concept of SBP to organisations because, in its eco-focus agenda, it also embraces EP and SP, and indices of great importance to every profit-making business entity. The concept of SBP is upheld by three principles: EP, SP and EnP (Elkington, 1994). As such, Anaman *et al.* (2023) define SBP as the ability to harmonise financial, environmental and social objectives in the performance of a business’s core mandate to maximise value. EP is concerned with the profitability of the firm. In contrast, SP and EnP encompass the firm’s involvement in upholding its responsibility to the environment while improving its image (Almemari *et al.*, 2021). It is widely reported in extant literature that society places a premium on organisations that tackle environmental issues. Improved stakeholder relationships and employee satisfaction, a more acceptable brand image and improved awareness of social responsibility are some benefits that Khurshid and Darzi (2016) indicate accrue to these organisations and can be used as an assessment of the SP of an organisation.

A plethora of studies in the literature revealed that Green HRMPs significantly relate to corporate sustainability (Al Dughan *et al.*, 2022; Awwad Al-Shammari *et al.*, 2022; Malik *et al.*, 2021; Mustafa *et al.*, 2022; Shahzad *et al.*, 2023). For instance, Shahzad *et al.* (2023) found that Green HRMPs significantly contribute to SBP, as these practices encourage employees to develop and implement efficient solutions to environmental challenges, leading to improved sustainability outcomes. Likewise, Al Dughan *et al.* (2022) observed that Green HRM positively impacts EnP and further postulated that Green HRM encourages behaviours and

---

attitudes that support sustainability objectives, leading to a more engaged and environmentally responsible workforce. In addition, [Rana and Arya \(2024\)](#) demonstrated that Green HRMPs lead to environmentally friendly behaviours among employees, which indirectly contribute to the overall sustainability of the organisation. [Ogiemwonyi et al. \(2023\)](#) in their study asserted that by aligning individual behaviours with the organisation's environmental goals, Green HRM ensures a collective effort towards sustainability performance. In addition, [Afzal et al. \(2023\)](#) evidenced in their study that the relationship between Green HRM and sustainability performance is stronger when there is a clear environmental strategy guiding the organisation's sustainability efforts. In furtherance, [Zaid et al. \(2018\)](#) found a positive link between the Green HRM bundle, green supply chain management and SBP in Palestine's manufacturing sector. [Mousa and Othman \(2020\)](#) revealed that the prioritisation and practice of Green HRM influenced SBP in the healthcare industry, especially in the areas of SP and EnP. Moreover, [Harb and Ahmed's \(2019\)](#) study showed that Green HRM generally improves managers' perceived financial sustainability. Despite the above pieces of evidence espoused in the extant literature, studies on the nexus between Green HRMPs and SBP (i.e. EP, SP and EnP) in the mining industry are rare, even more so in the Ghanaian context. Given this, our study hypothesises that;

- H1a.* Green HRMPs positively and significantly relate to EP.
- H1b.* Green HRMPs positively and significantly relate to SP.
- H1c.* Green HRMPs positively and significantly relate to EnP.

#### *Green HRMPs and green innovation*

Green innovation (GI) is defined as the "introduction of any new or significantly improved product, process, organisational change or marketing solution that reduces the use of natural resources and decreases the release of harmful substances across the whole life-cycle" ([Wang, 2019](#), p. 8). As per [Tseng et al. \(2013\)](#), GI falls under the category of technology, product design, management functions or aspects of a production process, implying that a firm's approach to integrating a green culture necessitates it adopting any of the categories. A typical example is that through the HRM function, firms are adopting innovative ways of delivering on their environmental responsibilities; subsequently, it has been observed that organisations with well-designed Green HRM can improve their GI, which beyond the advantage of reducing production waste and environmental pollution strengthens the business' green image and reputation, thereby strengthening their sustainable performance. Previous studies have shown that HRM may improve workers' knowledge, skills and ability, which supports the corporate's product and process innovation ([Seeck and Diehl, 2017](#)). Based on this reasoning, we propose that Green HRM has a favourable impact on GI. For instance, [Song et al. \(2020\)](#) in their study found that green HRM can positively influence GI. Likewise, [Shah and Soomro \(2023\)](#) found a positive and significant effect of Green HRMPs on GI. More so, [Al-Swidi et al. \(2022\)](#) reported that Green HRMPs positively relate to GI.

In addition, an extant review of the literature revealed that even at the small and medium-sized enterprises level, the adoption of Green HRMPs enhances firms' capability to be innovative about their market offerings ([Singh et al., 2020](#)). Likewise, [Song et al. \(2020\)](#) reported that GI significantly improves as organisations actively implement Green HRMPs. To add up, [Fang et al. \(2022\)](#) and [Malik et al. \(2021\)](#) postulate that Green HRMPs are positively related to GI and that organisations with robust Green HRMPs tend to foster a culture of innovation where ideas for environmental sustainability are encouraged and rewarded. These practices empower employees, promote a proactive environmental strategy and provide the skills and knowledge necessary to innovate for sustainability. In furtherance, it is evident from several studies that

---

the implementation of Green HRM augments the capability of GI in the context within which it is employed (Saudi *et al.*, 2019). Given this, our study hypothesises that;

*H2.* Green HRMPs positively and significantly relate to GI.

### *The mediating role of green innovation*

To the best of our knowledge, in spite of the pieces of evidence espoused in the extant literature, studies on the mediating role of GI in the nexus between Green HRMPs and SBP (i.e. EP, SP and EnP) in the mining industry are rare, even more so in the Ghanaian context. However related studies are reviewed in order to establish the mediating role of GI. Accordingly, scholars assert that the ability to stimulate a firm to develop GI strategies that are mindful and centred on responding to the various aspects of GI can add value or contribute to the firm's SBP (Zaid *et al.*, 2018; Guo *et al.*, 2020; Muafi *et al.*, 2021). For instance, Guo *et al.* (2020) explain that when GI is integrated into the practices of an organisation, it replaces inefficient and wasteful processes, systems, technologies and products with new or improved ones, which gives it a competitive playing field, reduces cost and increases revenue. From the increase in revenue perspective, as firms find innovative ways to be green through their products, processes and services, the diverse needs of customers are met through this approach, adding to enterprises' profit through the business value created and improving the green image and reputation of the firm (Cai and Zhou, 2014). More so, scholars assert that organisations that effectively implement Green HRM and foster GI tend to exhibit higher levels of SBP including reduced waste and emissions, improved energy efficiency and a better overall environmental impact (Aftab *et al.*, 2023; Awwad Al-Shammari *et al.*, 2022; Rana and Arya, 2024). In addition, Zhou *et al.* (2023) found that GI significantly mediated the relationship between Green HRMPs and environmental sustainability. Also, Awwad Al-Shammari *et al.* (2022) found that GI mediates the relationship between Green HRM and SBP among SMEs in the Kingdom of Saudi Arabia. This means that while Green HRM lays the groundwork by creating the right conditions and motivations, it is through concrete innovative actions that these efforts lead to measurable improvements in sustainability. Likewise, Al Doghan *et al.* (2022) revealed that GI bridges the gap between Green HRMPs and improved EnP. This is because GI directly contributes to reducing environmental impact through the development of new and improved processes, products and technologies. More so, Ahakwa *et al.* (2021) revealed the mediating role of GI between Green HRMPs and EnP in small and medium-sized manufacturing firms in Ghana. Given this, our study hypothesises that;

*H3a.* GI mediates the relationship between Green HRMPs and EP.

*H3b.* GI mediates the relationship between Green HRMPs and SP.

*H3c.* GI mediates the relationship between Green HRMPs and EnP.

