



Research article

Environmental sustainability among workers in Ghana: The role of green human resource management

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ABSTRACT

The study examined the role of green human resource management (HRM) practices on environmental sustainability (ES) among workers in Ghana. An explanatory research design was adopted for the study. Using a structured questionnaire, data was drawn from 221 workers from various sectors. Data gathered was analysed with Partial Least Square-Structural Equation Modelling. The study found that there is a direct link between green HRM and ES behaviour among workers in Ghana. The novelty of the findings of this study relates to workers' perspectives across multiple sectors in Ghana and is the first study to have applied value alignment theory to argue for green HRM and ES from the Global South. The study offers insights into how organisations in Ghana can integrate sustainable practices into human resource management strategies, fostering a more environmentally conscious workforce and contributing to national, regional and international sustainable development goals.

1. Introduction

Environmental sustainability remains a major global developmental agenda captured under the sustainable development goals (SDGs) guiding the world until 2030 [1]. Six out of the seventeen SDGs are directly crafted to achieve environmental sustainability. These six SDGs (SDGs 6, 7, 11, 12, 13, and 14) focused on clean water and sanitation, affordable and clean energy, sustainable cities and communities, responsible consumption and production, climate action, and finally, life below water. The operations of organisations apart from individual activities are critical in achieving these goals. Businesses in a wide range of industries have realised how important it is to implement eco-friendly practices [2–6]. Human resource management is one area in organisations where this shift toward sustainability is picking up [2,3].

In an effort to build a sustainable workplace and encourage employees to internalise environmental sustainability, green human resource management (green HRM) practices have evolved as a strategic approach to integrating environmental sustainability into the fundamental HRM functions [1,7,8] of organisations. Green HRM encompasses how employers enable environmentally sustainable behaviour of employees at the workplace through various practices to achieve environmental sustainability [8–12]. Green HRM relates to the integration of ecological consciousness into organisational human resource management functions or practices such as job analysis, recruitment and selection, orientation and training, performance appraisal, rewards and compensations, and health and

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safety at work [12,13].

A vast array of tactics and programmes are included in "green HRM practices," which are designed to lessen any negative impact of the organisation's activities on the environment [11,14]. These methods entail incorporating environmental factors into a number of HRM tasks, including performance appraisal, training and development, and recruiting and selection [2,8,10–14] among others. For example, during the hiring and selection process, companies may give preference to applicants who have a track record of environmental sustainability or who possess pertinent expertise in green technologies [15–17]. Programmes for employee training and development can be created to increase environmental awareness and give staff members the know-how and abilities they need to support environmental sustainability initiatives [10,18]. Sustainability practices can be incorporated into regular work routines by encouraging staff through the use of environmental targets and indicators in performance management systems [14–18]. Additionally, it is possible to create incentive and recognition programmes for staff members who actively participate in environmentally friendly practices through salary and incentives systems [19,20]. Green teams and sustainability committees are two examples of employee engagement programmes that can be started to promote employee involvement in environmental conservation efforts [21].

When employees embrace environmentally friendly activities as part of their daily routines, beliefs, and values, it contributes to the environmental sustainability efforts of organisations [21,22]. Thus, organisations should foster an atmosphere that encourages awareness, education, and participation in environmental issues by incorporating sustainability into a variety of HRM tasks. Employees are more likely to embrace these values and apply them to both their personal and professional lives when they see their company's dedication to sustainability demonstrated through Green HRM practices [3,22,23]. Changes in behaviour such as waste reduction, energy conservation, resource use, and environmentally conscious decision-making might result from employees' internalization of environmental sustainability [23,24].

Ghana and its citizens are currently facing serious and several environmental sustainability challenges. Some of these challenges include deforestation and land degradation, water scarcity and pollution, waste management challenges, coastal erosion and degradation, air and water pollution, and biodiversity loss [18,25–27]. Organisations take their resources from the environment and carry out their production in society, so they are intricately connected to those who are responsible for these environmental challenges [25, 26]. These environmental sustainability challenges have very serious short and long-term threats to Ghana's sustainable development agenda and the wellbeing of its citizens [24–27]. Addressing these environmental challenges will require a comprehensive approach involving policy reforms, and efforts of organisations and their workers among others. It is for this reason that this study sought to use organisations and workers in Ghana to examine how the human resource management functions in these organisations could be used to engineer environmental sustainability efforts among organisations and their workers.

Studies [2,12,27–30], have examined the connection between environmental performance and green HRM. These studies have produced conflicting findings about the significant components of green human resource management. Most of these studies were also carried out outside Ghana creating a contextual gap. Meanwhile, it is critical to pinpoint the fundamental parts or components of green HRM practices in order to expedite environmental performance in a developing economy such as Ghana. Ghana, a nation in West Africa, has had rapid economic expansion in recent years but this expansion has not been without a price: as cities and industries grow, pollution, deforestation, and waste management become more of a problem [31]. Ghanaian organisations need to know how internal organisational practices (Green HRM practices) can lessen the environmental effect on the public to attain sustainable environmental growth (Suleman et al., 2023). Studies in Ghana on green human resource management [15,16,32] were also limited to the health, manufacturing, and local government sectors. The study of Adjei-Bamfo et al. (2019) focused on only green recruitment and selection and the study by Ref. [32] was also limited to green hiring, green training, and green compensation.

Furthermore, existing studies from Ghana were conducted from human resource managers' perspectives rather than workers' perspectives. Thus, there is a dearth of studies on green human resource management across sectors as well as incorporating all the functional areas of human resources management from the perspectives of workers in Ghana. To fill this gap, this study sought to examine green human resource management practices and environmental sustainability among workers from education, banking and finance, local governance, sanitation, health, agriculture, and insurance sectors in Ghana. The novelty of this study, therefore, is that it is conducted from both workers' and human resource managers' perspectives across several sectors such as education sanitation utility local governance legal banking and finance, health, agriculture, and insurance unlike the single sector and only human resource managers perspective in earlier studies. Additionally, the study employed the value alignment theory to provide insights into how aligning organisational and employee values through green HRM can promote environmental sustainability in Ghana [33,34].

2. Literature review

2.1. Theoretical review

The value alignment theory employed by Refs. [35,36] to explain how green HRM practices encourage employees' pro-environmental behaviour at work in the New Zealand wine sector, serves as the foundation for this study [37]. Value Alignment theory, according to Refs. [35,36], is related to how employees' attitudes and actions are influenced by an organisation's environmental policies. Because they believe their values are in line with the organisation's, prospective employees who are already devoted to sustainability are likely to be drawn to companies with sustainability initiatives. According to value alignment theory, employees should be selected, trained, and developed with the appropriate values in mind so that they are in line with the organisation's culture [35,36,38]. The theory was used to support this study to argue that organisations in a developing economy like Ghana will need to hire employees who are environmentally conscious to aid their efforts to contribute to environmental sustainability [39]. The value alignment theory in this study was used in this study to argue that organisations that incorporate environmental consciousness in their

human resource management practices (such as green job analysis, green recruitment and selection, green health and safety, green orientation and training, green performance appraisal, green rewards, and compensation) are more likely to influence their workers to be environmentally responsible in their day to day activities in their organisations [37–39].

