

## Article

# Organizational Environmental Culture, Environmental Sustainability and Performance: The Mediating Role of Green HRM and Green Innovation

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**Abstract:** This study investigated Environmental Sustainability (ES) and Environmental Performance (EP) through the direct and indirect use of Organizational Environmental Culture (OEC). This study focused on top managers, namely, the CEOs and directors of SMEs, along with their middle managers. In this study, the researchers employed green HRM and Green Innovation (GI) as mediators. We applied a quantitative approach that utilized cross-sectional data collected from Saudi Arabian Small and Medium-sized Enterprises (SMEs). We used a survey questionnaire with a convenience sampling technique and succeeded in obtaining replies from 236 respondents. By using the Structural Equation Model (SEM), this study's findings demonstrate that OEC has a positive and significant effect on green HRM and GI. This study's findings support the development of policies that promote ES and EP through green environmental practices. Further, green HRM and GI are significant predictors of ES and EP. This study's findings also show that green HRM and GI have a mediating effect in developing the associations between OEC and ES and EP. Ultimately, this study's findings make a significant contribution to the depth of the empirical evidence about SMEs in the context of Saudi Arabia.

**Keywords:** environmental sustainability (ES); environmental performance (EP); organizational environmental culture (OEC); green HRM; green innovation (GI); small and medium-sized enterprises (SMEs)



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## 1. Introduction

In the present era, several organizations are facing numerous issues relating to environmental sustainability (ES) and environmental performance [1,2]. To address these massive challenges, HRM policies, green HRM, and green innovation (GI) are necessary [3,4]. ES and EP are associated with an organization's commitment to improving the environment. However, green HRM and GI development are not possible with a conducive organizational environmental culture (OEC) [5,6]. The green HRM enables individuals to be motivated with its robust capability and the prospect to persuade change [7,8]. Green HRM's most significant contribution is to utilize worker efficacy and waste management to boost green performance [9]. Hence, organizations must contemplate using HRM to accomplish environmentally friendly strategies [10].

In the literature, these constructs have been tested and confirmed from different angles and predictors in several contexts. For instance, Shahzad et al. [5] and Awawdeh et al. [11] claim an enormous role of GI in organizational sustainability and EP with the help of technology. Green HRM practices and GI bring ES and EP into the economy, where OEC plays

a significant role in developing green HRM and GI. According to [12,13], OEC becomes possible through solid beliefs, values and employee behaviours. Likewise, Song et al. [14] propose a significant effect of green HRM on green human capital and GI. The meaningfulness of work indirectly predicts green HRM and employee job satisfaction [15].

The literature offers inconsistent and empirical evidence of different constructs towards ES and EP. Thus, significant gaps still need to be explored. Regarding knowledge gaps, the direct connection between green HRM and GI with ES and EP is still inadequate at the organizational level [1,5,16]. The contribution of OEC towards ES and EP has remained limited through the mediation of green HRM and GI [5,11,17,18]. Regarding contextual gaps, empirical studies have not focused on Saudi Arabian SMEs [1,6–8]. During the last ten years, Saudi Arabia's SMEs have remained the most diversified SME market, particularly in the Middle East [19]. The Saudi Arabian SMEs sector contributes 33% of the country's GDP [20]. Its share of exports is 5%, and 34% of workers are employed in SMEs.

Despite these significant contributions, the SMEs are still confronted with the considerable challenges of sustainability, performance, green HRM, GI, and OEC if the Saudi Arabian 2030 Vision is to be achieved [4]. In considering its importance and pursuing the above gaps, we attempted to explore the contributions made by OEC, green HRM and GI in achieving ES and EP in the Saudi Arabian SMEs sector. We also tried to explore the mediating role of green HRM and GI to fill the remaining gaps of OEC towards ES and EP by taking the samples of managers of Saudi Arabia's SMEs. The originality and the practical value of this study's findings confirm the direct and indirect use of green HRM, ES and EP in Saudi Arabia.

Practically, this study's findings would support developing a framework and policies to achieve smooth ES and EP through the improvement of green HRM practices, GI and conducive organizational culture in SMEs. Theoretically, by providing empirical evidence in Saudi Arabia, this study's findings enrich and contribute to the existing management and environmental science literature and assist in developing the environment and green HRM theories.

## 2. Literature Review and Hypotheses Development

In Taiwanese SMEs, there is a positive relationship between OEC and environmental leadership through competitive advantage and green organizational identity [21]. Soomro and Shah's findings [22] confirm that organizational commitment, job satisfaction and OEC have a positive effect on EP. At the organizational level, OEC has a strong impact on green HRM and green HRM affected by the firm's EP. These positive linkages become possible through meaningfulness [15]. According to Akhavan et al. [23], there is a positive correlation between organizational culture and environmental responsiveness capability. Among Pakistan's manufacturing employees, environmental management control systems play a mediating role in shaping the association between OEC and the firm's EP [24].

Turning to green HRM, it has a constructive effect on both EP and firm performance. In addition, EP expressively mediates the connection between green HRM and firm performance [25]. In a similar vein, in the context of Malaysian firms, green employee empowerment has a significant effect on green HRM practices [26]. However, in Malaysian educational institutes, green HRM has a positive impact on employees' green behaviors. CEO ethical leadership moderates the significant association between the top management team commitment and green HRM. In turn, this mediates the association between green HRM and firms' EP [27]. These relationships are developed through the mediation of environmental knowledge [28]. Similarly, Yusliza et al.'s [29] findings underline that the top management has a meaningful effect on Corporate Social Responsibility (CSR) and green HRM. Rubel et al.'s findings [8] confirm that green HRM has a significant effect on the sharing of green knowledge and green service behaviors. In addition, the sharing of green knowledge is the most effective mediator in developing these associations (green HRM and green service behaviors). Similarly, in studying the situation in Pakistan, Hameed et al.'s findings [7] demonstrate that green HRM has an indirect effect on organi-

zational citizenship behaviors toward the environment. Each green value moderates the positive correlation between green employee empowerment and organizational citizenship behaviors. In Ghanaian manufacturing firms, green HRM is the most significant interpreter of employees' in-role green behaviors [30].

In terms of GI, there are significant links between creative process engagement and green transformational leadership and green product process innovation [31]. According to empirical evidence from [6], green process innovation has a mediating role in shaping the association between a proactive sustainability strategy, green entrepreneurial business and EP. In UAE's SMEs, there is a positive correlation between knowledge-related factors, namely acquisition, dissemination of information and responsiveness, and GI. In addition, environmental awareness can develop these associations [32]. According to Ullah et al. [33], GI makes a positive contribution toward fulfilling the sustainable development goals of Pakistani SMEs' environmental activities. Likewise, ref. [34] highlight that ecological regulation and green finance extensively promote GI. Industry 4.0 has a significant influence on open innovation which, in turn, leads to improved GI behaviors and performance [35]. Barforoush et al.'s pivotal work [16] suggests that regulations and technology and legislation play an influential role in GI. Shahzad et al.'s findings [5] underline GI's significant influence of corporate sustainable performance on the knowledge base economy.