## **Methodology**

### *Research design, population and sample*

In line with the purpose of this study, the descriptive time-lagged survey design was adopted. The study targeted managerial employees of five Ghanaian mining companies. We considered male and female employees to ensure inclusivity and diversity (Amponsah-Tawiah *et al.*, 2023). Enquiries from the respective human resource management departments indicated about one thousand and sixty-one (1,061) employees in all five companies. The study adopted a probability sampling technique, precisely the simple random sampling method for data collection. This technique was selected because it gives respondents within the companies an equal chance of being selected and aids in carrying out valid analyses and producing accurate results (Saunders *et al.*, 2019). Based on the sample size determination

formula proposed by Miller and Brewer (2003), a sample of 284 was arrived at. However, two hundred and seventy-eight (278) valid responses were received and further used for analysis. Table 1 displays the demographic characteristics of the respondents.

*Measures*

To ensure content validity in measuring the constructs under study as illustrated in the conceptual framework (see Figure 1), existing measurement instruments (scales) found in the reviewed literature were adapted. Subsequently, a 5-point Likert scale where 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree and 5 = strongly agree was used to obtain responses for all constructs because of its accuracy and reliability (Adu et al., 2020; Suleman et al., 2022b; Tang et al., 2017).

*Green HRMPs*

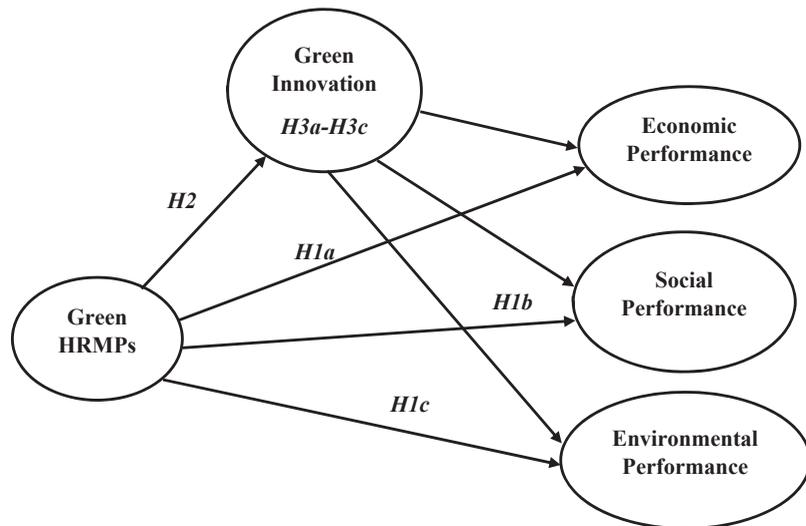
Green HRMPs were assessed using a nineteen-item instrument developed by Tang et al. (2017) with a sample item, “Our organisation attracts green job candidates who use green criteria to select organisations”.

*Green innovation*

GI was measured using an eight-item scale developed by Chiou et al. (2011) with an exemplary item, “Recovery of company’s end-of-life products and recycling”.

	Frequency	Percentage
<i>Gender</i>		
Male	154	55.4
Female	124	44.6
<i>Age</i>		
20–29 years	146	52.4
30–39 years	71	25.7
40–49 years	34	12.2
50–59 years	25	9.1
60 years and above	2	0.7
<i>Educational qualification</i>		
Diploma	23	8.1
Higher National Diploma (H.N.D)	37	13.2
Bachelor’s Degree	173	62.2
Master’s Degree	42	15.2
Doctorate Degree	4	1.4
<i>Marital status</i>		
Single	161	57.8
Married	109	39.2
Divorced	6	2.0
Widowed	1	0.3
Separated	2	0.7
<i>Length of service</i>		
1–5 years	147	53.0
6–10 years	90	32.4
11–15 years	26	9.5
16–20 years	8	2.7
Above 20 years	7	2.4

**Table 1.** Summary characteristics of respondent’s demographic information



**Figure 1.**  
Conceptual framework

Source(s): Author's construct (2023)

#### *Sustainable business performance*

SBP was measured using a twenty-item scale developed by [Yildiz Çankaya and Sezen \(2019\)](#). The scale was measured on three dimensions, namely, EP (seven items), EnP (five items) and SP (eight items), respectively. Sample items include “Of late the company experiences decrease in the cost of materials purchased” (EP), “There has been a decrease in the frequency of environmental accidents” (EnP) and “There has been an improvement in overall stakeholder welfare or betterment” (SP), respectively.

#### *Data analysis*

The data obtained from the respondents were analysed using descriptive and inferential statistics with the aid of IBM SPSS statistics (V 26.0) and Smart PLS (Version 4.0). Descriptive statistics was used to analyse the demographic information of the respondents as well as the mean, standard deviation, skewness, kurtosis and correlation among the study's constructs. Whereas the inferential analysis was used to test for the direct relationship between Green HRMPs and SBP and the mediating role of GI in the said relationship.

#### *Control variables*

Consistent with prior investigations into Green HRMPs and SBP (for example, [Awwad Al-Shammari et al., 2022](#)), we integrated demographic variables including employees' age, gender (1 = male, 2 = female) and tenure employees during the testing of our hypotheses.

#### *Controlling for common method bias (CMB)*

The meticulous control of CMB constitutes a pivotal aspect of empirical enquiries. Self-reporting measures in survey data collection potentially introduce CMB, thereby warranting deliberate mitigation strategies. To address potential CMB, the study first utilised two surveys

---

administered at different intervals, separated by a 3-month gap. The questionnaires were coded to aid in tracking their return and the participants' responses. In July 2023 (T2), a demographic assessment was conducted to collect data on the participants' demographic characteristics and Green HRMPs. However, an evaluation was conducted earlier in May 2023 (T1) to gather respondents' perspectives on GI and SBP. Also, we adhered to the proactive measures recommended by Podsakoff *et al.* (2003). First, we ensured participants' anonymity and confidentiality, underscoring the research-exclusive utility of their responses. Moreover, we employed temporal psychological separation to attenuate the influence of the carryover effect. This entailed applying a rubric-based approach, wherein a preamble was introduced as an expository prelude to elucidate requisites and directives for each questionnaire section. Our underlying premise was rooted in the anticipation that participants, upon perusing the preamble, would treat each section autonomously and refrain from transposing response patterns across sections.

## Results

The reflective model's latent variables were assessed based on their validity and reliability (Hair Jr *et al.*, 2017). The internal consistency reliability, average variance extracted (AVE) and composite reliability (CR) of the study's model were assessed. The results as presented in Table 2 show that Cronbach's  $\alpha$ 's were within the recommended threshold (Kyei-Frimpong *et al.*, 2023). Similarly, the CR of the latent variables exceeded the acceptable threshold of 0.7 (Hair *et al.*, 2012). In furtherance, convergent and discriminant validity were assessed to substantiate the validity of the variables. Given establishing convergent validity, the latent variable's AVE was evaluated by benchmarking it against 0.50 (Hair *et al.*, 2012). The results in Table 2 also showed that the AVE values exceeded 0.50. More so, since the values of CR and AVE were above the acceptable threshold, we concluded that it was not prudent to remove any indicator used in measuring the latent variables in our model that ranges from 0.4 to 0.7 (Amoako *et al.*, 2023; Kyei-Frimpong *et al.*, 2022).

Finally, the discriminant validity was assessed using the Fornell-Larcker and heterotrait-monotrait (HTMT) ratio criteria. According to Fornell and Larcker's (1981) criteria, the inter-correlations of the variables should be less than the square root of the AVE. This claim is thus supported by the results revealed in Table 3. Following Henseler *et al.*'s (2015) HTMT<sub>0.85</sub> criterion that values less than 0.85 are acceptable, discriminant validity was further confirmed. This is because the values as reported in Table 3 are less than the recommended threshold.