The rationale for using value alignment theory for this study was basically to ensure that organisations adopt practices that align with employee behaviours that promote the overall environmental sustainability goals of the organization. That is the human resource practices of organisations will foster environmental values and promote sustainable behaviours such as waste reduction, energy conservation, and environmentally-friendly practices. By using value alignment theory as a guiding principle, organisations can integrate environmental sustainability into their HR practices, create a culture of environmental stewardship, and foster employee behaviours that align with the organisation's sustainability goals, ultimately contributing to more effective and impactful green HRM initiatives.

2.2. Conceptual review and hypotheses development

2.2.1. Green human resource management practices and environmental sustainability

The adoption of environmentally friendly tactics and policies inside an organisation's HRM framework is known as "green HRM practices" [11,32]. These procedures include a wide range of HRM tasks, including hiring and selecting employees, managing performance, providing training and development, paying and rewarding employees, and encouraging employee involvement. Green HRM practices are essential for fostering environmental sustainability inside firms [8,11,13,17]. Organisations can foster a sustainable practice culture by integrating environmental considerations into HRM functions. This section discusses the relationship between the various variables of the study as they relate to the study hypotheses.

2.2.2. Relationship between green recruitment and selection (GRS) and green job analysis (GJA)

The connection between Green Recruitment and Selection (GRS) and other Green HRM functional areas is one particular area of study [8]. The process of identifying, assessing, and choosing applicants who have the necessary environmental sustainability knowledge, abilities, and commitment is known as "green recruitment and selection" (GRS) [13]. GRS procedures include asking about candidates' environmental awareness during interviews, evaluating their prior involvement in sustainability-related projects, and putting environmental requirements into job ads [17]. Organisations using GRS techniques tend to draw individuals who are more driven by sustainability and environmental consciousness [40]. Meanwhile, the success of green HRM also depends on green job analysis that leads to job descriptions and specifications that are environmentally sensitive. Despite the relevance of GRS in literature, much is not known about how it relates to GJA across sectors from the developing economy and workers' perspectives. For this reason, the study hypothesised that:

H1. Green job analysis (GJA) has a statistically significant relationship with green recruitment and selection (GRS) among Ghanaian organisations.

2.2.3. Relationship between green recruitment and selection and green performance appraisal

Green recruitment and selection can also relate to green performance appraisal (GPA) where environmental sustainability indicators are part of the performance evaluation of employees. Organisations can incentivise staff members to match their aims with sustainability objectives by integrating environmental performance indicators into performance management systems. Organisations using GRS techniques demonstrate better environmental performance [41]. Thus, GRS could impact directly green orientation and training programmes. Green recruitment and selection is also connected to green training and development or orientation and training (GOT). GRS-selected staff members are more likely to have a foundational grasp of environmental sustainability, which facilitates the provision of specialized training by organisations. According to Ref. [8], companies with robust GRS procedures have better success rates when it comes to educating staff members during orientation and training about green initiatives, which improves environmental performance. Despite the importance of GRS and GPA in literature, it is not clear how the two relate across sectors in a developing economy and from both the human resource managers' and workers' perspectives. It is for this reason that this study hypothesised that:

H2. Green recruitment and selection (GRS) has a statistically significant relationship with greenperformance appraisal (GPA) among Ghanaian organisations.

2.2.4. Relationship between green recruitment and selection and green health and safety (GHS)

Health and safety (Green Health and Safety- GHS) is also another functional area that can be influenced by green recruitment and selection [42]. Organisations could be more successful with imbibing environmental sustainability or consciousness of health and safety for both workers themselves and the general public if they hired employees who are inclined towards environmental sustainability (Renwick et al., 2013). Thus, green health and safety (GHS) could have a direct relationship with green recruitment and selection (GRS) [42]. Existing literature in recent times on the relationship between GRS and GHS remained a conceptual review lacking the empirical findings on the two variables that interact across sectors in a developing economy. Thus, this study hypothesised that:

H3. Green recruitment and selection (GRS) has a statistically significant relationship with greenhealth and safety practices (GHS) among Ghanaian organisations.

2.2.5. Relationship between green recruitment and green orientation and training

Though employees are hired based on certain qualities and competencies, they are required to be further trained regularly by their employers due to technological, social and economic change and competition [8]. Thus, green orientation and training relate to incorporating environmental sustainability activities in the training and orientation contents developed for new and existing employees [43,44]. It is believed that if hired employees already have respect for environmental sustainability and their personal value systems, training them becomes easier and better [43]. Additionally, organisations that ensure that they hire people who are environmentally sound and are willing to contribute positively towards the environmental sustainability of their organisation are also easily trained to imbibe environmental sustainability policies of their organisations [42]. The existing studies on the relationship between GOT and GRS have largely been conceptually reviewed [8], and conducted in developed economies [42,43]. To fill the gap in developing economies and across sectors, this study hypothesised that:

H4. Green recruitment and selection (GRS) have a statistically significant relationship with greenorientation and training (GOT) among Ghanaian organisations.

2.2.6. Relationship between green recruitment and selection and green rewards and compensation (GRC)

Reward and Compensation (Green rewards and compensation-GRC) is another functional area of HRM that could be impacted by GRS. Workers who actively contribute to sustainability initiatives could frequently receive praise and awards for their achievements. Organisations using GRS practices are more likely to have compensation systems that encourage environmentally friendly behaviour, which boosts employee motivation and engagement [44,45]. Thus, workers are likely to repeat environmental sustainability behaviours now and in the future if their efforts are adequately rewarded by management [42]. Alternatively, workers are likely going to be discouraged and refuse to contribute positively towards their work environment by adopting environmentally irresponsible behaviours if their previous environmentally sustainable efforts are not recognised and adequately rewarded. This is because inadequate rewards or lack of recognition by management could suggest to workers that their efforts or behaviour is not valued by the organisation [43]. All existing studies were carried out outside Ghana and in developed economies in only one sector. Thus there is a need to know how these two variables relate across multiple sectors from a developing economy perspective. For this reason, the study hypothesised that:

H5. Green recruitment and selection (GRS) have a statistically significant relationship with greenrewards and compensation (GRC) among Ghanaian organisations.