Associated with ES, factors such as human behaviors and the environment have positive and significant effects on SMEs' entrepreneurial sustainability [2]. According to Soomro et al. [36], sustainability education and sustainability orientation have positive effects on green entrepreneurship inclinations. Similarly, proactive environmental strategies have significant effects on corporate performance and the integration of internal green practices [37]. In respect of Pakistan's SMEs, green HRM practices have a positive and significant effect on ES. Moreover, CSR mediates the association between green HRM and EP [38]. Ojo et al.'s findings [39] underline the improvement of environmental IT behaviors through performance management, green training and employees' development and empowerment. Likewise, Soomro et al.'s [18] empirical evidence mentions organizational innovation and organizational learning as the most significant forecasters of firm performance.

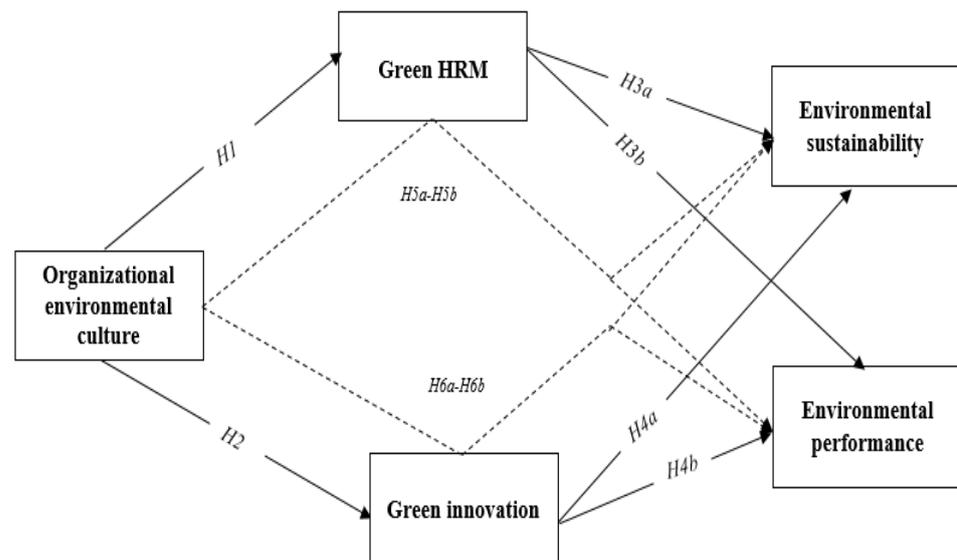
Consequently, despite many empirical investigations, gaps still exist in the literature. For instance, no previous study's findings underline the role of green HRM and GI in developing the association between OEC and ES and EP [5,11,17]. Further, there has been no previous investigation of the combined mediating effect of green HRM and GI with OEC on ES and EP [8,28,36,37,39]. Contextually, despite their apparent relationship in the literature mentioned above, the management of the Saudi Arabian SMEs sector has not paid sufficient attention to these constructs [9,15,40–43].

Based on the gaps in these relationships in the existing literature, we developed Figure 1 to investigate the top management of SMEs in Saudi Arabia to achieve the purpose of the study, which is to examine the OEC, ES and EP through green HRM and GI.

### 2.1. OEC, Green HRM and GI

OEC points out employees' beliefs, values, and behaviors [12]. Mainly, these beliefs and values signify the individuals' manner of thinking about what is happening, either rightly or wrongly, and how it affects their ethical values [44]. According to Arulrajah et al. [45], institutional settings have a significant effect on the OEC and building culture as one of green HRM's core components. It is a program of development techniques which assists firms to reduce their environmental impacts while growing their favorable effects on the environment. In plain terms, green HRM practices concentrate on ES through training green workers who can identify and contribute to the organization's environmental creativities. Green HRM practices focus on green initiatives, such as green performance management, which augments the organization's human wealth [15]. Factors such as strategy, structure, leadership and OEC have a positive and significant effect in predicting green HRM [46,47]. The organizational circumstances are essential to the firm making pro-environmental practices such as green HRM [27,48]. If the organizations adopt green

activities, they may achieve their profit-making goals, reduce adverse effects, and maximize the positive significance of their actions on the environment [40]. Together, these build a culture that endorses green HRM-associated exercises. Therefore, by edifice, OEC represents a climate in which green actions are highly esteemed and inspire green appraisal. Hiring and training are robust domains of green HRM [49,50]. Similarly, Shafaei et al.'s findings [15] highlight that OEC has a strong impact on green HRM, EP and GI. Consequently, the literature demonstrates that there is an important and positive link between OEC and green HRM and GI [40]. Green OEC impacts on green performance [41]. Among a firm's managers, OEC is associated with environmental preservation, which is likely to enhance GI. Therefore, when compared to their competitors, firms highlight their GI abilities by bringing their corporate culture into line to maintain their environmental quality standards [51].



**Figure 1.** This study's conceptual model.

Consequently, the related literature highlights that OEC has a robust and constructed role in developing green HRM and GI in different segments. However, among the SMEs' top management, this matter is still in its infancy. Therefore, when considering its vital role in the context of Saudi Arabian SMES' managers, we formulated the following hypotheses:

**H1.** OEC has a positive influence on green HRM.

**H2.** OEC has a positive influence on GI.

## 2.2. Green HRM, ES and EP

In the environmental milieu, the term "green" refers to the vigorous sustenance of earth-friendly exercises which defend the environment and protect natural assets. Green HRM is one of the best approaches for furthering a firm's environmental performance because it delivers an indispensable base to efficiently manage a firm's environmental influence [52]. Fundamentally, green HRM enhances a firm's competitive advantage and the practices for the betterment of environmental management while, at the same time, reducing costs and increasing revenue flows to achieve significant environmentally related business goals [48]. Furthermore, green HRM supports organizations towards increasing their environmental performance through improving employee awareness about environmental issues [53]. ES is promoted directly by green HRM movements and mediated by CSR [38]. ES underlines the compliance with environmental standards, improvements and the reduction of hazardous material [54]. It refers to the recognition of new practices and suggestions to improve the environment and to protect it more effectively. ES can be achieved through rational decision making and solving the problems which negatively

affect the environment [55]. The findings of Doran and Ryan's study [56] show that the adoption of green practices and environmental regulatory pressure promote ES and profitability. Likewise, an organization's system associated with the environment nurtures green rehearsal acceptance in SMEs [36]. The green HRM is a positive and significant contributor to organizational environmental upshot [17,57]. Scholars such as Shafaei et al. [15] and Yong et al. [47] are strongly certain that those individuals with green values are more likely to achieve ES. These values enhance OEC.