The results in Table 4 present the descriptive statistics (means, standard deviations, skewness and Kurtosis) and correlations of the study constructs. From the same Table 4, the results showed that Green HRMPs are positively related to GI ( $r = 0.406, p < 0.01$ ), EP ( $r = 0.302, p < 0.01$ ), SP ( $r = 0.320, p < 0.01$ ) and EnP ( $r = 0.241, p < 0.01$ ). Similarly, the results of the study revealed that GI is also positively related to EP ( $r = 0.483, p < 0.01$ ), SP ( $r = 0.267, p < 0.01$ ) and EnP ( $r = 0.369, p < 0.01$ ) (see Figure 2).

After satisfying the psychometric properties of the study's measurement model, the structural model was assessed using the magnitude and significance of the path coefficient as shown in Figure 2. The bootstrapping procedure with 5,000 resample was utilised. Green HRMPs account for 47.6% of the variance in GI. More so, Green HRMPs and GI combined to account for 48.3%, 64.5% and 47.9% of the variance in EP, SP and EnP, respectively. This present study's values demonstrated predictive relevance since GI, EP, SP and EnP had  $Q^2$  values of 0.010, 0.045, 0.033 and 0.016, respectively. The model for this study reported a composite standardised root mean square residual (SRMR) value of 0.026, which falls below the recommended threshold of 0.07 (Bagozzi and Yi, 2012).

Constructs	Factor loading	$\alpha$	CR	AVE
Green human resource management practices		0.938	0.945	0.503
Green HRMP1	0.767			
Green HRMP2	0.744			
Green HRMP3	0.737			
Green HRMP4	0.818			
Green HRMP5	0.740			
Green HRMP6	0.679			
Green HRMP7	0.772			
Green HRMP8	0.687			
Green HRMP9	0.732			
Green HRMP10	0.633			
Green HRMP11	0.642			
Green HRMP12	0.771			
Green HRMP13	0.708			
Green HRMP14	0.637			
Green HRMP15	0.622			
Green HRMP16	0.662			
Green HRMP17	0.667			
Green innovation		0.857	0.898	0.637
GI1	0.822			
GI2	0.819			
GI3	0.831			
GI4	0.769			
GI5	0.745			
Economic performance		0.848	0.885	0.526
EP1	0.643			
EP2	0.722			
EP3	0.677			
EP4	0.741			
EP5	0.834			
EP6	0.701			
EP7	0.743			
Social performance		0.862	0.893	0.514
SP1	0.709			
SP2	0.777			
SP3	0.778			
SP4	0.795			
SP5	0.754			
SP6	0.570			
SP7	0.597			
SP8	0.721			
Environmental performance		0.856	0.890	0.537
EnP1	0.621			
EnP2	0.745			
EnP3	0.759			
EnP4	0.761			
EnP5	0.750			
EnP6	0.757			
EnP7	0.727			

**Table 2.**  
Confirmatory factor  
analysis among study  
constructs

### *Hypotheses testing*

The result of the hypotheses testing is presented in [Table 5](#). Our results revealed that Green HRMPs significantly predicted EP ( $\beta = 0.434, t = 5.302, p < 0.01$ ) and SP ( $\beta = 0.250, t = 2.268, p < 0.024$ ), indicating support for *H1a* and *H1c*. On the contrary, the results revealed that

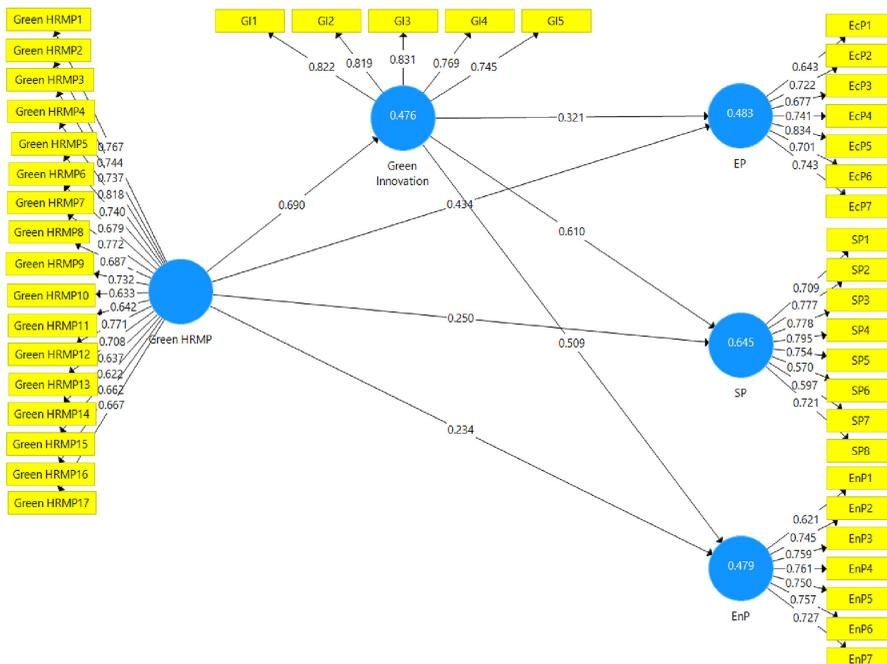
GHRMPs in the mining industry

		1	2	3	4	5
<i>Fornell-Larcker criterion</i>						
1	EP	0.725				
2	EnP	0.679	0.733			
3	Green HRMPs	0.655	0.586	0.709		
4	GI	0.620	0.671	0.690	0.798	
5	SP	0.695	0.572	0.671	0.482	0.717
<i>Heterotrait-Monotrait ratio (HTMT)<sub>0.85</sub> criterion</i>						
1	EP					
2	EnP	0.804				
3	Green HRMPs	0.720	0.635			
4	GI	0.725	0.778	0.763		
5	SP	0.808	0.794	0.738	0.708	

**Table 3.** Discriminant validity among study constructs

		Mean	SD	SK	K	1	2	3	4	5
1	Green HRMPs	5.62	2.558	0.045	1.014	–				
2	GI	3.78	0.945	–0.886	0.970	0.406**	–			
3	EP	4.11	0.868	–1.233	1.061	0.302**	0.483**	–		
4	SP	3.75	0.882	–0.309	–0.560	0.320**	0.267**	0.296**	–	
5	EnP	3.82	0.914	–0.585	0.578	0.241**	0.369**	0.350**	0.389**	–

**Table 4.** Descriptive statistics and correlation among study constructs



**Figure 2.** Final measurement model with standardised item loadings

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics ((O/STDEV))	p-values	Decision
<i>Direct effect</i>						
Green HRMPs → EP	0.434	0.447	0.082	5.302	0.000	Supported
Green HRMPs → EnP	0.234	0.242	0.121	1.941	0.053	Not Supported
Green HRMPs → GI	0.690	0.690	0.060	11.464	0.000	Supported
Green HRMPs → SP	0.250	0.256	0.110	2.268	0.024	Supported
GI → EP	0.321	0.321	0.097	3.299	0.001	Supported
GI → EnP	0.509	0.520	0.097	5.276	0.000	Supported
GI → SP	0.610	0.607	0.082	7.479	0.000	Supported
<i>Mediating effect</i>						
Green HRMPs → GI → EP	0.221	0.221	0.069	3.218	0.001	Partial Mediation
Green HRMPs → GI → SP	0.421	0.420	0.078	5.406	0.000	Partial Mediation
Green HRMPs → GI → EnP	0.352	0.359	0.078	4.534	0.000	Full Mediation
<i>Stoner-Geisser Q<sup>2</sup></i>						
Green innovation		0.010				
Economic performance		0.045				
Social performance		0.033				
Environmental performance		0.016				
SRMR		0.026				

**Table 5.**  
Results of direct and mediating effects

Green HRMPs did not significantly predict EnP ( $\beta = 0.234$ ,  $t = 1.941$ ,  $p > 0.05$ ), indicating non-support for *H1b*. More so, our results revealed that Green HRMPs positively and significantly relate with GI ( $\beta = 0.690$ ,  $t = 11.464$ ,  $p < 0.001$ ), indicating support for *H2*. Nonetheless, the thesis of our study was to investigate GI's mediating role in the association between Green HRMPs and SBP (EP, SP and EnP).