2.2.7. Relationship between green health and safety (GHS) and environmental sustainability (ES)

It is not enough to compel employers to ensure that the work environment is free from danger and risk for workers [46,47]. Workers are also required to ensure that personal protective equipment and standard operation procedures are followed or adhered to Refs. [43, 44]. The relationship between green health and safety and environmental sustainability suggests that organisations that inculcate environmental consciousness in their workers towards their work environment will enhance their general environmental sustainability effort towards the ecological environment. Meanwhile, the existing study focused on measuring the scale for green health and safety and environmental sustainability [43,44] without considering the relationship between the two variables. It is for this reason that this study hypothesised that:

H6. Green health and safety (GHS) have a statistically significant relationship with environmental sustainability (ES) practices among Ghanaian organisations

2.2.8. Relationship between orientation and training (GOT), and environmental sustainability (ES)

Orientation and training programmes for employees (Training and Development) can be linked to the environmental sustainability efforts of organisations (Green orientation and training-GOT) [43]. The main goals of green HRM practices in orientation and training (GOT) are to increase employee awareness and give them the skills and information they need to participate in sustainable activities [8]. According to Ref. [41], companies with green training programmes investments perform better environmentally. Employees who participate in training programmes have a better awareness of sustainability concerns and can make valuable contributions to environmental sustainability projects. Existing studies have focused on just one sector at a time lacking a holistic view of the relationship between GOT and ES across sectors in a developing economy. Thus, this study hypothesised that:

H7. Green orientation and training (GOT) have a statistically significant relationship with environmental sustainability (ES) practices among Ghanaian organisations.

2.2.9. Relationship between green orientation and training (GOT) green performance appraisal (GPA)

Performance appraisal, orientation and training are all important human resource management practices [48–52]. The former ensures that employees' competencies are enhanced either through on-the-job or off-the-job methods to enable them to perform their present and future jobs; while the latter relates to regularly monitoring and measuring the performance of workers to determine the need for further training, promotion and raise pay among others [42,43]. The relationship between the two variables (GOT and GPA) suggests that organisations that ensure that their workers are oriented and trained on environmental sustainability issues in addition to their technical skills stand the chance to better influence both work performance and compliance towards organisational environmental initiatives by their workers during appraisal of their workers. It also suggests that workers who are introduced to green environmental issues during training and orientations will measure well on such issues during performance appraisal as compared to

their counterparts who did not. Meanwhile, the existing literature [42,43] only addressed measurement items or scales for the two variables. Thus, to empirically establish a relationship between GOT and GPA, this study hypothesised that:

H8. Green orientation and training (GOT) have a statistically significant relationship with green performance appraisal (GPA) among Ghanaian organisations.

2.2.10. Relationship between green performance appraisals (GPA) and environmental sustainability (ES)

Another human resource functional area that can be linked to environmental sustainability efforts is performance appraisal (GPA) [32]. Using green performance appraisal entails evaluating employee performance using environmental targets and indicators [32]. Organisations having performance management systems in line with environmental goals appear to perform better environmentally [45]. Organisations can encourage employees to incorporate sustainable practices into their everyday work routines by connecting performance evaluations to sustainability objectives [11,12,32]. To contribute to the debate from the developing economy and across sectors as well as human resource managers and workers' perspectives, this study hypothesised that:

H9. Green performance appraisals (GPA) have a statistically significant relationship with environmental sustainability (ES) practices among Ghanaian organisations.

2.2.11. Relationship between green rewards and compensation (GRC) and environmental sustainability (ES)

Rewards and compensations (Pay and Benefits) can also relate to the environmental sustainability efforts of organisations (Green rewards and compensation-GRC). Green HRM rewards and compensation include identifying and rewarding staff members who actively participate in eco-friendly activities. [4] posit that employee enthusiasm and engagement in sustainability initiatives are stronger in companies with green compensation systems. Employers can help staff members understand the value of environmental sustainability by encouraging green conduct and rewarding such behaviours. It is for these reasons that this study hypothesised that:

H10. Green rewards and compensation (GRC) has a statistically significant relationship with environmental sustainability (ES) practices among Ghanaian organisations

Based on the conceptual and theoretical theory guiding this study, a conceptual framework was carved to guide this study as presented in Fig. 1.

3. Methods and materials

The entire methodology was guided by existing studies using PLS-SEM [53–55] and the recommended process is presented in Fig. 2

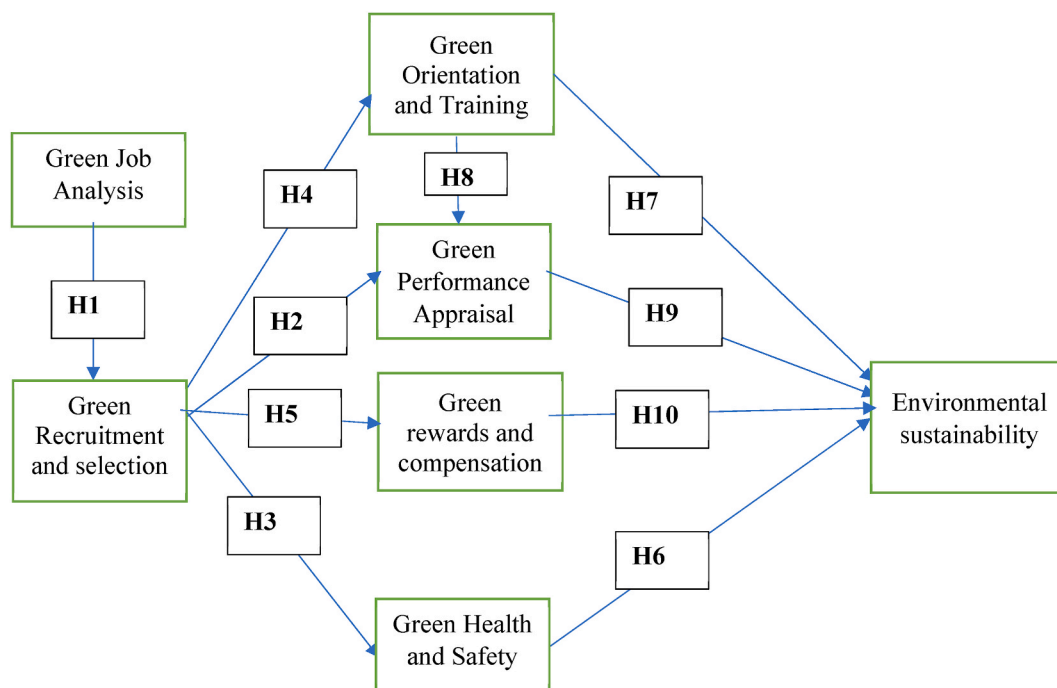


Fig. 1. Conceptual framework showing the relationship between green human resource management practices and environmental sustainability. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