The HRM is a better solution to enhance a firm's competitive advantage [17] and to achieve environmentally oriented business deals [48]. Sudin [52] strongly suggests that green HRM is one of the preeminent approaches towards improving firms' EP since it offers an indispensable base for them to competently accomplish their environmental effects. EP is the organization's commitment to defending and representing environmental care with significant quantifiable operational strictures [2,52]. EP refers to the organization's commitment to defend the environment and signifies environmental care through defining measurable operational parameters [15,42]. It represents a firm's environmental action [58] and is, also, a sign of the interaction between a firm and the environment [59]. Henceforth, environmentally friendly HR exercises lead to greater competencies, lower expenses and better employee retention and engagement [47]. Furthermore, green HRM supports firms in improving their EP through increasing employee awareness of environmental concerns [60]. Similarly, Dutta's [61] findings underline green HRM's significant contribution since it is one of the best ways for firms to achieve better EP. According to Kim et al. [62], employees are the firms' building blocks and their pro-environmental behaviors lead to improvements in the firms' EP.

In the literature, improvements to a firm's EP are possible through green HRM, green empowerment, green initiatives and activities, and ES [60,63]. Furthermore, in the context of the supply chain, green HRM has a good reputation for developing EP [17]. As shown by the study findings of [42,49], firms can improve their human capital by implementing green HRM practices that, ultimately, enhance EP. On the other hand, empirical evidence from [50] does not show that green HRM has a direct effect on EP.

Indeed, in a different context, the literature supports the positive associations between green HRM and ES and EP. However, it is recognized that the Saudi Arabian SMEs sector faces significant problems regarding EP and ES [2]. Therefore, we formulated the following hypotheses:

**H3a.** *Green HRM has a positive influence on ES.*

**H3b.** *Green HRM has a positive influence on EP.*

### 2.3. GI, ES and EP

GI is about new products and processes that significantly decrease environmental impacts [64]. It is an organizational change or marketing solution that reduces both the use of natural resources and the release of either harmful substances or toxic materials across the whole life cycle [41]. Shahzad et al.'s [5] findings highlight that GI has a significant effect on sustainable corporate performance, i.e., social, economic and EP. GI has an excellent reputation in developing ES and EP. However, green product innovation has only a significant effect on financial performance [65]. Chu et al.'s [66] findings demonstrate that the GI is a meaningful analyst of financial performance. Likewise, technological innovation has a substantial effect on EP and has a constructive effect on the firm's performance. In addition, green financing has a positive and significant role in respect of EP [11]. In the context of SMEs, environmental strategy is the significant forecaster of GI and EP [67]. In five South Asian economies, panel data show that GI plays a substantial role in improving environmental quality [38]. Similarly, within SMEs, GI has a significant resilient effect on all three sustainable performance constructs (environmental, economic, and social sustainability). Comparatively, the association between GI and EP is stronger in medium-sized firms than in small-sized firms [10]. In Turkey, GI enhances both the firm economic performance and

EP. In addition, while GI has a significant influence on firm performance, environmental uncertainty reduces such an effect [9]. Consequently, in the presence of different variables in other regions and at different times, GI has shown itself to be separately the significant and positive forecaster of ES and EP [9–11]. However, with OEC, there are few occasions when GI relates to both ES and EP. Therefore, we formulated the following hypotheses:

**H4a.** *GI has a positive influence on ES.*

**H4b.** *GI has a positive influence on EP.*

#### 2.4. Mediating Effect of Green HRM

In Malaysia's manufacturing SMEs, GI has a mediating role in developing the association between green practices and ES [68]. According to Song et al. [14], green HRM has a direct influence on GI and green human capital has a significant mediating effect on the association between GHRM and GI [69]. Moreover, the analysis underlines that green HRM has an indirect influence on GI through green human capital. Similarly, at the individual level, meaningfulness through work plays an indirect role between green HRM and employee job satisfaction [15]. A seminal work by [8] underlines that the sharing of green knowledge acts as a robust mediator between GHRM and green service behaviors. Among the Palestinian higher education institutes, green work engagement mediates the associations between green HRM and employees' green behaviors [30]. Likewise, green human capital mediates the association between green HRM and organizational commitment [70]. In the context of green HRM, the findings of [70] underline the positive connection between green HRM and GI via green creativity. Recently, in the context of Portugal's tourism sector, [43] demonstrates a positive association between green HRM and employee eco-friendly behaviors through the mediation of organizational identification. Consequently, the literature examines the mediating role of green HRM in developing several relationships both directly and indirectly [8,30,70]. However, its investigation of the mediating role between OEC, ES and EP needs further in-depth exploration, particularly in the context of Saudi Arabia's SMEs. Therefore, we developed the following hypotheses:

**H5a.** *Green HRM mediates the association between OEC and ES.*

**H5b.** *Green HRM mediates the association between OEC and EP.*

#### 2.5. Mediating Effect of GI

GI is noted as a significant factor in green aspects. In Malaysian industries, EP and GI appear as full mediators that develop the relationships between firm performance and green OEC [71]. In his study, Wang [41] targets manufacturing firms to assess corporate green culture and green performance. This study's findings show that there is a complete mediation between GI and green performance and green OEC. According to Michaelis et al. [72], by inspiring firms to assume a green innovation approach, green corporate culture impacts indirectly on a firm's green performance. Afum et al.'s [65] findings show that green practices have an indirect effect on sustainable performance and financial performance. Similarly, GI mediates the association between sustainable corporate performance and the knowledge management process [5]. The findings of [50] reveal that GI has a powerful mediating role in establishing the connection between green HRM and EP.