Mackinnon *et al.* (2012) criteria for testing mediating were followed using Smart PLS (Version 4.0). Green HRMPs were found to have a significant effect on GI ( $\beta = 0.690$ ,  $t = 11.464$ ,  $p < 0.001$ ). Also, GI was found to have a significant effect on EP ( $\beta = 0.321$ ,  $t = 3.299$ ,  $p < 0.001$ ), EnP ( $\beta = 0.509$ ,  $t = 5.276$ ,  $p < 0.001$ ) and SP ( $\beta = 0.610$ ,  $t = 7.479$ ,  $p < 0.001$ ). Further, we estimated the indirect effect of Green HRMPs on SBP (EP, SP and EnP) through the mediating variable (GI). The results as shown in Table 5 support the proposition that GI will mediate the association between Green HRMPs and EP ( $\beta = 0.221$ ,  $t = 3.218$ ,  $p < 0.001$ ), SP ( $\beta = 0.421$ ,  $t = 5.406$ ,  $p < 0.001$ ), and EnP ( $\beta = 0.352$ ,  $t = 4.534$ ,  $p < 0.001$ ), indicating support for *H3a*, *H3b* and *H3c*. These findings unveil a nuanced picture of the relationship between Green HRMPs, GI, EP, SP and EnP. Thus, the results indicated a complete mediation (full mediation) effect of GI in the link between Green HRMPs and EnP. This suggests that the implementation of Green HRMPs does not necessarily lead to EnP directly but serves as a catalyst for green innovative business approaches (i.e. GI), which, in turn, significantly enhances and improves firms' EnP. However, the relationships between Green HRMPs and EP as well as SP were characterised by partial mediation. In these

---

instances, Green HRMPs exert a direct influence on firms' EP and SP, while simultaneously influencing these performances indirectly through GI. **GHRMPs in the mining industry**

## Discussion and conclusion

### *Discussion*

Our findings revealed that Green HRMPs significantly predicted EP and SP, indicating support for *H1a* and *H1b*. Interestingly, the prediction that Green HRMPs will significantly predict EnP was not met, indicating non-support for *H1c*. These findings suggest that when mining firms integrate sustainable and environmentally conscious practices within HRM policies, this can lead to better economic outcomes such as being more attractive to investors and customers, leading to better market positions and EP. With respect to the positive impact on SP, the results indicate that Green HRMPs positively affect the mining firms' employees, the local community and other stakeholders. However, the lack of significant prediction of EnP by Green HRMPs could be due to several reasons. First, it could be that the environmental impact of mining is typically extensive and complex; hence Green HRMPs alone may not be sufficient to significantly mitigate the damage caused by large-scale mining operations. Also, there might be a stronger focus and immediate pressure to show improvements in economic and social realms rather than environmental ones, which can sometimes lead to a lag in environmental initiatives or less direct investment in areas that would lead to measurable EnP. These findings lend support to the NRBV theory (Hart, 1995) which posits that firms can gain competitive advantages by reducing their environmental impacts and enhancing their resource efficiencies. This suggests that practices such as environmental training, sustainable work designs and eco-friendly policies are effectively contributing to reducing ecological damage and promoting SBP. Empirically, our findings that Green HRMPs significantly predict EP and SP align with the broader literature. For instance, Shahzad *et al.* (2023) and Al Doghhan *et al.* (2022) found that Green HRMPs lead to improved sustainability outcomes. Similarly, Rana and Arya (2023) and Ogiemwonyi *et al.* (2023) observed that Green HRMPs encourage environmentally friendly behaviours, contributing to overall SBP. This is consistent with the idea that Green HRMPs, such as environmental awareness training, green performance metrics and sustainability-focused employee engagement, directly influence employees' attitudes and behaviours, leading to enhanced environmental stewardship and social responsibility within organisations.

Our findings revealed that Green HRMPs positively and significantly relate to GI, indicating support for *H2*. This implies that adopting environmentally friendly HR practices can contribute to innovation in green initiatives within the mining sector, as this may involve the development and implementation of environmentally sustainable technologies, practices or processes in mining operations. These findings lend support to the NRBV theory (Hart, 1995) and suggest that innovation can be seen as a way of effectively leveraging natural resources in a manner that aligns with environmental sustainability, ensuring the long-term viability of the mining sector. Empirically, our findings are consistent with prior studies that provide further support for the idea that Green HRMPs have a favourable impact on promoting innovation in the context of environmental sustainability (Shah and Soomro, 2023; Song *et al.*, 2020). More so, our findings corroborate with the findings of Al-Swidi *et al.* (2022) who found a positive relationship between green HRM practices and GI. Saudi *et al.*'s (2019) findings provide additional support to this claim, reinforcing the idea that Green HRMPs contribute significantly to the capability of organisations to innovate for sustainability. Similarly, Fang *et al.* (2022) and Malik *et al.* (2021) postulate a positive relationship between Green HRMPs and GI, suggesting that organisations with robust Green HRMPs tend to foster a culture of innovation. Our findings are consistent with these assertions, supporting the idea that Green HRMPs contribute to fostering a culture of innovation for environmental sustainability.

The hypotheses that GI mediates the association between Green HRMPs and SBP (i.e. EnP, EP and SP) were supported, indicating support for *H3a*, *H3b* and *H3c*. Thus, GI partially mediated the relationships between Green HRMPs and EP as well as Green HRMPs and SP. However, GI fully mediated the relationship between Green HRMPs and EnP. These results suggest that while Green HRMPs contribute to better economic and social outcomes, GI is also a necessary component to achieve these results. In other words, simply adopting Green HRMPs is not enough as these need to be coupled with innovative strategies that further these goals. More so, adopting Green HRMPs in the mining industry alone does not lead to improved environmental outcomes but the innovative application of these practices that drives real change. Theoretically, drawing on the NRBV theory, these results suggest that while initial green practices are beneficial, it is the innovative application and extension of these practices that drive substantial improvements in efficiency, cost savings, and community relations. More strikingly, long-term environmental improvements are contingent on a firm's ability to innovate and develop new, sustainable methods and technologies. Empirically, these results corroborate with [Guo et al. \(2020\)](#) assertion that integrating GI leads to the replacement of inefficient processes with more efficient ones, offering firms a competitive edge, reducing costs, and boosting revenue. [Cai and Zhou \(2014\)](#) extend this argument by suggesting that GI meet diverse customer needs, thereby enhancing business value and improving the firm's green reputation. This is in line with the partial mediation observed, where GI serves as a bridge between Green HRMPs, EP and SP, indicating that while Green HRMPs lay the groundwork, the full spectrum of benefits is realised through the implementation of GI. More so, these results unequivocally support the notion that organisations with strong Green HRMPs and GI tend to exhibit better environmental outcomes. This is consistent with prior studies that postulate that effective Green HRMPs coupled with GI lead to reduced waste and emissions, improved energy efficiency and a generally better environmental impact ([Aftab et al., 2023](#); [Awwad Al-Shammari et al., 2022](#); [Rana and Arya, 2024](#)).