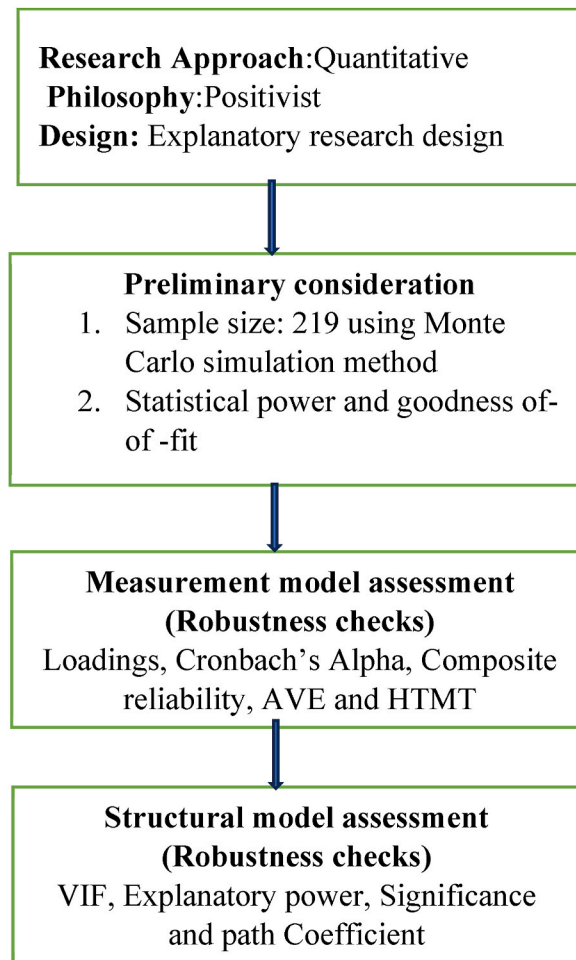


Fig. 2. Methodological processes adopted for this study.

of this study. This study was rooted in the positivist philosophical position with the quantitative approach and specifically underpinned by the explanatory research design. The explanatory research design helped to explain why and how organisations in Ghana adopt green human resource management practices. Furthermore, the explanatory research design also helped to ascertain the effect of the adoption of green human resource management practices on the environmental sustainability efforts of organisations in Ghana from workers' perspective. To estimate the sample size for PLS-SEM analysis, the study used the Monte Carlo simulation method [56,57]. The justification for using the Monte Carlo simulation method as compared to simpler methods like the inverse square root or minimum R-squared methods, was that the latter provides a more accurate and robust minimum sample size [55–57]. This is because the Monte Carlo simulation method takes into account the specific characteristics of the PLS-SEM model, including the expected effect sizes and the desired statistical criteria [56,57]. In this study, Maximum number of independent variables pointing at a construct = 11, Expected R-squared (R^2) = 0.29, Desired statistical power = 0.95, Significance level (α) = 0.05 and Target proportion of successful simulations = 0.95. Through the iterative Monte Carlo simulation process, the minimum sample size required to achieve a statistical power of 0.95, a significance level of 0.05, and an expected R-squared of 0.29 with a maximum of 11 independent variables pointing at a construct is 219.

Data was collected from a sample of 219 respondents from the public sector of Ghana. The sample of 219 respondents came from a variety of sectors, including education, banking and finance, local governance, sanitation, health, agriculture, and insurance. The stratified sampling technique and simple random sampling techniques were deployed for this study to cater for several sectors in this study and to also ensure that all respondents had equal chances of being selected for this study.

The data collection was done with a structured questionnaire converted into a Google form softcopy questionnaire distributed to respondents in various sectors of the Ghanaian economy. The questionnaire used was measured on a four-point scale—1 = strongly disagree, 2 = disagree, 3 = agree, and 4 = highly agree. Since the goal of the study was for each respondent to express their agreement or disagreement with the items/questions, a four-point Likert scale was utilized rather than the five-point Likert scale for measurement with a neutral option. Furthermore, since a neutral/unsure response cannot fall under either of the two extremes (agree or disagree), the neutral or undecided response may also have an impact on the mean values or outcomes that are obtained. This explained why the

four-point was used instead of the five-point scale. There were two main sections to the questionnaire: questions about the ten hypotheses that guided the study and demographic information about the respondents. The Cronbach Alpha coefficient was utilized to assess the instrument's validity and reliability. All variables met the minimum coefficient criterion of 0.70 [58–61]. All items measuring the dimensions of green human resource management practices as shown in Table 1 were adapted from Ref. [43] and items measuring environmental sustainability were also adapted from Ref. [44]. See Table 1.

The study observed all necessary research ethics including respondents' free consent, anonymity, confidentiality, and the ability to withdraw even after they had started the process. The Office of the Provost of the College of Distance Education granted permission for this study to be carried out on behalf of the Institutional Review Board of the University of Cape Coast with the number. CoDE/ASSP/R.1/VL.1/3. In terms of informed consent, this study was carried out during the locked-down period of the COVID-19 pandemic when most of the respondents in this study were at home and written consent could not be obtained. For this reason, the study made use of a Google form questionnaire (the approved questionnaire was converted into a Google form questionnaire) forwarded to respondents individually and these respondents had the freedom to either participate in the study by responding to the Google questionnaire or not since the handset/mobile phone was their own property. The link to the questionnaire was <https://forms.gle/XwZNkLuFshLasuLW6>.

Partial least squares-structural equation modelling (PLS-SEM) was used to analyse the hypotheses. All preliminary analyses in terms of reliability and validity (using Cronbach's Alpha, rho_A, Composite Reliability, and Average Variance Extracted), discriminant validity (using the Fornell-Larcker Criterion), and multicollinearity presence (using the inner value inflated factor) were checked for the PLS-SEM before the main path relationship was established for the hypotheses guiding the study. The reason for using PLS-SEM was that PLS-SEM is a second generation of multivariate analysis techniques which combines various techniques available in the first generation of multivariate analysis (factor analysis, regression and correlation (Hair et al., 2012). PLS-SEM is preferred over SPSS because of its robustness for testing all variables simultaneously and is more flexible to either large or small sample sizes.

4. Results and findings

In this part, the results are presented in two ways. The study's primary hypotheses and the respondents' demographic features.

4.1. Demographic characteristics of respondents

Two sets of results are provided: the primary findings for the research hypotheses and demographic information about the participants. Table 2 displays the results for the respondents' demographic attributes. The findings showed that the majority of respondents were male (57.0 %), were between the ages of 31 and 40 (56.6 %), worked in the education sector (23.1 %), had one to five years of experience in their respective fields (50.2 %), and held non-managerial positions (62.4 %).

4.2. Preliminary analysis

Several preliminary analyses before the main path analysis were conducted to analyse the hypotheses guiding the study. The first preliminary analysis conducted was to check for the loading of each item measuring each variable of the study and the results are presented in Table 3 and Fig. 3. The loadings in both Table 3 and Fig. 3 revealed that all the items used to measure the seven variables of the study loaded well since their values obtained were above the 0.70 minimum thresholds established for this study based on the suggestion of [52].

The next preliminary analysis conducted was to check for the Construct Reliability and Validity of the seven variables of the study using four indices and the results are presented in Table 4. A minimum threshold of 0.70 and 0.50 was established to guide the interpretation of the results respectively for the first three indices (Cronbach's Alpha, rho_A, Composite Reliability) and the last indices- Average Variance Extracted (AVE). The results obtained for the first three indices were between 0.815 and 0.943 for Cronbach's Alpha, 0.816 and 0.945 for rho_A, and 0.891 and 0.951 for Composite Reliability. Values obtained for the last indicator were also between 0.637 and 0.731. The results suggest that all the values were above the minimum threshold suggesting that the model (PLS-SEM) attained the Construct Reliability and Validity status.

