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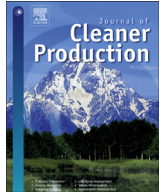
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The impact of green human resource management and green supply chain management practices on sustainable performance: An empirical study

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ABSTRACT

This study aims at investigating the linkage between green human resource management bundle practices and green supply chain management (i.e. external and internal practices), as well as their impact on the Triple Bottom Lines of sustainability performance (i.e. environmental, social, and economic performance). A quantitative method is applied in which data is collected from a customized survey with 121 firms functioning in the most pollutant manufacturing sectors (i.e. food, chemical, and pharmaceutical sectors) in Palestine. The data analysis was conducted using the partial least squares structural equation modeling. The results from data analysis show that both of green human resource management and green supply chain management practices have a positive effect to sustainable performance in a joint manner. In fact, the results revealed that green human resource management practices have a direct effect on the sustainable performance, with the green supply chain management practices mediating this effect. In particular, internal green supply chain management practices positively mediate between green human resources management practices and sustainable performance, whereas external green supply chain management practices mediate only the relationship between GHRM bundle practices and environmental dimension of sustainable performance, thus suggesting absence of awareness among manufacturers regarding the effectiveness of this type of GSCM practices for an improved economic and social dimensions of sustainable performance, and calling for more attention from green training programs. This study is considered as the first empirical study exploring the impact of green human resource management and green supply chain management on components of sustainable performance in Palestine, adding great value to the current green human resource management-green supply chain management literature via responding to recent calls to test the combined impact of both practices on TBL of sustainability performance. At the end, the theoretical and managerial implications, limitations of the current study and future research directions have been discussed.

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1. Introduction

Undoubtedly, the impact of manufacturing organisations on the environment is a growing concern, leading to demands for

sustainable practices which meet environmental, economic, and social needs (Diabat et al., 2013; Abdullah et al., 2015; Hussain et al., 2018). Indeed, all organisations are now 'obliged' to make more effort in balancing their economic, social, and environmental performance, especially for those with community, competitive and regulatory pressures (Ayuso et al., 2014; Russo and Fouts, 1997). Achieving this balance is perceived as a difficult and, in some cases, controversial challenge (George et al., 2015; Haffar and Searcy, 2017).

In the first place, there is complexity involved in implementing

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effective environmental management systems to improve environmental and social performance, meanwhile, having a positive effect on an organisation's economic performance (Epstein and Buhovac, 2014); also, it is important for organisations to change their cultural mindsets by implementing green behaviour into their business processes as an ethical requirement (Harris and Crane, 2002); a study by Lai et al. (2010) suggested that such challenges can be approached by spreading green ideologies in a cross-functional manner, not just through the usual designated departments (Wagner and Blom, 2011). This study represents an investigation into how green management is best spread across two critical business functions: the human resources function (Daily and Huang, 2001; Wagner, 2013) and the supply chain function (Kumar and Chandrakar, 2012).

On the other hand, further and deeper investigation concerning the relationship between these two functions is still required. According to several scholars in the field (Jabbour and de Sousa Jabbour, 2016; Fisher et al., 2010), recent studies have also expressed the need for more cross-functional research (Menon, 2012) to explore the dissemination of green management transversely across different functions or organisations and to find concurrent results and mutual relationships between various functions (Jabbour and de Sousa Jabbour, 2016; Pagell and Shevchenko, 2014). Addressing this need, this research investigated green management systems in the human resources and supply chain functions in addition to their relationships. For while the positive role of both green human resource management (GHRM) and green supply chain management (GSCM) practices on environmental performance is well known, there are few studies which have investigated the two functions and their relationship together (Jabbour and de Sousa Jabbour, 2016). This lack of research is noticed for two reasons: firstly, even though researchers theoretically acknowledge that GHRM practices are a prominent internal driver of GSCM practices (e.g. Aragón-Correa et al., 2013; Cantor et al., 2012; Dubey et al., 2017; Sarkis et al., 2010), some of them have mainly concentrated on the external pressures on companies (Paulraj, 2009; Wolf, 2014); secondly, while the literature on human resource management (HRM) and on supply chain management (SCM) has largely concentrated on the relationship between HRM and SCM practices more generally (e.g. Ellinger and Ellinger, 2014; Gómez-Cedeño et al., 2015; Hohenstein et al., 2014; Huo et al., 2015), there is little mention of a 'green version' of these concepts (Jabbour et al., 2017; Jabbour and de Sousa Jabbour, 2016; Longoni et al., 2017; Nejadi et al., 2017). There is, therefore, a recognised need in the field for further studies which explore the co-occurring results (and predicted trade-offs) that GHRM and GSCM might utilise at the triple bottom line (TBL): the economic, environmental, and social performance of companies (Elkington, 1997; Milne and Gray, 2013). This paper investigates the linkage between GHRM and GSCM and their impact on the TBL of sustainability performance, clarifying the positive effects that both GHRM and GSCM practices can have on the sustainable performance of 121 manufacturing firms in the food, chemical, and pharmaceutical sectors operating in Palestine.