#### *Theoretical implications*

Our study makes several theoretical contributions to research. First, the Green HRMPs – sustainable business performance (SBP) (EP, SP and EnP) relationship has been overlooked in the mining sector. Our study fills this research void by demonstrating that Green HRMPs is linked to sustainable business performance (EP, SP and EnP) in the mining sector. This is one of the few studies that have identified green HRMPs as a predictor of sustainable business performance in the mining sector, particularly in the context of Ghana, a sub-Saharan country. Second, our study adds to extant knowledge on Green HRMPs by revealing its influence on GI. Finally, our results expand understanding on Green HRMPs relationship with sustainable performance's (EP, SP and EnP) through GI which is almost non-existent in the Ghanaian mining industry.

#### *Managerial implications*

Our study has several implications for managers and practitioners seeking to enhance SBP through implementing Green HRMPs and fostering GI. First, management of firms in the mining industry should prioritise the implementation of Green HRMPs as a means to drive SBP. This includes incorporating sustainability criteria in performance evaluations, providing training and development in green practices, and involving employees in sustainability initiatives. Thus, by embedding sustainability considerations into HRM practices, organisations can foster a culture of sustainability and enhance employees' awareness and commitment to environmental and social goals. Second, managers who seek to drive SBP should create an organisational climate that values and encourages innovation.

---

This can be done by providing resources and support for green projects, establishing platforms for idea generation and knowledge sharing, and recognising and rewarding employees' contributions to sustainability initiatives. Furthermore, managers in the mining industry must take a holistic and strategic approach to sustainability, recognising the complexities and long-term nature of achieving genuine improvements in SBP. By doing so, they cannot only enhance their firm's economic and social outcomes but also contribute to the larger goal of environmental sustainability and corporate responsibility. More so, by actively supporting and promoting GI efforts, firms in the mining industry can leverage the positive impact of GI on SBP. This may include allocating dedicated resources for GI projects, establishing innovation platforms and networks and integrating sustainability considerations into the innovation process.

#### *Recommendation for future study*

Despite the several contributions of our study, it is not without limitations as in the case of other studies. First, our study focused on organisational-level outcomes of Green HRMPs (i.e. EP, SP and EnP), however, to foster a comprehensive understanding, future research could examine Green HRMPs on individual-level outcomes such as employee green commitment and behaviours and the role of GI in these nexus. Second, even though our study adopted a time-lagged approach in examining the relationships between Green HRMPs, GI and SBP outcomes, there are still some tendencies of inherent CMB issues (Podsakoff *et al.*, 2003). As such, future research can adopt a longitudinal or experimental design to capture the dynamics and changes in these relationships over time as this would also provide a more robust understanding of the causal links between these variables. Finally, our study falls within the positivist (quantitative design) paradigm to establish relationships, however, to provide more in-depth insights into the issues of Green HRM and sustainable outcomes of firms, future research can adopt the interpretivists (qualitative design) or pragmatists (mixed-methods) paradigms.

#### *Conclusion*

All in all, our study provides a comprehensive perspective on the intricate dynamics of Green HRMPs, GI and SBP within the mining industry. Thus, underscoring the potential for organisations to embrace environmentally conscious HRM practices while harnessing the power of innovative technologies, particularly in this current climate action era. As mining firms navigate the complexities of a rapidly changing global landscape, our study offers actionable insights into how organisations can achieve economic success and contribute to environmental sustainability, thus paving the way for a greener and more innovative future. Furthermore, our findings indicate that organisations fostering a culture of innovation and providing resources for green projects are more likely to generate GI towards SBP.

#### **References**

- Adu, I.N., Boakye, K.O., Suleman, A.-R. and Bingab, B.B.B. (2020), "Exploring the factors that mediate the relationship between entrepreneurial education and entrepreneurial intentions among undergraduate students in Ghana", *Asia Pacific Journal of Innovation and Entrepreneurship*, Vol. 14 No. 2, pp. 215-228, doi: [10.1108/apjie-07-2019-0052](https://doi.org/10.1108/apjie-07-2019-0052).
- Aftab, J., Abid, N., Cucari, N. and Savastano, M. (2023), "Green human resource management and environmental performance: the role of green innovation and environmental strategy in a developing country", *Business Strategy and the Environment*, Vol. 32 No. 4, pp. 1782-1798, doi: [10.1002/bse.3219](https://doi.org/10.1002/bse.3219).

- Afzal, C.M., Khan, S.N., Baig, F.J. and Ashraf, M.U. (2023), "Impact of green human resource management on environmental performance: the mediating role of green innovation and environmental strategy in Pakistan", *Review of Applied Management and Social Sciences*, Vol. 6 No. 2, pp. 227-242, doi: [10.47067/ramss.v6i2.311](https://doi.org/10.47067/ramss.v6i2.311).
- Ahakwa, I., Yang, J., Tackie, E.A. and Asamany, M. (2021), "Green human resource management practices and environmental performance in Ghana: the role of green innovation", *SEISENSE Journal of Management*, Vol. 4 No. 4, pp. 100-119, doi: [10.33215/sjom.v4i4.704](https://doi.org/10.33215/sjom.v4i4.704).
- Al Doghan, M.A., Abdelwahed, N.A.A., Soomro, B.A. and Ali Alayis, M.M.H. (2022), "Organizational environmental culture, environmental sustainability and performance: the mediating role of green HRM and green innovation", *Sustainability*, Vol. 14 No. 12, p. 7510, doi: [10.3390/su14127510](https://doi.org/10.3390/su14127510).
- Al-Minhas, U., Ndubisi, N.O. and Barrane, F.Z. (2020), "Corporate environmental management: a review and integration of green human resource management and green logistics", *Management of Environmental Quality: An International Journal*, Vol. 31 No. 2, pp. 431-450, doi: [10.1108/MEQ-07-2019-0161](https://doi.org/10.1108/MEQ-07-2019-0161).
- Albort-Morant, G., Leal-Millán, A., Cepeda-Carrion, G. and Henseler, J. (2018), "Developing green innovation performance by fostering of organizational knowledge and cooperative relations", *Review of Managerial Science*, Vol. 12 No. 2, pp. 499-517, doi: [10.1007/s11846-017-0270-z](https://doi.org/10.1007/s11846-017-0270-z).
- Almemari, K., Almazrouei, R. and Alnahhal, M. (2021), "The impact of green human resource management on the sustainable performance of the manufacturing companies in the Uae", *Journal of Southwest Jiaotong University*, Vol. 56 No. 4, pp. 436-447, doi: [10.35741/issn.0258-2724.56.4.39](https://doi.org/10.35741/issn.0258-2724.56.4.39).
- Al-Swidi, A.K., Al-Hakimi, M.A., Gelaidan, H.M. and Al-Temimi, S.K.A. (2022), "How does consumer pressure affect green innovation of manufacturing SMEs in the presence of green human resource management and green values? A moderated mediation analysis", *Business Ethics, the Environment and Responsibility*, Vol. 31 No. 4, pp. 1157-1173, doi: [10.1111/beer.12459](https://doi.org/10.1111/beer.12459).
- Amoako, E.K., Nubuor, S.A., Suleman, A.R., Abdul Bawa, A. and Akwetey-Siaw, B. (2023), "Mining safely: examining the moderating role of safety climate on mineworkers' mental health and safety behavior nexus", *Kybernetes*, ahead-of-print, doi: [10.1108/K-06-2023-1067/full/html](https://doi.org/10.1108/K-06-2023-1067/full/html).
- Amponsah-Tawiah, K. and Mensah, J. (2016), "Occupational health and safety and organizational commitment: evidence from the Ghanaian mining industry", *Safety and Health at Work*, Vol. 7 No. 3, pp. 225-230, doi: [10.1016/j.shaw.2016.01.002](https://doi.org/10.1016/j.shaw.2016.01.002).
- Amponsah-Tawiah, K., Lartey, J.K.S. and Suleman, A.R. (2023), "Drug abuse and suicidal thoughts among employees: an emerging economy perspective", *Kybernetes*, ahead-of-print, doi: [10.1108/K-12-2022-1706](https://doi.org/10.1108/K-12-2022-1706).
- Anaman, P.D., Ahmed, I.A., Suleman, A.-R. and Dzakah, G.A. (2023), "Environmentally sustainable business practices in micro, small, and medium enterprises: a sub-saharan African country perspective", *Business Perspectives and Research*, ahead-of-print, 227853372311627, doi: [10.1177/22785337231162740](https://doi.org/10.1177/22785337231162740).
- Anlesinya, A. and Susomrith, P. (2020), "Sustainable human resource management: a systematic review of a developing field", *Journal of Global Responsibility*, Vol. 11 No. 3, pp. 295-324, doi: [10.1108/jgr-04-2019-0038](https://doi.org/10.1108/jgr-04-2019-0038).
- Appiah, D.O. and Osman, B. (2014), "Environmental impact assessment: insights from mining communities in Ghana", *Journal of Environmental Assessment Policy and Management*, Vol. 16 No. 04, pp. 1-20, doi: [10.1142/s1464333214500318](https://doi.org/10.1142/s1464333214500318).
- Awwad Al-Shammari, A.S., Alshammrei, S., Nawaz, N. and Tayyab, M. (2022), "Green human resource management and sustainable performance with the mediating role of green innovation: a perspective of new technological era", *Frontiers in Environmental Science*, Vol. 10, 901235, doi: [10.3389/fenvs.2022.901235](https://doi.org/10.3389/fenvs.2022.901235).
- Bagozzi, R.P. and Yi, Y. (2012), "Specification, evaluation, and interpretation of structural equation models", *Journal of the Academy of Marketing Science*, Vol. 40 No. 1, pp. 8-34, doi: [10.1007/s11747-011-0278-x](https://doi.org/10.1007/s11747-011-0278-x).