Table 1
Sources of measurement scale used for items forming the variables of the study.

s/n	Variable	Source
1	Dimensions of green human resource management items	[43]
1a	Green health and safety	[43]
1b	Green job analysis	[43]
1c	Green orientation and training	[43]
1d	Green performance appraisal	[43]
1e	Green rewards and compensations	[43]
1f	Green recruitment and selection	[43]
2	Environmental sustainability items	[44]

Table 2
Demographic characteristics of respondents.

Variables	No.	%
Sex		
Male	126	57.0
Female	93	43.
Total	219	100.0
Age		
20–30	57	26.1
31–40	123	56.1
41–50	30	13.7
51 Years and Above	9	4.1
Total	219	100.0
Sector of Employment		
Education	49	22.5
Sanitation	6	2.7
Utility	16	7.3
Local Governance	28	12.8
Legal	44	20.0
Banking And Finance	31	14.1
Health	9	4.1
Agriculture	9	4.1
Insurance	5	2.3
Others	22	10.1
Total	219	100.0
Tenure		
1–5 Years	109	49.8
6–10 Years	46	21.0
11 Years And Above	64	29.2
Total	219	100.0
Status of Position		
Management	83	37.9
Non-Management	136	62.1
Total	219	100.0

Source: Field data (2023)

4.3. Discriminant validity

Another preliminary analysis conducted was to check for the discriminant validity and the analysis was conducted using the Fornell-Larcker Criterion and **Heterotrait-Monotrait Ratio** and the results are presented in [Table 5](#). The results revealed that all the values obtained were below the maximum threshold of 0.850 suggested by [58] guiding the interpretation of this result. The results therefore mean that the PLS-SEM model established for this study attained the discriminant validity status.

4.4. Collinearity Statistics

The last preliminary analysis conducted for the study was to check for the presence of multicollinearity using the inner variance inflated factor (VIF) and a threshold of 3.30 suggested by Ref. [58]. The results of the multicollinearity analysis are presented in [Table 6](#). The results revealed that all values obtained were between 1.000 and 3.20 which were below the maximum threshold. This means that the PLS-SEM used was without the presence of multicollinearity which suggests that the data can be used for inferential analysis.

4.5. Path analysis for the hypotheses testing

The main results for testing the hypotheses of the study are presented in [Table 7](#). Out of the ten direct hypotheses established to guide this study, two were rejected and eight were accepted because of the significance and non-significance relationship established for these hypotheses. The results specifically revealed that green job analysis (GJA) was significantly related to green recruitment and selection (GRS) at ($\beta = 0.690$, $t = 18.173$, $p = 0.000$) for the first hypothesis. Hypothesis two also achieves a significant relationship between green recruitment and selection (GRS) and green performance appraisal (GPA) at ($\beta = 0.258$, $t = 2.870$, $p = 0.004$). Green recruitment and selection (GRS) again significantly related to green health and safety (GHS) at ($\beta = 0.658$, $t = 15.205$, $p = 0.000$) for the third hypothesis. Green recruitment and selection (GRS) further related significantly with green orientation and training (GOT) at ($\beta = 0.858$, $t = 40.835$, $p = 0.000$) for the fourth hypothesis and lastly, green recruitment and selection (GRS) established a significant relationship with green rewards and compensation (GRC) at ($\beta = 0.705$, $t = 20.152$, $p = 0.000$) for hypothesis five.

Apart from green recruitment and selection, another variable of concern to this study is green health and safety (GHS) which established a significant relationship with environmental sustainability (ES) at ($\beta = 0.628$, $t = 9.240$, $p = 0.000$) for hypothesis six. Also, green orientation and training (GOT), however, established a non-significant relationship with environmental sustainability (ES)

Table 3
Outer loadings.

	ES	GHS	GJA	GOT	GPA	GRC	GRS
Environmental sustainability							
ES1	0.775						
ES2	0.756						
ES3	0.812						
ES4	0.831						
ES5	0.836						
ES6	0.827						
ES7	0.759						
ES8	0.731						
ES9	0.781						
ES10	0.811						
ES11	0.854						
Green Reward and Compensation							
GRC3						0.859	
GRC4						0.869	
GRC5						0.802	
GRC6						0.819	
Green Health and Safety							
GHS1		0.798					
GHS2		0.869					
GHS3		0.841					
GHS4		0.854					
GHS5		0.879					
Green Job Analysis							
GJA1			0.829				
GJA2			0.845				
GJA3			0.862				
GJA4			0.875				
Green Orientation and Training							
GOT1				0.889			
GOT2				0.829			
GOT3				0.781			
GOT4				0.866			
GOT5				0.844			
Green Performance Appraisal							
GPA1					0.831		
GPA2					0.890		
GPA3					0.843		
GRS1							0.835
GRS2							0.786
GRS3							0.833
GRS4							0.857
GRS5							0.843
GRS6							0.823

Note: ES= Environmental sustainability; GHS= Green Health and Safety; GJA=Green Job Analysis; GOT= Green orientation and training; GPA=Green performance appraisal; GRC=Green rewards and compensations; GRS=Green recruitment and selection.

Source: Field data (2023)

at ($\beta = 0.044$, $t = 0.455$, $p = 0.650$). That notwithstanding, Green orientation and training (GOT) is significantly related to green performance appraisal (GPA) at ($\beta = 0.627$, $t = 7.049$, $p = 0.000$) for hypothesis eight. Green performance appraisal (GPA) is significantly related to environmental sustainability (ES) at ($\beta = 0.257$, $t = 2.013$, $p = 0.045$) for the ninth hypothesis. Lastly, the tenth hypothesis also established that there was a non-significant relationship between green performance appraisal (GPA) and environmental sustainability at ($\beta = 0.031$, $t = 0.376$, $p = 0.707$).

The graphical representation of the significant path relation between the variables of the study is also presented in Fig. 4. The results in Fig. 4 further corroborate the significance and non-significant path relationship obtained with the PLS-SEM model used for this study. The bootstrapping results as presented in Fig. 3 further agree with the suggestion of [55] assertion of using bootstrapping to confirm path relations between variables of a study.

The results of the PLS-SEM ability to explain the variance in the variables of the study are also presented in Table 8. The results revealed that the model used explains approximately 68 percent variance in environmental sustainability, 43 percent variance in green health and safety, and a whopping 74 percent in green orientation and training of employees. Furthermore, the PLS-SEM further contributed to explaining about 74 percent variance in green performance appraisal, 50 percent variance in green rewards and compensation, and lastly 48 percent variance in green recruitment and selection. All values of the R-square were further supported with the R=Square adjusted presented in Table 8.