Consequently, in its capacity as a mediating variable, GI has a good reputation for developing the associations between the different factors [41,50,71]. However, the integration of ES and EP remains untested. Contextually, the top management of Saudi Arabian SMEs need to pay sufficient attention to this. Therefore, we formulated the following hypotheses:

**H6a.** *GI mediates the association between OEC and ES.*

**H6b.** *GI mediates the association between OEC and EP.*

### 3. Research Methods

#### 3.1. Approach and Respondents

We applied a quantitative descriptive approach to deal with statistical data because this saves time and other resources [73]. This strategy (quantitative method) is a robust method because its data analysis involves both numbers and figures [74]. Most scholars support the quantitative research approach since it is based on statistical data [75,76]. Importantly, since this method uses scientific data, it helps to generalize the results [77]. Bearing in mind the context of this study, we concentrated on the collection of cross-sectional data from Saudi Arabian SMEs. We concentrated on the SMEs because of their active and leading role in the development of the country's economy [2,78]. Saudi Arabia SMEs have a robust reputation in for bringing stability to and accelerating the country's economic growth and, in turn, creating sustainable employment. In the Arab world, SMEs have a good reputation for addressing the challenges of generating employment and diversifying economies. In Saudi Arabia, access to finance, productive capacity, and a favorable business environment contribute to the faster growth of SMEs [79,80]. However, like other countries, Saudi SMEs suffer from inadequate and poor coordination execution capacity, lack of development, effective SME formation policy environment and short educational programs have made unattractive entrepreneurship [81,82]. Furthermore, Saudi SMEs are also confronting uncertainties in their businesses and significant economic downturn due to un-systematic Human Resource Development activities, particularly un-succession planning structurally or functionally [83]. In this way, the success of SMEs depends upon management and senior positions in the executive, CEO and managerial positions [81,84]. The CEOs and managers have diverse responsibilities and job natures, but they both play an enormous role in the organizational success to overcome the challenges [80,83]. Recently, the Saudi government has been involved in the up-gradation of human resource capital to bring efficacy in dealing with the challenges of replacing the emigrant workforce and the skill development strategy [85].

From the statistical point of view, SMEs vary by country and are based on the number of employees and the value of sales/assets. However, the most commonly used parameter is the number of employees. Concerning the structure of SMEs in Saudi Arabia, a significant number of small and medium enterprises are running their operational activities [86,87]. Saudi Arabia follows the definition of SMEs as a "micro" structure highlighted when there are 1–2 employees with annual revenue less than USD 27,000. Likewise, "small" refers to 3–49 employees with annual revenue of USD 27,000–1.3 million. Finally, "medium" is the number of employees between 50–200 with annual revenue of USD 1.3–13.3 million [88].

Currently, the Saudi Arabian government fully endorses the role of SMEs as the significant driver of economic diversity and the government has steadfastly ranked the development of SMEs in its 2030 Vision [4]. However, SME management teams are facing significant problems and obstacles in achieving their targets of profits, ES and EP. Therefore, in this study, we decided to collect data from top SME managers, CEOs, directors and middle managers. These individuals are significant information sources and have abundant knowledge about the problems faced by the SMEs, and, therefore, they are most likely to provide the necessary data of the SMEs [89]. Moreover, they have dynamic skills and capabilities to manage their firms in a meaningful way [90]. Another reason for our choosing them is that they are very familiar with HRM processes, HRM practices and firm sustainability and performance [91]. Comparatively, the features of CEOs, top managers, middle managers, and directors of SMEs resemble big companies' managers. For example, SME heads confront an increasingly unstable, complex and changing economic context. They adapt themselves to challenges that they are not always well prepared to face [92]. SME managers are mainly concerned with issues dealing with their "local", more natural economic environment [93]. Likewise, both SME managers and big companies' managers both contribute and work hard to the success of their organizations. Compared to prominent industry managers, SME managers' attitude toward risk is very high [94].

### 3.2. Data Collection Means and Sample Size

We applied the survey questionnaire as a suitable means to collect the data with great authenticity and to make it easier for the respondents [95]. A survey questionnaire is the most popular technique in social and management sciences since it is an economical way of accumulating information. It costs little and enables comprehensive coverage of the population both nationally and internationally with quick responses [96]. Moreover, the adoption of an online questionnaire is helpful, also, in terms of data collection, data visualization, data storage, and work collaboration. Likewise, there is little cost and time in extracting the empirical facts [97]. We employed convenience sampling due to being fast, inexpensive [98] and easy to cover the wide range of Saudi Arabian SMEs. Our study concentrated on both males and females to avoid sample bias. Age-wise, we focused on respondents aged from 21 years to 60 years. In addition, we assessed their job tenure in their current employments based on years, and we noted their years of experience of being employed in the firms' management posts. Finally, for this study's potential respondents we focused on all types of management agents, i.e., CEOs, top managers, directors and middle managers, and we used both personal and e-mail services to obtain the data. We applied both techniques (personal visits and online surveys) to reach the respondents. We obtained the respondents' consent before distributing the questionnaire. We e-mailed the respondents about the survey's purpose and objectives and we asked them to return the completed questionnaire. We distributed 400 questionnaires to the respondents in both modes. We received back 236 valid samples, representing a 59% overall response rate. More specifically, we collected 160 (68%) valuable surveys through personal visits and 76 (32%) through emails.

We applied a t-test to observe the mean difference between both samples (offline and online) and found a significant difference in mean scores at  $<0.005$  \*\* or a two-tailed significance level (Table 1). In this way, we conclude the existence of a statistical difference between offline and online samples [99]. The online and offline data collection modes offer significant research platforms [100]. We found the differences in responses because online research is not the same as offline research [101]. The online responses are poorer quality than offline surveys [102,103] due to the restriction of individuals with access to required technologies, e.g., internet, computers or smartphones. Individuals with problematic Internet use may have complications in controlling or maintaining issues of everyday life [104]. Online surveys provide a quicker response rate than offline surveys. However, both modes have weaknesses and strengths. The key differences in both are primarily found in the sampling of respondents, research project design, response rate and the quality of the obtained data.

**Table 1.** Mean difference in offline and online samples.

Offline	Online	df	Sig. (2-Tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
160 (68%)	76 (32%)	236	<0.005 **	4.227	2.273	4.025

*p* = significance level; \*\* *p* < 0.01.

In our study, the online and offline responses were inconsistent due to these technical and behavioural issues [100]. However, our results were not affected by the significant differences in the response rates. We neither developed any hypothesis on a comparative basis nor applied both collected samples individually. Thus, these differences in responses (online and offline) did not affect the outcomes of the results [101].

We neither specified nor differentiated the Saudi Arabian SME response rate based on firm size (small versus medium-sized) because we had not developed our study with the aim and objectives of either categorizing or differentiating between the respondents. We were in favor of collecting a large amount of data (more than 200 data points) to reduce the possibilities of convergence and software catastrophes. With two to four constructs, our sample size fulfils the Monte Carlo simulation's recommended criterion for the model. In

this respect, the researcher(s) may plan on gathering at least 100 cases, with 200 cases being the optimum [105].