- 
- Barney, J. (1991), "Firm resources and sustained competitive advantage", *Journal of Management*, Vol. 17 No. 1, pp. 99-120, doi: [10.1177/014920639101700108](https://doi.org/10.1177/014920639101700108).
- Brundtland, G.H. (1987), *Report of the World Commission on Environment and Development: Our Common Future*, World Commission on Environment and Development, New York, United Nations.
- Cai, W.G. and Zhou, X.L. (2014), "On the drivers of eco-innovation: empirical evidence from China", *Journal of Cleaner Production*, Vol. 79, pp. 239-248, doi: [10.1016/j.jclepro.2014.05.035](https://doi.org/10.1016/j.jclepro.2014.05.035).
- Carvalho, F.P. (2017), "Mining industry and sustainable development: time for change", *Food and Energy Security*, Vol. 6 No. 2, pp. 61-77, doi: [10.1002/fes3.109](https://doi.org/10.1002/fes3.109).
- Chiou, T.Y., Chan, H.K., Lettice, F. and Chung, S.H. (2011), "The influence of greening the suppliers and green innovation on environmental performance and competitive advantage in Taiwan", *Transportation Research Part E: Logistics and Transportation Review*, Vol. 47 No. 6, pp. 822-836, doi: [10.1016/j.tre.2011.05.016](https://doi.org/10.1016/j.tre.2011.05.016).
- El-Kassar, A.N. and Singh, S.K. (2018), "Green innovation and organizational performance: the influence of big data and the moderating role of management commitment and HR practices", *Technological Forecasting and Social Change*, Vol. 144 No. 2, pp. 1-16, doi: [10.1016/j.techfore.2017.12.016](https://doi.org/10.1016/j.techfore.2017.12.016).
- Elkington, J. (1994), "Towards the sustainable corporation: win-win-win business strategies for sustainable Development", *California Management Review*, Vol. 36 No. 2, pp. 90-100, doi: [10.2307/41165746](https://doi.org/10.2307/41165746).
- Fang, L., Shi, S., Gao, J. and Li, X. (2022), "The mediating role of green innovation and green culture in the relationship between green human resource management and environmental performance", *Plos One*, Vol. 17 No. 9, e0274820, doi: [10.1371/journal.pone.0274820](https://doi.org/10.1371/journal.pone.0274820).
- Fornell, C. and Larcker, D.F. (1981), "Evaluating structural equation models with unobservable variables and measurement error", *Journal of Marketing Research*, Vol. 18 No. 1, pp. 39-50, doi: [10.1177/002224378101800104](https://doi.org/10.1177/002224378101800104).
- Gołębiewska, A., Jakubczak, W., Prokopowicz, D. and Jakubczak, R. (2021), "The post-pandemic development of the green circular economy and the declarations made during the UN climate change conference (COP26) as security determinants", *European Research Studies Journal*, Vol. 24 No. 4B, pp. 251-275, doi: [10.35808/ersj/2655](https://doi.org/10.35808/ersj/2655).
- Guo, Y., Wang, L. and Yang, Q. (2020), "Do corporate environmental ethics influence firms' green practice? The mediating role of green innovation and the moderating role of personal ties", *Journal of Cleaner Production*, Vol. 266, 122054, doi: [10.1016/j.jclepro.2020.122054](https://doi.org/10.1016/j.jclepro.2020.122054).
- Hair Jr, J.F., Matthews, L.M., Matthews, R.L. and Sarstedt, M. (2017), "PLS-SEM or CB-SEM: updated guidelines on which method to use", *International Journal of Multivariate Data Analysis*, Vol. 1 No. 2, pp. 107-123, doi: [10.1504/ijmda.2017.087624](https://doi.org/10.1504/ijmda.2017.087624).
- Hair, J.F., Ringle, C.M. and Sarstedt, M. (2012), "Partial least squares: the better approach to structural equation modeling?", *Long Range Planning*, Vol. 45 Nos 5-6, pp. 312-319, doi: [10.1016/j.lrp.2012.09.011](https://doi.org/10.1016/j.lrp.2012.09.011).
- Harb, T.H.A.D.N. and Ahmed, S. (2019), "Perceived financial sustainability of tourism enterprises: do green human resource management practices really matter", *Journal of Tourism and Hospitality Management*, Vol. 7 No. 2, pp. 173-185, doi: [10.15640/jthm.v7n2a15](https://doi.org/10.15640/jthm.v7n2a15).
- Hart, S.L. (1995), "A natural-resource-based view of the firm", *Academy of Management Review*, Vol. 20 No. 4, pp. 986-1014, doi: [10.2307/258963](https://doi.org/10.2307/258963).
- Hart, S.L. and Dowell, G. (2011), "Invited editorial: a natural-resource-based view of the firm: fifteen years after", *Journal of Management*, Vol. 37 No. 5, pp. 1464-1479, doi: [10.1177/0149206310390219](https://doi.org/10.1177/0149206310390219).
- Henseler, J., Ringle, C.M. and Sarstedt, M. (2015), "A new criterion for assessing discriminant validity in variance-based structural equation modeling", *Journal of the Academy of Marketing Science*, Vol. 43 No. 1, pp. 115-135, doi: [10.1007/s11747-014-0403-8](https://doi.org/10.1007/s11747-014-0403-8).
-