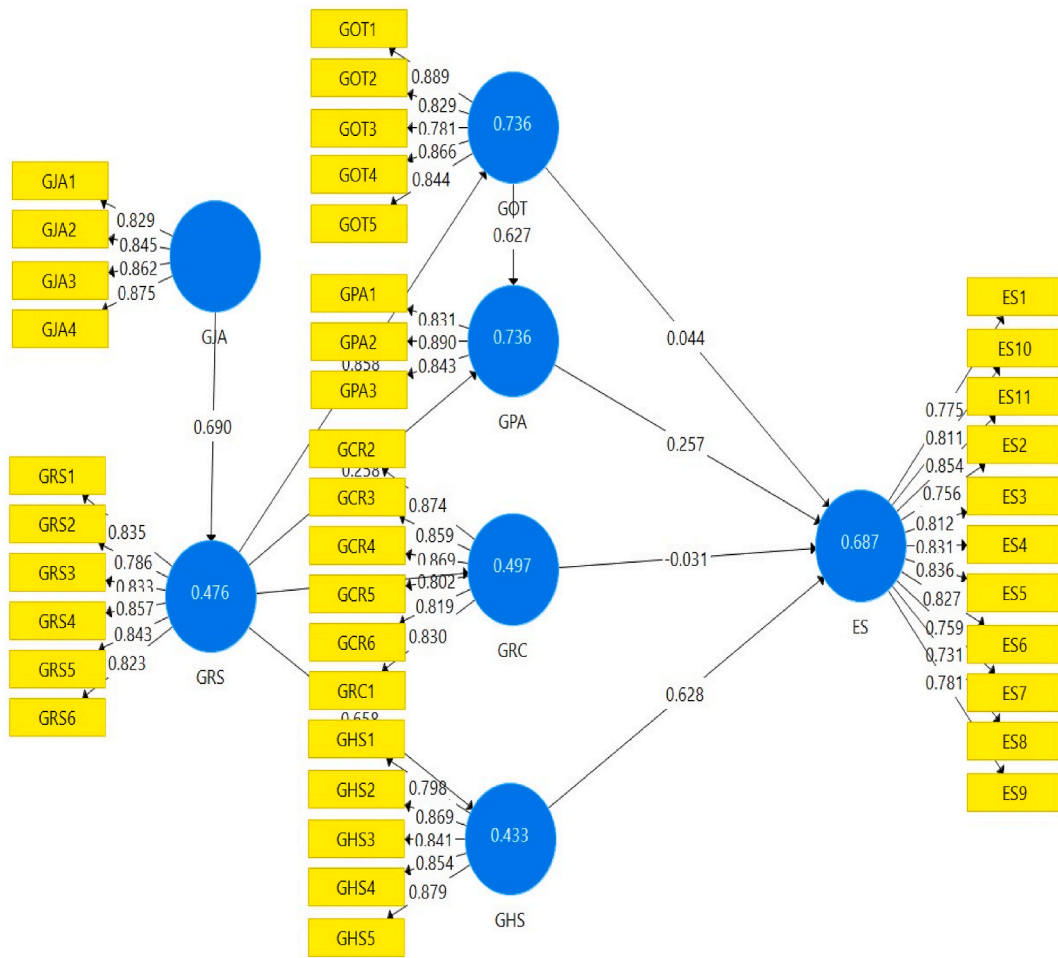


Fig. 3. Item loading for each variable of the study.
Source: Field data (2023)

Table 4
Construct reliability and validity.

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)	Mean	Std. Deviation
ES	0.943	0.945	0.951	0.637	2.68326	0.738020
GHS	0.903	0.908	0.928	0.720	2.6878	0.73068
GJA	0.875	0.876	0.914	0.727	2.5294	0.78352
GOT	0.897	0.901	0.924	0.710	2.5973	0.71082
GPA	0.815	0.816	0.891	0.731	2.6018	0.74150
GRC	0.918	0.921	0.936	0.710	2.5882	0.73091
GRS	0.910	0.910	0.930	0.689	2.6652	0.76640

Note: environmental sustainability; GHS= Green Health and Safety; GJA=Green Job Analysis; GOT= Green orientation and training; GPA=Green performance appraisal; GRC=Green rewards and compensations; GRS=Green recruitment and selection.
Source: Field data (2023)

5. Discussion of results

The first hypothesis established that green job analysis is significantly related to green recruitment and selection of companies in Ghana. The results mean that any percent increase in attention and desire of organisations to incorporate green job analysis in evaluating and designing their jobs will result in the same percentage increase in ensuring that their recruitment and selection will produce workers who are environmentally conscious of their activities in the organisation. Job analysis really determines the job description and the person fit and it is further used for advertising job vacancies. Hence the desire to hire environmentally conscious workers should start by incorporating environmental consciousness activities into the job design and job description. The findings are

Table 5
Fornell-larcker criterion and heterotrait-monotrait ratio (HTMT).

	ES	GHS	GJA	GOT	GPA	GRC	GRS
ES	0.798						
GHS	0.802	0.849					
GJA	0.772	0.741	0.843				
GOT	0.676	0.695	0.697	0.843			
GPA	0.673	0.641	0.675	0.848	0.805		
GRC	0.636	0.691	0.675	0.727	0.783	0.842	
GRS	0.660	0.658	0.690	0.838	0.795	0.705	0.830
Heterotrait-Monotrait Ratio (HTMT)							
	ES	GHS	GJA	GOT	GPA	GRC	GRS
ES							
GHS	0.866						
GJA	0.848	0.829					
GOT	0.730	0.764	0.786				
GPA	0.763	0.742	0.799	0.786			
GRC	0.674	0.748	0.748	0.794	0.828		
GRS	0.708	0.719	0.773	0.749	0.819	0.763	

Source: Field data (2023)

Table 6
Inner VIF values of VIF.

	ES	GHS	GJA	GOT	GPA	GRC	GRS
ES							
GHS	2.258						
GJA							1.000
GOT	3.142				2.788		
GPA	3.200						
GRC	3.074						
GRS		1.000		1.000	2.788	1.000	

Note: ES= Environmental sustainability; GHS= Green Health and Safety; GJA=Green Job Analysis; GOT= Green orientation and training; GPA=Green performance appraisal; GRC=Green rewards and compensations; GRS=Green recruitment and selection.

Source: Field data (2023)

Table 7
Path coefficients.

Hypotheses	Original Sample	Sample Mean	Standard Deviation	T Statistics	P Values	Confidence intervals		f Square
						2.5 %	97.5 %	
1. GJA -> GRS	0.690	0.693	0.038	18.173	0.000	0.614	0.758	0.909
2. GRS -> GPA	0.258	0.253	0.090	2.870	0.004	0.069	0.417	0.066
3. GRS -> GHS	0.658	0.659	0.043	15.205	0.000	0.565	0.740	0.763
4. GRS -> GOT	0.858	0.858	0.021	40.835	0.000	0.807	0.890	2.788
5. GRS -> GRC	0.705	0.706	0.035	20.152	0.000	0.625	0.766	0.988
6. GHS -> ES	0.628	0.627	0.068	9.240	0.000	0.485	0.756	0.558
7. GOT -> ES	0.044	0.068	0.098	0.455	0.650	-0.115	0.254	0.002
8. GOT -> GPA	0.627	0.632	0.089	7.049	0.000	0.458	0.804	0.393
9. GPA -> ES	0.257	0.230	0.128	2.013	0.045	-0.034	0.458	0.047
10. GRC -> ES	0.031	-0.024	0.082	0.376	0.707	-0.186	0.144	0.001

Note: ES= Environmental sustainability; GHS= Green Health and Safety; GJA=Green Job Analysis; GOT= Green orientation and training; GPA=Green performance appraisal; GRC=Green rewards and compensations; GRS=Green recruitment and selection.

in agreement with the findings of Jackson et al. (2018) that green job analysis relates to green recruitment and selection in the workplace. The findings of [40,43] were, however, limited to members of the firm's upper echelon, including the CEO and members of the top management team (TMT) from medical and pesticide-chemical firms. Thus, this study makes a contribution in terms of findings from workers' perspectives and from across sectors.