### 3.3. Instrument Evaluation

We evaluated the questionnaire's essential assumptions, namely its reliability and validity, by conducting a mini version (pilot study) before moving to the collection of larger samples. To ensure both these assumptions, we used a pilot study to collect 26 samples. Turning to the reliability of the survey, we confirmed it through using Cronbach's alpha ( $\alpha$ ). As an alpha response, we found it to be 0.69 (overall) and we noted, also, that the reliability of individual factors was within the acceptable ranges ( $>0.60$ ) [106]. In addition, we ensured the loadings scores to observe the relationships of the items with their respective factors. We found them to be constructive and correlated. In terms of the instrument's validity, we ensured its adequate physical appearance by seeking the assistance of university professors who were very knowledgeable about the latest trends and techniques of quantitative assessments. Finally, after minor modifications, we applied the valid and reliable questionnaire to obtain responses from a larger number of participants.

### 3.4. Measures

We assessed OEC based on three items adapted from [54]. The OEC's sample item is "Continuous environmental improvement is part of my organization's mission". Likewise, we assessed the green HRM construct based on seven items of the empirical study by [107]. The analyst item for green HRM is "My organization rewards employees for EP". Further, we applied six items of [108] to gauge the green innovation (GI) with the taster item "The organization uses the fewest number of materials to comprise the product for conducting the product development or design". We adopted six items from different scholars, i.e., [17,55,109], to assess ES with a sample item of "Our organization places emphasis on airborne omission reduction". Finally, we tested EP with eight items. These items were adapted from [15]. The mockup item was "My organization uses local products from the community". We ranked all the survey items on a five-point Likert scale starting from strongly agree (1) to strongly disagree (5).

## 4. Analysis

We used Analysis of Moment Structures (AMOS) version 26.0 to analyze the data. To ensure the measurement model, we confirmed the convergent discriminant validity. Furthermore, we ensured model fitness and path analysis in the structural model.

### 4.1. Demographics

In total, we gathered 236 samples and found most were males ( $n = 152$  or 64.40%) as compared to females ( $n = 84$  or 35.60%). Likewise, most respondents were 31 to 40 years of age ( $n = 102$  or 43.22%). Between 41 and 50 years, we found 76 respondents (32.20%); 48 (20.34%) respondents were between 21 to 30 years of age while only 4.24% ( $n = 10$ ) respondents were 51 to 60 years of age. Furthermore, in terms of tenure in the existing firm, we found a majority ( $n = 78$  or 33.05%) of respondents had 6 to 10 years. Seventy-two ( $n = 72$ ) or 30.51% had been employed for 11 to 15 years; 20.34% ( $n = 48$ ) of employees had worked for their firm for less than five years, while a small number of respondents ( $n = 38$  or 16.10%) were very experienced and had been employed by the firm for 16 to 20 years. Finally, most respondents were middle managers ( $n = 96$  or 40.68%). Similarly, the top managers were 27.97% ( $n = 66$ ), 17.80% ( $n = 42$ ) were directors and 13.55% ( $n = 32$ ) were CEOs.

### 4.2. Measurement Model

We conducted the factor loadings to confirm the internal consistency among items and their relevancy with respective factors. The scores of factor loadings are acceptable since their values either exceed or are greater than 0.70 [110]. From our analysis, four items

(ghrm6, gi4, es2 and ep7) did not achieve the threshold value of 0.70 [110]. Therefore, we decided to exclude them from further consideration in the analysis. Further, we noted the Composite Reliability (CR) of all the constructs fell between 0.790 to 0.882 ( $>0.70$ ) [106] (Table 2). We ensured Average Variance Extracted (AVE) to gauge the identical appearance among the constructs. We found the range of AVE scores to be between 0.771 (ES) to 0.863 (Green HRM) (see Table 2). The AVE values greater than 0.50 show the great identity among the scale constructs [110]. Finally, we found Cronbach's alpha ( $\alpha$ ) of all the factors with satisfactory scores ( $>0.70$ ) [110] (see Table 2). In this way, we found all acceptable values of convergent validity (see Table 2).

**Table 2.** Measurement model.

Construct	Item Code	Factor Loadings	CR	AVE	$\alpha$
Organizational environmental culture (OEC)	oec1	0.890	0.827	0.798	0.878
	oec2	0.887			
	oec3	0.872			
Green HRM	ghrm1	0.879	0.882	0.863	0.829
	ghrm3	0.865			
	ghrm2	0.855			
	ghrm4	0.848			
	ghrm5	0.832			
	ghrm7	0.809			
	gi1	0.889			
Green innovation (GI)	gi2	0.879	0.859	0.781	0.852
	gi3	0.861			
	gi5	0.842			
	gi6	0.821			
	es7	0.888			
Environmental sustainability (ES)	es5	0.879	0.832	0.771	0.848
	es6	0.867			
	es3	0.851			
	es4	0.802			
	es1	0.799			
	ep1	0.892			
Environmental performance (EP)	ep2	0.862	0.790	0.809	0.782
	ep4	0.851			
	ep3	0.844			
	ep5	0.830			
	ep8	0.821			
	ep6	0.811			

Notes: AVE = summation of the square of the factor loadings. CR = square of the summation of the factor loadings.  $\alpha$  = Cronbach's alpha.

In addition, we ensured discriminant validity to observe the level of difference among the constructs [111]. To achieve this result, we compared the square root of AVE with existing relationships. The square root of AVE seemed diagonally higher than the scores in the rows and columns of their concerned construct (see Table 3). Consequently, we confirmed adequate discriminant validity.

To further ensure and provide the solution to critical issues, a variance-based approach heterotrait-monotrait ratio of correlations (HTMT) was conducted to observe discriminant validity. This approach is a part of establishing a new standard means of assessing the discriminant validity of a measurement model [112,113]. Technically, HTMT does not need a factor analysis to gain factor loadings, nor does it involve calculating construct scores. Due to its straightforward application and good performance, it is the most frequent business research test [114]. If the HTMT's value of two constructs is 1, it means there is no discrimination properly [112,114]. More specifically, the upper bound of the 90% bootstrap confidence interval is larger than 1, warranting a type I error rate of 5%. If the value is 1, for instance, the two constructs are impeccably correlated, and it is larger than the upper bound of the bootstrap confidence interval. Thus, the construct correlation is significantly

smaller than 1 [112,115]. In our analysis, the values of HTMT were different from 1 because the HTMT is an estimator for the inter-construct correlation [112]. As a result, we ensured discriminant validity assumptions and moved forward.

**Table 3.** Discriminant validity.

	Constructs	1	2	3	4	5
1	OEC	0.798				
2	Green HRM	0.299	0.763			
3	GI	0.308	0.139	0.732		
4	ES	0.387	0.277	0.148	0.755	
5	EP	0.378	0.262	0.332	0.320	0.779

Notes: Diagonals represent the square root of the AVE while the other entries represent the correlations; Organizational Environmental Culture (OEC); Green Innovation (GI); Environmental sustainability (ES); Environmental Performance (EP).