- 
- Jayabalan, N., Zafir, M.M., Kumar, R.M.H.M., Hayati, Y. and Mai, F.M.B. (2020), "The role of OCBE on green HRM towards performance sustainability", *International Journal of Innovation, Creativity and Change*, Vol. 13 No. 5, pp. 388-399.
- Khurshid, R. and Darzi, M.A. (2016), "Go green with green human resource management practices", *Clear International Journal of Research in Commerce and Management*, Vol. 7 No. 1, pp. 19-21.
- Küçüköğlü, M.T. and Pinar, R.İ. (2015), "Positive influences of green innovation on company performance", *Procedia-Social and Behavioral Sciences*, Vol. 195 No. 195, pp. 1232-1237, doi: [10.1016/j.sbspro.2015.06.261](https://doi.org/10.1016/j.sbspro.2015.06.261).
- Kyei-Frimpong, M., Nyarko Adu, I., Suleman, A.R. and Owusu Boakye, K. (2022), "In search of performance-oriented leadership behaviours in the Ghanaian financial service sector: the role of knowledge sharing", *Journal of Work-Applied Management*, Vol. 14 No. 2, pp. 272-287, doi: [10.1108/jwam-01-2022-0001](https://doi.org/10.1108/jwam-01-2022-0001).
- Kyei-Frimpong, M., Kodwo Amoako, E., Akwetey-Siaw, B., Owusu Boakye, K., Nyarko Adu, I., Suleman, A.R. and Abdul Bawa, A. (2023), "Employee empowerment and organizational commitment among employees of star-rated hotels in Ghana: does perceived supervisor support matter?", *Journal of Work-Applied Management*, ahead-of-print, doi: [10.1108/JWAM-05-2023-0038](https://doi.org/10.1108/JWAM-05-2023-0038).
- Kyriakopoulos, G.L. (2021), "Environmental legislation in European and international contexts: legal practices and social planning toward the circular economy", *Laws*, Vol. 10 No. 1, pp. 1-15, doi: [10.3390/laws10010003](https://doi.org/10.3390/laws10010003).
- Likhitkar, P. and Verma, P. (2017), "Impact of green HRM practices on organization sustainability and employee retention", *International Journal for Innovative Research in Multidisciplinary Field*, Vol. 3 No. 5, pp. 152-157.
- Litvinenko, V.S. (2020), "Digital economy as a factor in the technological development of the mineral sector", *Natural Resources Research*, Vol. 29 No. 3, pp. 1521-1541, doi: [10.1007/s11053-019-09568-4](https://doi.org/10.1007/s11053-019-09568-4).
- MacKinnon, D.P., Coxé, S. and Baraldi, A.N. (2012), "Guidelines for the investigation of mediating variables in business research", *Journal of Business and Psychology*, Vol. 27, pp. 1-14, doi: [10.1007/s10869-011-9248-z](https://doi.org/10.1007/s10869-011-9248-z).
- Malik, M.S., Ali, K., Kausar, N. and Chaudhry, M.A. (2021), "Enhancing environmental performance through green HRM and green innovation: examining the mediating role of green creativity and moderating role of green shared vision", *Pakistan Journal of Commerce and Social Sciences (PJCSS)*, Vol. 15 No. 2, pp. 265-285.
- Miller, R.L. and Brewer, J.D. (2003), *The AZ of Social Research: A Dictionary of Key Social Science Research Concepts*, Sage, Thousand Oaks, CA.
- Mousa, S.K. and Othman, M. (2020), "The impact of green human resource management practices on sustainable performance in healthcare organisations: a conceptual framework", *Journal of Cleaner Production*, Vol. 243, 118595, doi: [10.1016/j.jclepro.2019.118595](https://doi.org/10.1016/j.jclepro.2019.118595).
- Muafi, M., Syafri, W., Prabowo, H. and Nur, S.A. (2021), "Digital entrepreneurship in Indonesia: a human capital perspective", *The Journal of Asian Finance, Economics and Business*, Vol. 8 No. 3, pp. 351-359.
- Muisyo, P.K., Qin, S., Ho, T.H. and Julius, M.M. (2022), "The effect of green HRM practices on green competitive advantage of manufacturing firms", *Journal of Manufacturing Technology Management*, Vol. 33 No. 1, pp. 22-40, doi: [10.1108/JMTM-10-2020-0388](https://doi.org/10.1108/JMTM-10-2020-0388).
- Mustafa, F., Arshad, S., Iqbal, A. and Khan, S.N. (2022), "The influence of green HRM on environmental performance: the mediating effect of green innovation and moderating effect of environmental strategy", *International Journal of Business and Economic Affairs*, Vol. 7 No. 4, pp. 34-44, doi: [10.24088/ijbea-2022-74003](https://doi.org/10.24088/ijbea-2022-74003).
- Mutti, D., Yakovleva, N., Vazquez-Brust, D. and Di Marco, M.H. (2012), "Corporate social responsibility in the mining industry: perspectives from stakeholder groups in Argentina", *Resources Policy*, Vol. 37 No. 2, pp. 212-222, doi: [10.1016/j.resourpol.2011.05.001](https://doi.org/10.1016/j.resourpol.2011.05.001).