The findings for the second hypothesis that green recruitment and selection are significantly related to green performance appraisal mean that any percentage increase in green recruitment and selection will lead to the same percentage increase in green performance appraisal. The results further suggest that companies that pay attention to recruiting and selecting new employees who are environmentally conscious stand a better chance of appraising these employees' contribution to environmental sustainability in their organisations. That is, to evaluate/appraise an employee's contribution to environmental sustainability should be rooted in the

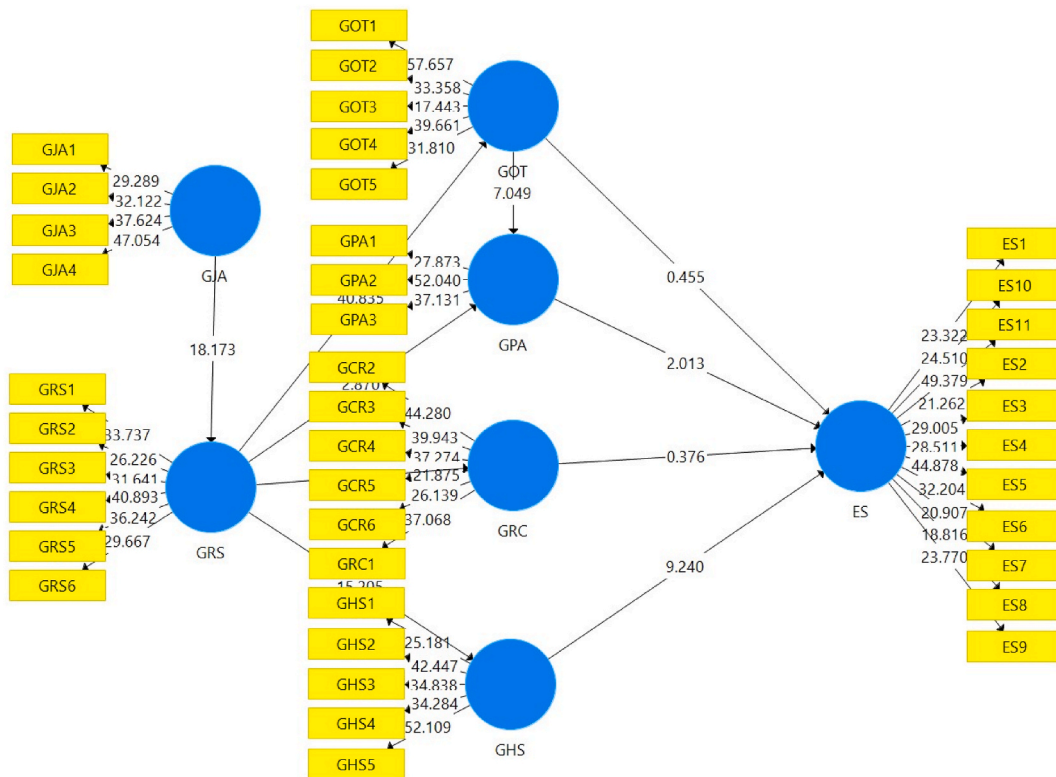


Fig. 4. Bootstrapping.

Table 8
variance explained by the model.

	R Square	R Square Adjusted
ES	0.687	0.681
GHS	0.433	0.430
GOT	0.736	0.735
GPA	0.736	0.734
GRC	0.497	0.495
GRS	0.476	0.474

Source: Field data (2023)

recruitment and selection procedure that produces environmentally conscious employees. Though the study of [8,32] also established the significance of green recruitment and selection (green hiring), it was rather linked to innovative work behaviour in the health sector among others. This study therefore contributes by linking green recruitment and selection to green performance appraisal across sectors from workers’ perspectives.

The third hypothesis revealed that green recruitment and selection are significantly related to green health and safety at the workplace. The results mean that environmental safety for workers, customers, and the general public at the workplace is closely related to how new employees are recruited and selected in organisations. That is environmentally conscious applicants hired are better placed to ensure green health and safety in the work environment for the benefit of themselves and the general public. The findings of this study remained a contribution to knowledge since these findings are missing in the existing literature. The study of [11, 12] conceptualised and analysed green human resource management practices as a variable without examining the individual elements or practices as analysed in this study across sectors from the perspectives of workers in Ghana. The studies of [32,42] were also conceptual reviews without empirical findings for these variables.

The fourth hypothesis also revealed that green recruitment and selection significantly influenced green orientation and training of employees. This result means that any percentage increase in ensuring that new employees hired by organisations have some level of environmental consciousness will result in the same percentage increase in successfully orienting and training such workers on environmental sustainability issues in their operations. Alternatively, it will be very daunting for employers to imbibe environmental sustainability issues in their workers during orientation and training sessions if these employees are not environmentally conscious during the hiring process. This is because characters formed are very difficult to change or modify and organisations interested in

environmental sustainability will need to bring on board like-minded people and continue to train them on such important environmental sustainability issues. Though [41] used the process model to establish green recruitment and selection are significantly related to green training in India, this study contributes with the use of value alignment theory to establish that green recruitment and selection relates to green orientation and training among workers in the Global South. The findings of [43,44] also only revealed potent items for measuring these variables without establishing a significant relationship between them as established by this study.

It is important to note again that green recruitment and selection are significantly related to green rewards and compensation for the fifth hypothesis of the study. The results revealed that compensating and rewarding employees for their contribution to environmental sustainability is significantly influenced by green recruitment and selection. That is, a hiring process that pays attention to environmentally conscious employees stands a better chance of motivating employees to contribute more to environmental sustainability through compensation and rewards systems [45]. found similar outcomes in the Spanish tourism sector among hotel managers. Thus, this study contributes again across sectors from the Global South that green rewards and compensation systems are significantly influenced by green recruitment. Additionally, the findings of [43,44] on the same variables were only measuring items for scale development without providing statistical significance between the same variables.

Findings for hypothesis six that green health and safety related to environmental sustainability means that any percentage increase in awakening green health and safety consciousness among workers will result in the same percentage increase in environmental sustainability efforts of organisations. Thus, organisations stand a better chance to contribute to environmental sustainability if their workers ensure green health and safety in the workplace. Green health and safety among workers mean the organisation has implemented green practices to minimise environmental health and safety risks in the workplace. Green health and safety at the workplace also suggest that organisation actively promotes employee well-being through the implementation of green health and safety initiatives. The findings of [62] only established that green jobs are associated with health and safety challenges in Europe. Thus, this study makes a contribution to the literature that green health and safety practices result in environmental sustainability among organisations in the Global South.