#### 4.3. Structural Model

Before evaluating the hypotheses, we confirmed the model's fitness by observing model fit indices. We ensured all the model fit indices were within the acceptable ranges as CMIN/df = 2.228 (<3), GFI = 0.911 (>0.90); AGFI = 0.929 (>0.90); NFI = 0.919 (>0.90); CFI = 0.928 (>0.90) and RMSEA = 0.039 (<0.05) [106] (see Table 4). We tested the hypotheses based on the level of significance in terms of  $\beta$  values, t-values, probability values and confidence interval scores. By using SEM, we found that OEC had a positive significant effect on green HRM and GI (H1 =  $\beta = 0.389$ , LL = 0.521, UL = 0.239,  $p < 0.01$ ; H2 =  $\beta = 0.201$ , LL = 0.453, UL = 0.262,  $p < 0.01$ ) (see Figure 2 and Table 5). Therefore, hypotheses H1 and H2 are accepted. The SEM ensured that green HRM had a positive and significant relationship with ES and EP (H3a =  $\beta = 0.351$ , LL = 0.600, UL = 0.310,  $p < 0.01$ ; H3b =  $\beta = 0.422$ , LL = 0.398, UL = 0.219,  $p < 0.01$ ). Therefore, hypotheses the H3a and H3b are accepted. Likewise, we noted GI's significant predictive power on ES and EP (H4a =  $\beta = 0.317$ , LL = 0.590, UL = 0.271,  $p < 0.01$ ; H4b =  $\beta = 0.476$ , LL = 0.453, UL = 0.243,  $p < 0.01$ ) (see Figure 2 and Table 5). Therefore, hypotheses H4a and H4b are accepted. Moreover, as mentioned in Figure 3 and Table 6 concerning indirect paths, the analysis demonstrates that green HRM has a positive mediating effect in developing OEC's relationship with ES and EP (H5a =  $\beta = 0.336$ , LL = 0.167, UL = 0.186,  $p < 0.01$ ; H5b =  $\beta = 0.311$ , LL = 0.156, UL = 0.171,  $p < 0.01$ ). Therefore, hypotheses H5a and H5b are accepted. Finally, GI is the robust mediating factor which develops OEC's relationships with ES and EP (H6a =  $\beta = 0.414$ , LL = 0.220, UL = 0.238,  $p < 0.01$ ; H6b =  $\beta = 0.392$ , LL = 0.169, UL = 0.180,  $p < 0.01$ ) (see Figure 4 and Table 6). Therefore, hypotheses H6a and H6b are accepted.

**Table 4.** Goodness of fit indices.

Model Fit Indicators →	CMIN/df	GFI	AGFI	NFI	CFI	RMSEA
Appeared values →	2.228	0.911	0.929	0.919	0.928	0.039

Note: CMIN =  $\chi^2$ /chi-square/df; df = degrees of freedom; GFI = goodness-of-fit index; AGFI = adjusted goodness-of-fit index; NFI = normed fit index; CFI = comparative fit index; RMSEA = root mean square error of approximation.

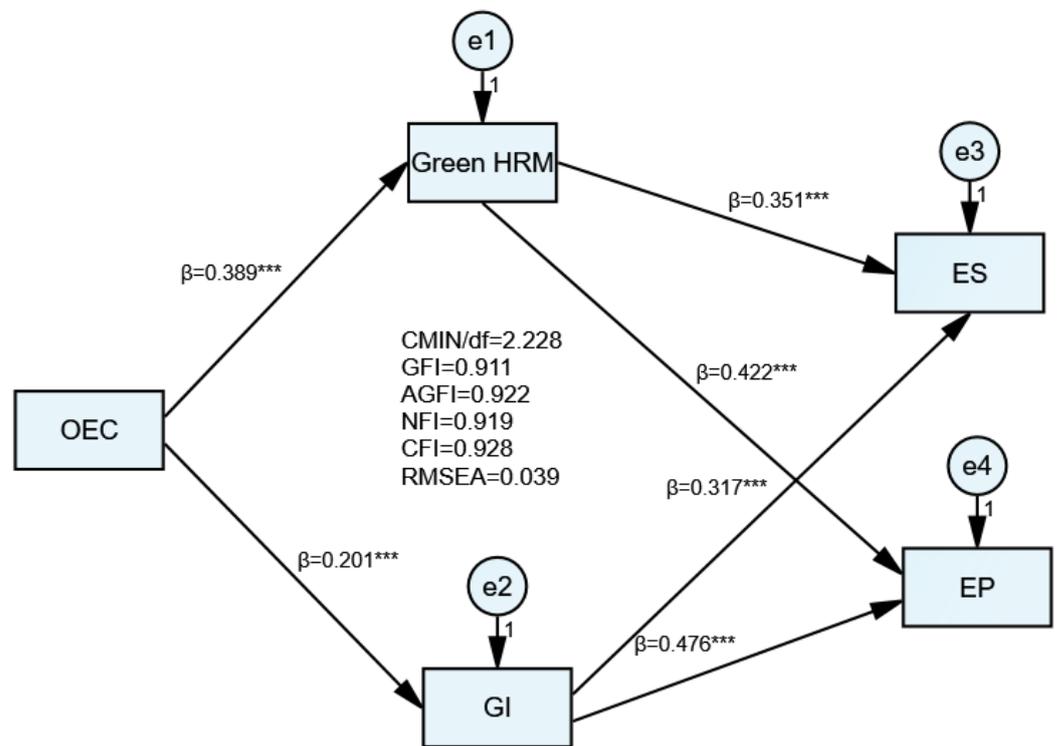


Figure 2. Path model (direct effects).  $p$  = significance level; \*\*\*  $p < 0.05$ .

Table 5. Direct effects.

Hypotheses	IV	Path	DV	Std. $\beta$	SE	$t$ -Value	LL	UL	Decision
H1	OEC	→	Green HRM	0.389	0.028	4.559 ***	0.521	0.239	Accepted
H2	OEC	→	GI	0.201	0.030	6.889 ***	0.453	0.262	Accepted
H3a	Green HRM	→	ES	0.351	0.025	5.407 ***	0.600	0.310	Accepted
H3b	Green HRM	→	EP	0.422	0.029	7.321 ***	0.398	0.219	Accepted
H4a	GI	→	ES	0.317	0.040	6.662 ***	0.590	0.271	Accepted
H4b	GI	→	EP	0.476	0.032	8.008 ***	0.453	0.243	Accepted

Note(s): IV, independent variable; DV, dependent variable; OEC, Organizational Environmental Culture; GI, Green Innovation; ES, Environmental Sustainability; EP, Environmental Performance; SE = standard error; CR = critical ratio;  $p$  = significance level; \*\*\*  $p < 0.05$ .