- 
- Ogiemwonyi, O., Alam, M.N. and Alotaibi, H.S. (2023), "Pathways toward environmental performance: link between green human resource management, green innovation, and green behavior at work in manufacturing companies", *Journal of Cleaner Production*, Vol. 425, 138949, doi: [10.1016/j.jclepro.2023.138949](https://doi.org/10.1016/j.jclepro.2023.138949).
- Podsakoff, P.M., MacKenzie, S.B., Lee, J.Y. and Podsakoff, N.P. (2003), "Common method biases in behavioral research: a critical review of the literature and recommended remedies", *Journal of Applied Psychology*, Vol. 88 No. 5, pp. 879-903, doi: [10.1037/0021-9010.88.5.879](https://doi.org/10.1037/0021-9010.88.5.879).
- Rana, G. and Arya, V. (2024), "Green human resource management and environmental performance: mediating role of green innovation—a study from an emerging country", *Foresight*, Vol. 26 No. 1, pp. 35-58, doi: [10.1108/fs-04-2021-0094](https://doi.org/10.1108/fs-04-2021-0094).
- Rehman, M.A., Seth, D. and Shrivastava, R.L. (2016), "Impact of green manufacturing practices on organisational performance in Indian context: an empirical study", *Journal of Cleaner Production*, Vol. 137, pp. 427-448, doi: [10.1016/j.jclepro.2016.07.106](https://doi.org/10.1016/j.jclepro.2016.07.106).
- Saeed, A., Jun, Y., Nubuor, S.A., RasikaPriyankara, H.P. and Jayasuriya, M.P.F. (2018), "Institutional pressures, green supply chain management practices on environmental and economic performance: a two theory view", *Sustainability (Switzerland)*, Vol. 10 No. 5, pp. 1-24, doi: [10.3390/su10051517](https://doi.org/10.3390/su10051517).
- Saudi, M.H.M., Obsatar Sinaga, G. and Zainudin, Z. (2019), "The effect of green innovation in influencing sustainable performance: moderating role of managerial environmental concern", *International Journal of Supply Chain Management*, Vol. 8 No. 1, pp. 303-310.
- Saunders, M.N.K., Lewis, P. and Thornhill, A. (2019), *Research Methods for Business Students*, 8th ed., Pearson, Harlow.
- Seeck, H. and Diehl, M.R. (2017), "A literature review on HRM and innovation—taking stock and future directions", *The International Journal of Human Resource Management*, Vol. 28 No. 6, pp. 913-944, doi: [10.1080/09585192.2016.1143862](https://doi.org/10.1080/09585192.2016.1143862).
- Shah, N. and Soomro, B.A. (2023), "Effects of green human resource management practices on green innovation and behavior", *Management Decision*, Vol. 61 No. 1, pp. 290-312, doi: [10.1108/md-07-2021-0869](https://doi.org/10.1108/md-07-2021-0869).
- Shahzad, M.A., Jianguo, D. and Junaid, M. (2023), "Impact of green HRM practices on sustainable performance: mediating role of green innovation, green culture, and green employees' behavior", *Environmental Science and Pollution Research*, Vol. 30 No. 38, pp. 88524-88547, doi: [10.1007/s11356-023-28498-6](https://doi.org/10.1007/s11356-023-28498-6).
- Sharma, R. and Gupta, N. (2015), "Green HRM: an innovative approach to environmental sustainability", *Proceeding of the Twelfth AIMS International Conference on Management*, pp. 2-5.
- Singh, K. and Kalirajan, K. (2003), "A decade of economic reforms in India: the mining sector", *Resources Policy*, Vol. 29 Nos 3-4, pp. 139-151, doi: [10.1016/j.resourpol.2004.08.001](https://doi.org/10.1016/j.resourpol.2004.08.001).
- Singh, S.K., Del Giudice, M., Chierici, R. and Graziano, D. (2020), "Green innovation and environmental performance: the role of green transformational leadership and green human resource management", *Technological Forecasting and Social Change*, Vol. 150, pp. 1-12, doi: [10.1016/j.techfore.2019.119762](https://doi.org/10.1016/j.techfore.2019.119762).
- Song, W., Yu, H. and Xu, H. (2020), "Effects of green human resource management and managerial environmental concern on green innovation", *European Journal of Innovation Management*, Vol. 24 No. 3, pp. 1460-1060, doi: [10.1108/EJIM-11-2019-0315](https://doi.org/10.1108/EJIM-11-2019-0315).
- Sorensen, P. (2011), "Mining in South Africa: a mature industry?", *International Journal of Environmental Studies*, Vol. 68 No. 5, pp. 625-649, doi: [10.1080/00207233.2011.591242](https://doi.org/10.1080/00207233.2011.591242).
- Stemn, E. (2019), "Analysis of injuries in the Ghanaian mining industry and priority areas for research", *Safety and Health at Work*, Vol. 10 No. 2, pp. 151-165, doi: [10.1016/j.shaw.2018.09.001](https://doi.org/10.1016/j.shaw.2018.09.001).

- Suleman, A.-R., Amponsah-Tawiah, K., Adu, I.N. and Boakye, K.O. (2022a), "The curious case of green human resource management practices in the Ghanaian manufacturing industry; a reality or a mirage?", *Management of Environmental Quality: An International Journal*, Vol. 33 No. 3, pp. 739-755, doi: [10.1108/MEQ-12-2021-0269](https://doi.org/10.1108/MEQ-12-2021-0269).
- Suleman, A.R., Bingab, B.B.B., Boakye, K.O. and Sam-Mensah, R. (2022b), "Job rotation practices and employees performance: do job satisfaction and organizational commitment matter?", *SEISENSE Business Review*, Vol. 2 No. 1, pp. 13-27, doi: [10.33215/sbr.v2i1.730](https://doi.org/10.33215/sbr.v2i1.730).
- Suleman, A.R., Amponsah-Tawiah, K. and Ametorwo, A.M. (2023), "The role of employee environmental commitment in the green HRM practices, turnover intentions and environmental sustainability nexus", *Benchmarking*, ahead-of-print, doi: [10.1108/BIJ-06-2022-0393](https://doi.org/10.1108/BIJ-06-2022-0393).
- Taabazuung, J., Luginaah, I., Djietror, G. and Otiso, K.M. (2012), "Mining, conflicts and livelihood struggles in a dysfunctional policy environment: the case of Wassa West District, Ghana", *African Geographical Review*, Vol. 31 No. 1, pp. 33-49, doi: [10.1080/19376812.2012.690089](https://doi.org/10.1080/19376812.2012.690089).
- Tang, G., Chen, Y., Jiang, Y., Paillé, P. and Jia, J. (2017), "Green human resource management practices: scale development and validity", *Asia Pacific Journal of Human Resources*, Vol. 56 No. 1, pp. 31-55, doi: [10.1111/1744-7941.12147](https://doi.org/10.1111/1744-7941.12147).
- The Ghana Chamber of mines (2020), "2020 mining industry statistics and data", available at: <http://ghanachamberofmines.org>
- Tietze, F., Schiederig, T. and Herstatt, C. (2011), "What is green innovation? –A quantitative literature review", *The XXII ISPIM Conference*.
- Tseng, M.L., Wang, R., Chiu, A.S., Geng, Y. and Lin, Y.H. (2013), "Improving performance of green innovation practices under uncertainty", *Journal of Cleaner Production*, Vol. 40, pp. 71-82, doi: [10.1016/j.jclepro.2011.10.009](https://doi.org/10.1016/j.jclepro.2011.10.009).
- Wagner, M. and Blom, J. (2011), "The reciprocal and non-linear relationship of sustainability and financial performance", *Business Ethics: A European Review*, Vol. 20 No. 4, pp. 418-432, doi: [10.1111/j.1467-8608.2011.01622.x](https://doi.org/10.1111/j.1467-8608.2011.01622.x).
- Wang, C.H. (2019), "How organizational green culture influences green performance and competitive advantage: the mediating role of green innovation", *Journal of Manufacturing Technology Management*, Vol. 30 No. 4, pp. 666-683, doi: [10.1108/jmtm-09-2018-0314](https://doi.org/10.1108/jmtm-09-2018-0314).
- Yildiz Çankaya, S. and Sezen, B. (2019), "Effects of green supply chain management practices on sustainability performance", *Journal of Manufacturing Technology Management*, Vol. 30 No. 1, pp. 98-121, doi: [10.1108/JMTM-03-2018-0099](https://doi.org/10.1108/JMTM-03-2018-0099).
- Zaid, A.A., Jaaron, A.A. and Bon, A.T. (2018), "The impact of green human resource management and green supply chain management practices on sustainable performance: an empirical study", *Journal of Cleaner Production*, Vol. 204, pp. 965-979, doi: [10.1016/j.jclepro.2018.09.062](https://doi.org/10.1016/j.jclepro.2018.09.062).
- Zhou, M., Li, J. and Yang, M. (2023), "Unlocking green growth challenges: role of green HRM, green career adaptability, and green career success", *Environmental Science and Pollution Research*, Vol. 30 No. 53, pp. 113835-113845, doi: [10.1007/s11356-023-30129-z](https://doi.org/10.1007/s11356-023-30129-z).
- Zubair, D.S.S. and Khan, M. (2019), "Sustainable development: the role of green HRM", *International Journal of Research in Human Resource Management*, Vol. 1 No. 2, pp. 1-6, doi: [10.33545/26633213.2019.v1.i2a.11](https://doi.org/10.33545/26633213.2019.v1.i2a.11).

### Corresponding author

Michael Kyei-Frimpong can be contacted at: [k.michael90@yahoo.com](mailto:k.michael90@yahoo.com)

For instructions on how to order reprints of this article, please visit our website:

[www.emeraldgroupublishing.com/licensing/reprints.htm](http://www.emeraldgroupublishing.com/licensing/reprints.htm)

Or contact us for further details: [permissions@emeraldinsight.com](mailto:permissions@emeraldinsight.com)