The non-significant relationship established between green orientation and training and environmental sustainability for hypothesis seven means that green orientation and training do not share its predictive power with environmental sustainability. That is green orientation and training are not enough to predict environmental sustainability probably unless associated with green recruitment and selection. The findings of this study suggest that orienting and training employees who are not environmentally conscious from the onset will not result in environmental sustainability among organisations. The findings, however, disagree with the findings of [17,32] who found a significant relationship between green training and employee innovative behaviour in the health sector of Ghana. The disparity could be due to the fact that this study examined green orientation and training and its relationship with environmental sustainability across sectors from workers' perspectives.

The eighth hypothesis also revealed that green orientation and training significantly influenced green performance appraisal in the workplace. The results mean that evaluating employees on their environmental sustainability contribution through their work-related activities is rooted in exposure and training of these workers on environmental sustainability issues. Organisations that incorporate environmental sustainability issues in their orientation and training programmes for workers will be successful in evaluating these workers' contributions to a green environment. Thus, any percentage change in green orientation and training will result in the same percentage change in green performance appraisal in Ghanaian workplaces. These findings remained one of the significant contributions to the existing literature due to the absence of similar findings in previous studies.

Findings for the ninth hypothesis also revealed that green performance appraisal significantly influenced the environmental sustainability of organisations. These results mean that any significant shift in the efforts of organisations to ensure that their workers are appraised of the environmental sustainability contribution of their work-related activities will lead to the same increase in the efforts of workers to contribute to environmental sustainability. The results mean that workers' awareness that they will be appraised on how their activities in the organisation contribute to environmental sustainability will motivate them to better contribute to the sustainability of the environment. The results of [63] that green performance appraisal relates to environmental sustainability were only established based on data obtained from managerial personnel in the textile industrial sector of Pakistan. This study again contributed to the literature that green performance appraisal relates to environmental sustainability in the Global South across sectors.

The non-significant relationship established between green rewards and compensation and the environmental sustainability of the organisation for the last hypothesis (Hypothesis ten) means that green rewards and compensation are not an adequate predictor of environmental sustainability. The results mean that environmental sustainability cannot just be achieved by promising to reward and compensate employees for contributing to environmental sustainability. Rather organisations should probably spend more on green recruitment and selection, green performance appraisal, and green orientation and training which stand to result in the environmental sustainability of an organisation. The absence of similar findings in the existing literature makes these findings another contribution to knowledge from the Global South.

6. Contribution to knowledge

The novelty of this study lies with its findings that cut across different sectors such as education, banking and finance, local governance, sanitation, health, agriculture, and insurance sectors in the Ghanaian economy as compared to the findings of previous studies that were limited to either health, manufacturing or local government. The second novelty of the outcome of this study is that it is the first study to apply value alignment theory to argue for green HRM and environmental sustainability from the Global South. The last novelty of the findings of this study relates to the nature of the respondents considered in this study. While previous findings were limited to the perspectives of human resource managers, the findings of this study stem from the perspectives of workers.

7. Theoretical and practical implications

The findings of this study have several practical and theoretical implications. The implications of the findings for the value alignment theory by Refs. [35,36] is that organisations will never make progress with environmental sustainability efforts among their workers if this all-encompassing concept and idea are left to chance. That means that a deliberate effort and clear direction in terms of the policy on environmental sustainability by organisations will remain the foundation for attaining environmental sustainability efforts among workers. Meanwhile, the outcome of this study contributes to the value alignment theory that organisations should ensure that they deliberately hire employees who are interested in incorporating environmental sustainability into their daily activities at the workplace. This should reflect in organisations policies on recruitment and selection, job analysis, performance appraisal, orientation and training, rewards and compensation, and health and safety aspects of job design at the workplace.

The practical implication of the findings of this study is that green job analysis and green recruitment and selection remain the bedrock upon which environmental sustainability awareness among workers can be achieved. That is the job design and duties to be performed should be linked to environmental sustainability issues before vacancies are advertised and applicants are hired. The findings of this study further imply that all efforts in green performance appraisal and green orientation and training without recourse to green recruitment and selection will not necessarily lead to environmental sustainability awareness among workers in Ghanaian workplaces.

8. Conclusion, recommendations, limitations and suggestions for further studies

This study examines environmental sustainability among workers in Ghana: the role of green human resource management. The study found that green job analysis is significantly related to green recruitment and selection. The study also found that green recruitment and selection significantly influenced green performance appraisal, green health and safety, green orientation and training, and green rewards and compensations. The study also further concluded that environmental sustainability among workers was significantly related to green health and safety, green performance appraisal, and green orientation and training significantly related to green performance appraisal. Environmental sustainability among workers was however found to have had a non-significant relationship with green orientation and training and rewards and compensations.

Based on the findings of the study, it is therefore recommended that human resource managers in Ghanaian workplaces should pay attention to incorporating green job analysis in their job designs that prioritize environmental sustainability and reduce the negative environmental impact. Organisations should also encourage employees to suggest ways to improve the environmental sustainability of their job roles and regularly review and update job roles to ensure alignment with environmental sustainability goals. It is also recommended that human resource managers should pay attention to green recruitment and selection. That is attention should be given to hiring employees that are environmentally conscious. Thus, criteria on environmental consciousness should be built into the selection devices that will be used to evaluate the suitability of the final candidate to be employed. This is because hiring applicants with environmental consciousness are better trained to be more environmentally responsible employees as compared to other employees who are not environmentally conscious. Human resource managers should further ensure that all other human resource management functions such as performance appraisal, orientation and training, health and safety, and rewards and compensations are incorporated with environmental consciousness (green human resource management practices).

This study is limited to the inter and intra-direct relationship between human resource functions and environmental sustainability without focusing on the mediating or indirect influences or relationships. Thus, further studies can consider the indirect intra and inter-relationship between the functional areas of human resource management and environmental sustainability among workers. This study is limited to green human resource management practices and environmental sustainability among workers in Ghanaian workplaces. It did not examine other functional areas in the organisation. Further studies can consider comparing green human resource management practices with other functional areas such as procurement and marketing functions in organisations. Further studies could also consider comparative studies among workers in Ghana and workers in other countries. This study though was based on the perspectives of workers, it did not examine employees/workers' own personal norms with regard to environmental sustainability apart from what policies and practices are occasioned by organisational hierarchy. Further studies could incorporate employee personal norms in establishing the relationship between green HRM and environmental sustainability.

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Data availability statement

Data for this study can be obtained from <https://forms.gle/p5crmp6Z8iuk4fuN6>.

CRediT authorship contribution statement

Evans Appiah Kissi: Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal analysis, Data curation. **Moses Segbenya:** Writing – review & editing, Writing – original draft, Software, Resources, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **John Oti Amoah:** Writing – review & editing, Writing – original draft, Resources,

Methodology, Investigation.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.heliyon.2024.e33380>.

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