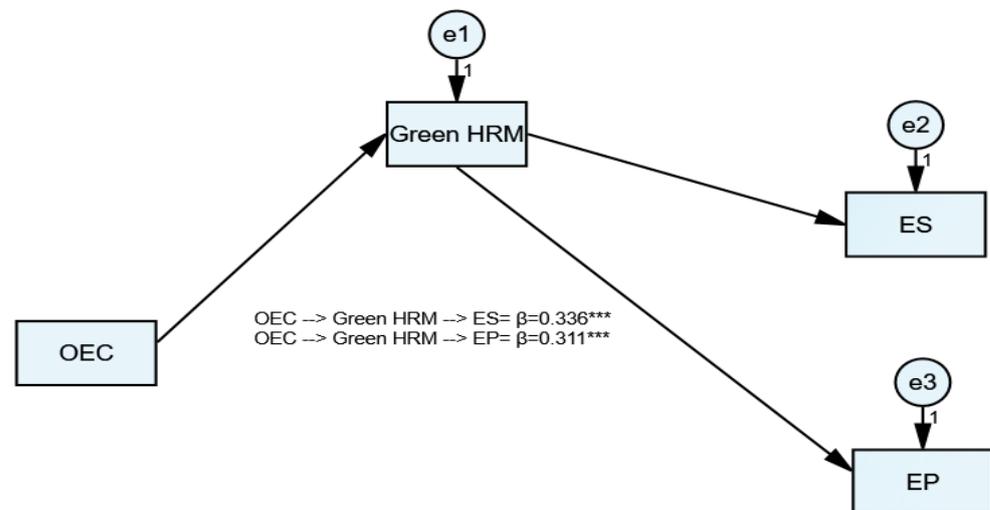
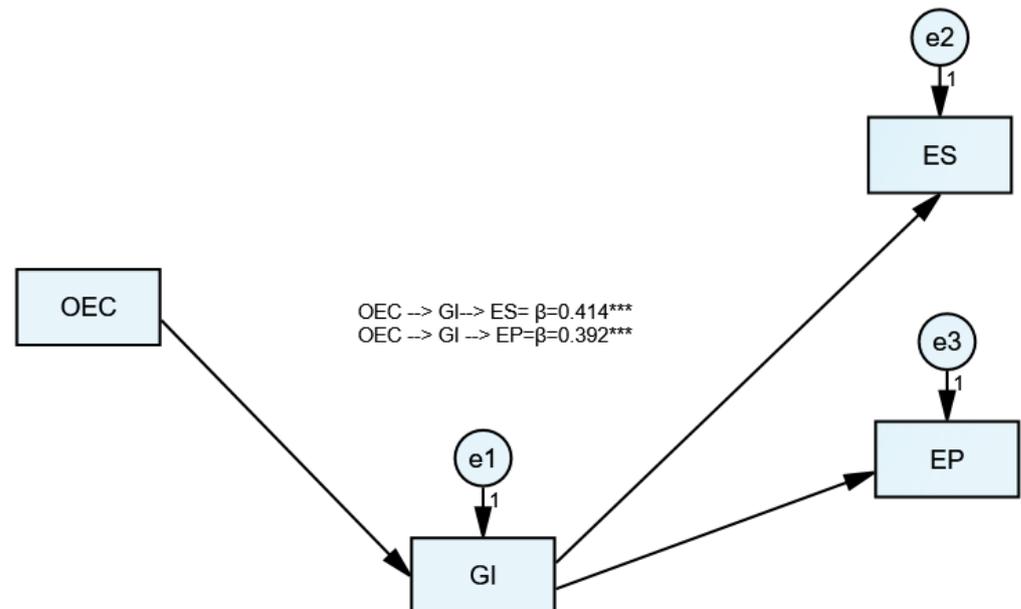


Figure 3. Mediating effect of green HRM.  $p$  = significance level; \*\*\*  $p < 0.05$ .

**Table 6.** Mediating effects.

Hypotheses	IV	Path	Mediator	Path	DV	Std. $\beta$	SE	<i>t</i> -Value	LL	UL	Decision
H5a	OEC	→	Green HRM	→	ES	0.336	0.009	3.930 **	0.167	0.186	Accepted
H5b	OEC	→	Green HRM	→	EP	0.311	0.006	3.888 **	0.156	0.171	Accepted
H6a	OEC	→	GI	→	ES	0.414	0.010	4.008 **	0.220	0.238	Accepted
H6b	OEC	→	GI	→	EP	0.392	0.005	3.820 **	0.169	0.180	Accepted

Note(s): IV, independent variable; DV, dependent variable; OEC, Organizational Environmental Culture; GI, Green Innovation; ES, Environmental Sustainability; EP, Environmental Performance; \*\*  $p < 0.01$ .

**Figure 4.** Mediating effect of GI.  $p$  = significance level; \*\*\*  $p < 0.05$ .

## 5. Discussion and Conclusions

This study investigated the relationship between OEC, ES and EP through the mediation of green HRM and GI in the top management of Saudi Arabian SMEs. By applying SEM, the findings show that OEC has a positive and significant effect on green HRM and GI. The statistical results, such as the  $\beta$  and *t*-values, underline a robust predictive power of OEC on both green HRM and GI (H1 and H2 accepted). We found a more powerful effect of OEC on green HRM (H1 =  $\beta = 0.389$ ) than the effect of OEC on GI (H2 =  $\beta = 0.201$ ). These statistical outcomes suggest that OEC had a more active role in developing green HRM than GI. In the literature, these associations are reinforced by numerous scholars, i.e., [15,40,44,116], who support the positive associations between OEC, green HRM and GI. The findings highlight that managers are serious about resolving environmental issues, for example water consumption, energy consumption and generation of waste, and that they consider these issues to be of high priority. As part of their firms' missions, they are eager to continue their efforts to significantly improve the environment. Environmental awareness is, also, their firms' objective. They think the development of green HRM and GI through OEC will help significantly in resolving their firms' environmental issues.

We observed the statistically significant effect of green HRM on ES and EP. Comparatively, we found green HRM with a tremendous beta value (H3b =  $\beta = 0.422$ ) towards EP, of which the beta of green HRM appeared low towards ES (H3a =  $\beta = 0.351$ ). These values reflect that green HRM has a meaningful role in enhancing EP relative to ES. Turning to green HRM's positive associations with ES and EP, these are supported by this study's findings. Likewise, these findings are consistent with those of several previous studies [50,53,61,62]. The existence of positive results highlights that the execution of green HRM practice in terms of reward systems, green selection, appraisal, and training promote environmentally friendly behaviors through firms' human resource actions. Accordingly, employees, who

are aware of green issues, are more concerned about alleviating environmental issues. Consequently, they effortlessly achieve better outcomes in carrying out their responsibilities and, in turn, these lead in overall terms to increased EP.