A reading of current literature also exposes a scarcity of empirical studies on GHRM and GSCM within the manufacturing sector in developing countries (Jabbour et al., 2017; Mishra et al., 2017; Nejadi et al., 2017; Rehman et al., 2016). Conducting such studies in environments as challenging as Palestine is not unproblematic, for the manufacturing organisations in Palestine are dominated by dual environmental legislations: Palestinian National Authority Law and Israeli Authorities Law; these laws are applied in the Occupied Palestinian Territories (OPT) where the vast majority

of Palestinian manufacturers are placed (Palestinian Federation of Industries, 2009). The unique situation in the OPT results from the application of these Israeli laws on the internal environmental policies of Palestine (Görlach et al., 2011), obliging manufacturers to abide by Israeli environmental policies alongside those of the Palestinian National Authority. Palestine is considered to be a major participating member in a number of regional agreements on transboundary environmental subjects, mainly water and solid waste, and, on this basis, has secured funds from international donors to help implement measures within the Occupied Territories for adopting cleaner and better ecological practices and technologies (EQA, 2010). Such a unique and complex situation for the Palestinian manufacturing sector is reflected in an uncertain level of preparedness of this sector to adopt and implement green practices (Masri and Jaaron, 2017). A study of GSCM and GHRM adoption and their relationship in firms which operate in this unique context is certain to offer new and in-demand insights and to contribute to bridge a gap found in the literature.

The distinctive features of this study are as follows:

- i. As stated above, very few studies explore GSCM practices and GHRM practices in the context of developing countries. Indeed, empirical studies of issues around green practices are still a relatively recent venture, especially for the emerging Asian economies (Geng et al., 2017). This study, then, represents a strengthening of empirical evidence from a unique developing country in the field of GHRM and GSCM research. In fact, this study is the first of its kind in Palestine.
- ii. It should be noted, however, that the study of these two areas of green practices (i.e. GHRM and GSCM) is not challenges free. GHRM studies primarily concentrate on GHRM's direct effect on ecological performance without really addressing the mechanisms which have led to this impact (Jackson et al., 2011; Longoni et al., 2016). Studies of GSCM practices recognise its positive effects on sustainable performance outcomes (Abdul-Rashid et al., 2017; Chin et al., 2015), although other studies have highlighted the negative relationships (Bowen et al., 2001; Cordeiro and Sarkis, 1997). The resulting unclearly defined link between GSCM approval and the consequent performance in the literature begs for a further explanation of the reasons for the success of some firms in implementing GSCM and the failure of others. A better understanding of the organisational barriers which make GSCM adoption difficult is essential (Jabbour and de Sousa Jabbour, 2016). This empirical study argues, in light of the above research, that a combined investigation of GHRM and GSCM practices will provide a much better understanding of the effects of both areas on sustainable performance and will provide very useful insights for future theory and practice.
- iii. This research is considered as the first empirical work exploring the impact of GHRM and GSCM on the TBL of sustainability, adding significant evidence from Palestine to the current GHRM-GSCM literature.

In keeping with its aims, the article is designed as follows. Section two provides the research background on GHRM and GSCM practices. Section three presents a theoretical model for the study and proposes a set of hypotheses, followed by the research methodology in section four. Research results are analysed in section five and discussed in section six, before presenting the final comments of this study in section seven.

2. Research background

The importance of the role of HRM in enhancing environmental performance has, in fact, been recognised and noticed from the mid-nineties (Milliman and Clair, 1996), and its positive desired consequences on environmental performance have been progressively explored as well (Jackson and Seo, 2010; Wagner, 2013). Many human resource practices have been identified to effectively disseminate green ideologies (Fernández et al., 2003) and to assist in the adoption of green management initiatives (Jabbour and Santos, 2008a, 2008b). According to a new review of various empirical studies, Renwick et al. (2013) argued that a cluster of HRM practices (i.e. the so-called GHRM bundle, comprising unchangeable and adherent HRM practices) improves ecological performance by deploying environmental values and principles within the organisation. In other words, the GHRM bundle's practices are known to have a positive effect on greening an organisation. This study also considers the GHRM bundle as a cohesive set of human resource practices, which has consequences for the performance of manufacturing firms through:

- (i) green hiring (GH);
- (ii) green training and involvement (GTI);
- (iii) green performance management and compensation (GPC).

These practical measures should be implemented by those who are responsible for guiding a team, with the main aim of instilling environmentally-friendly attitudes in the working environment (Kim et al., 2017).