Furthermore, the findings underline that GI has a positive and significant effect on ES and EP. For the statistical effect of GI on ES and EP, the beta value was more robust for GI towards EP ( $H4b = \beta = 0.476$ ). However, beta also accepted the  $H4a$  ( $\beta = 0.317$ ) with significance at  $p < 0.01$ . These positive results are consistent with several previous empirical studies such as [11,38,66,67]. These findings suggest that SMEs are circumspectly thoughtful about whether their product is able to be recycled, decompose and be reused for steering product progress or shape. The manufacturing process of SME employees is engaged in reducing the emission of waste or hazardous substances. Furthermore, they try to minimize the use of other resources such as electricity, oil, coal and water. In addition, they reduce their firms' massive use of raw materials.

This study's findings show that green HRM has a mediating effect in shaping firms' OEC associations with ES and EP within the organizations. Our statistical path analysis of indirect effects underlined relatively more significant beta values ( $\beta = 0.336$ ) for OEC towards ES than EP ( $\beta = 0.311$ ) in the presence of green HRM. This slight difference shows that green HRM plays a positive mediating effect in developing the association of OEC with ES and EP. More specifically, green HRM plays a more prominent role in forming a positive relationship between OEC and ES than EP. To some extent, these findings are consistent with the previous results, i.e., [8,43,70], in the mediating effects of the different factors in developing the associations in the other regions. This study's findings demonstrate, also, that green HRM indirectly develops OEC's association with ES and EP. These findings underline that firms are interested in developing their pro-environmental organizational cultures to reduce the different adverse effects that arise through omissions and energy consumption. These developments comply, also, with the environmental standards and are more effective at protecting the environment. The SMEs' top management teams make the decisions to solve problems related to ES and EP.

Finally, this study's findings show that GI has a mediating effect in shaping OEC's relationships with ES and EP. Our statistical indirect effects reflect that GI robustly mediated the relationship between OEC and ES ( $H6a = \beta = 0.414$ ) compared to the association between OEC and EP ( $H6b = \beta = 0.392$ ). GI contributes more between OEC and ES than OEC to EP. GI's positive and contributory role reflects that firms buy products from vendors and use green chemical products free from hazardous materials.

In summary, the overall findings demonstrate that OEC has a positive and significant effect on green HRM and GI. Green HRM and GI both predict ES and EP. The green HRM factor is the most significant mediator in developing OEC's favorable association with ES and EP. Lastly, GI plays, also, a mediating role in shaping OEC's positive relationship with ES and EP among the top managers of Saudi Arabian SMEs. They are concerned with dealing with their firms' environmental problems on a high priority basis. They wish to execute green HRM practices to promote, through HR, activities and environmentally friendly behaviors among their employees. They are keen to achieve better results for their firms through increasing EP. Furthermore, they wish to reduce their firms' environmental waste and use of hazardous substances. Consequently, they anticipate the need to comply more successfully with the environmental standards and environmental protection measures. In terms of Saudi Arabian SMEs, there are massive increases in the numbers of entrepreneurs and they contribute significantly to the country's GDP to increase the level of employment. The entrepreneurs are eager to achieve Saudi Arabia's 2030 Vision by bringing about ES and green initiatives.

## 6. Implications, Limitations and Future Research Directions

In practical terms, this study's findings provide policymakers and environmental agencies with advice in formulating pro-environmental plans to reduce adverse effects on SMEs. Furthermore, the confirmation of the contribution of green HRM and GI both

directly and indirectly open new avenues for researchers to investigate the different roles of these factors in other contexts. Moreover, the connections between OEC with ES and EP through green HRM and GI further boost the SMEs to focus on green products to reduce the adverse effects of their firms' actions on the environment. Theoretically, this study's findings are beneficial in generating new theories and ideas through choosing green HRM, GI and OEC as predictors of different outcomes, for example, commitment, satisfaction and entrepreneurial performance. This study's findings open new paths, also, to developing theories regarding the development of attitudes and intentions toward environmental sustainability. Moreover, through empirical confirmation, this study's findings make a significant contribution to the literature on management and environmental science. The integration of the factors, for example, OEC, green HRM and GI, towards both ES and EP further enrich the depth of literature on the capacity of direct and indirect connections between these constructs. Contextually, this study's findings provide significant managerial implications for SME owners and top management in developing pro-environmental and greener policies to further improve ES and EP among SMEs and, more particularly, in Saudi Arabia. In this respect, this study's findings provide the SME owners and CEOs with guidelines to bring about a conducive and friendly organizational environment to increase the commitment, unity and positive behaviors and, in turn, lead to more environmentally friendly SMEs.

Scientifically, this study makes a vital contribution through using AMOS and SEM analysis as the latest analytical techniques. It ensures the readers understand OEC's, green HRM's and GI's direct and indirect impacts on ES and EP. The use of the scientific method, the application of rigorous and cognitive assumptions and careful observations are helpful to readers in acquiring new knowledge. Moreover, the systematic and creative initiatives used in this study may improve knowledge about humans, culture, and society that can be applied to new areas of interest. Finally, this study's planned, neutral, systematic and multiple-step process helps to discover facts and provides more knowledge not contained in the current literature.

The study is limited because it used only a quantitative approach that involved the collection of cross-sectional data from a single source. Contextually, the study is restricted only to Saudi Arabian SMEs' CEOs, directors and middle managers. The study employed only a survey questionnaire to collect the data. The outcomes may not provide the assumption of generalization globally. Statistically, the arrangement of SMEs in Saudi Arabia is different, i.e., micro, small, and medium enterprises, regarding the firm's assets. Thus, these might have a significant effect on the statistical results. Finally, the study's results were based on a correlational design; hence we could not identify a cause-and-effect association between the online/offline integration and the outcome measures.

We recommend that future studies use mixed methods, i.e., quantitative followed by qualitative, to validate the results of the same model. We recommend, also, that future investigations be extended to other sectors such as education and health to observe the role of OEC, green HRM and GI towards ES and EP. The other factors such as organizational commitment, job satisfaction, personality traits, attitudes and intentions and pro-environmental characteristics may be applied, also, to examine the direct and indirect impacts on ES and EP within the SME context. Future studies may utilize experimental design or longitudinal methods to examine possible causal relationships. More specifically, future investigations should measure the extent to which online and offline integration levels may account for potential differences in associations between individuals and Internet-use behaviors by integrating mediating and moderating variables.

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