This study selected these three practices as the GHRM bundle practices as they were deemed the top such practices by Longoni et al. (2016) and Guerci et al. (2016) for their effectiveness in spreading green ideologies and culture within organisations, and for the synergistic impact of their joint adoption. The HRM literature, according to criticism from Combs et al. (2006) and Longoni et al. (2016), has nevertheless focused extensively on individual practices rather than a set of practices. This research, in contrast, identifies human resources as 'bundles' which have the potential to improve organisational performance. This is congruent with Renwick et al.'s (2013) study, which called for more studies on the relationship between GHRM bundle practices and firm outcome. Previous GHRM studies focused largely on the effect of environmental dimensions, while explorations of the linkage between GHRM practices and the TBL approach are rare.

In the area of SCM, however, organisations have increasingly paid attention to the responsibility for their suppliers and customers, as well as for their internal operational processes, thereby broadening ecological management practices external to an organisation's usual limitations (Krause et al., 2009). Interest in GSCM from experts in business operations is growing, largely due to an increasing awareness of the harmful effects of manufacturing organisations on nature. GSCM is therefore considered to be a means of effective strategic management which improves the environmental performance of manufacturing firms, in addition to improving other sustainability performance targets (Hassan et al., 2016). De Giovanni (2012) supports this by stating that GSCM is

not just a tool for minimising the environmental footprints of products and operations, but is also a unique strategy for providing economic benefits as well as enhancing social welfare. Additionally, it can be seen from the existing empirical evidence that eco-friendly practices generally exhibit decent social performance, such as gaining loyalty from customers (De Giovanni, 2012) and improving corporate image (Eltayeb and Zailani, 2011).

GSCM practices can be defined in this paper as both intrinsic and extrinsic directed practices (Gimenez et al., 2012; Wolf, 2014), which are adopted to implement green values across different supply chain processes (Srivastava, 2007). Table 1 illustrates internal and external GSCM practices as detailed in the current supply chain literature.

However, there have been numerous adoptions and discussions made in previous works of literature on these practices (De Giovanni, 2012; Laari et al., 2016; Yang et al., 2013; Zhu et al., 2013). Besides providing a competitive advantage, adoption of these two sets of intra- and inter-organisational green practices is possible by any members in the supply chain, either on the upstream or downstream side of the chain (Sarkis, 2012; Zhu et al., 2008). Indeed, many researchers have called to conduct more research on investigating the relationships between multiple dimensions of GSCM, such as internal GSCM practices (Int-GSCM) and external GSCM practices (Ext-GSCM) (Yu et al., 2014; Zhu et al., 2012) and sustainable performance, to help illustrate the inconsistency of results in GSCM literature (Geng et al., 2017; Yu et al., 2014).

The sustainability concept has become increasingly important in business operations, SCM, and HRM. For instance, Jackson and Seo (2010) laid out the need for HRM involvement in sustainability; on the other hand, Vachon and Klassen (2008) stated that environmental sustainability is a supply chain imperative. An effective assessment of sustainable performance passes through the simultaneous evaluation of economic, environmental and social performance (GRI, 2006). As a result, for a business to operate successfully at the current time and in the future, it needs to embrace the concept of sustainability, especially the TBL (Hussain et al., 2018). Hence, the components of the TBL of sustainability performance have the same weight and create shared value (Svensson et al., 2018). However, the environmental performance refers to the ability of the organisation to reduce air emissions and effluent waste, decrease consumption of hazardous and toxic material, as well as lower the frequency of environmental accidents (Zhu et al., 2008); meanwhile social performance refers to the real effects of green practices on the social aspects related to the image of firm and their goods from the viewpoint of various stakeholders such as suppliers, employees, customers, and the public (Newman et al., 2016). The economic performance refers to financial and marketing performance improvements resulting from implementing green practices that enhance the organisation's position compared to the industry average (Green and Inman, 2005; Zhu et al., 2005). Hence, the sustainable performance, for the purposes of the present study, is defined as the actual output from the implementation both of GSCM and GHRM practices on the organisation's environmental, economic, and social performance.

This study, therefore, builds on new studies on the linkage

Table 1
GSCM practices.

Practices	Definition
Internal GSCM practices (Int-GSCM)	Activities without direct supplier or customer involvement, which can be managed and implemented by an individual manufacturer and involve areas such as internal environmental management (IEM) and eco-design (ECO). (Bon et al., 2018; Zhu et al., 2012).
External GSCM practices (Ext-GSCM)	The environmental management practices which need partial cooperation and transactions with suppliers and customers in terms of their environmental cooperation (EC), green purchasing (GP), and reverse logistics (RL). (Bon et al., 2018; Zhu et al., 2013).

between GHRM practices, GSCM practices and sustainable performance, supported by the resource-based view (RBV) theory (Barney, 1991). In terms of the RBV of green supply chains, when HRM and environmental management work in conjunction, obstacles to the successful execution of GSCM can be overcome (Sarkis et al., 2010). For example, the common GSCM goal of achieving cleaner production relies on a responsible and expert green workforce. The hypotheses for this study are formulated based firstly on research into the separate effects of GHRM and GSCM on sustainable performance, in section 3.1 and section 3.2 respectively, then an examination of the connection between these two areas of practice in section 3.3.

3. Hypotheses development

3.1. GHRM practices and sustainable performance

It is recognised that considering greener actions in every step of HRM tasks is vital, since HRM practices support the implementation and maintenance of an environmental management system, thereby assisting a company in achieving a better environmental performance (EP) (Jabbour and Santos, 2008b). In fact, GHRM plays an essential part in the spread and greening of firms in an effective way (Nejati et al., 2017). In addition to the obvious benefits to the environment, the implementation of green initiatives increases a company's appeal and leads to talent retention, making GHRM a crucial area of business management (Patel, 2014). Previous literature on HRM generally concentrated on the effect of individual practices on the performance of firms, rather than on a bundle of practices (Combs et al., 2006). Renwick et al. (2013) hypothesised that GHRM practices may have greater effects on environmental and organisational performance if they were jointly implemented. In line with this view, recent GHRM literature has primarily revolved around the impact of GHRM practices on the organisational performance of bundles (Longoni et al., 2016; Renwick et al., 2013). According to Russo and Fouts (1997), the RBV is capable of differentiating the resources utilised by organisations. This is believed to affect an organisation's EP and ultimately improve its economic performance (Ec.P) (Solovida et al., 2017). Thus, by understanding GHRM practices, organisations can improve their EP in a sustainable manner (Arulrajah et al., 2015). Therefore, we hypothesise and theorise that:

H1a. GHRM bundles positively affect EP.

It has been remarked by some researchers that if employee qualities such as motivation, competence, etc. are the results of green practices in their workplace, then financial performance may consequently improve (Epstein and Roy, 2001; Turban and Greening, 1997). Worker recruitment, which takes green credentials into consideration, or at least concern for the environment, can, in turn, attract a higher calibre of staff who apply because of a firm's good record of environmental practice (Linnenluecke and Griffiths, 2010; Ramus and Steger, 2000). Also beneficial for a company is the development and encouragement of an employee's environmental interests and activities, which may lead to skill and motivation improvements, better retention and work-related results, and better overall Ec.P (Wagner, 2013, 2015). Margaretha and Saragih (2013) point out that organisations tend to adopt green sustainable business practices and aim at a greener corporate culture with the general goals of better efficiencies, decreased costs, and an altogether better atmosphere for employee engagement. Improved sales and a reduction in costs are the result of promoting a greener culture (Mehta and Chugan, 2015); therefore, we hypothesise that:

H1b. GHRM bundles positively affect Ec.P.

It is widely accepted that there are many benefits for companies associated with tackling environmental issues; not least an improved level of employee satisfaction, better stakeholder relationships, staff retention, and a more acceptable brand image (Khurshid and Darzi, 2016). Other benefits are also recognised, such as improved social responsibility awareness among the workforce and the recruitment and retention of talent (Mehta and Chugan, 2015). Wagner (2013), in fact, claimed that there is evidence that those companies which invested in social responsibilities had gained tangible benefits regarding customer and employee satisfaction, excellent staff recruitment, and innovation, factors likely to consolidate a firm's social performance (SP). As mentioned by Rezaei-Moghaddam (2016), those manufacturing firms which invested in social programmes took an important step by reinforcing GHRM. Such programmes naturally focus on the health and safety of employees, to prevent them from being exposed to detrimental emissions, for example. In addition to having a reporting role, it is argued that incorporating green programmes will improve the performance of manufacturing companies' sustainability.

In the case of SP, it is clearly important for organisations to ensure that their production operations include social activities which can enhance the effects of plant actions on both internal communities (i.e. staff) and external communities (i.e. customers and suppliers) (Pullman et al., 2009). In addition, there is evidence to show that organisations which had adopted GHRM practices were found to significantly contribute to the living conditions of their employees, in addition to satisfying their environmental needs. The consequence was an overall positive effect on the Ec.P of the company and on the welfare of employees (Renwick et al., 2013); Mandip (2012) also affirms that employee health and general welfare benefitted from very positive effects via their company's adoption of GHRM practices and policies. Taking account of this very positive body of research, this study's research hypotheses were developed, as follows:

H1c. GHRM bundles positively affect SP.

3.2. GSCM practices and sustainable performance

Concerning Ext-GSCM, both Diabat et al. (2013) and Green et al. (2012) found that a positive relationship exists between green purchase (GP), reverse logistics (RL) and cooperation with customers that are a part of Ext-GSCM practices and EP. Other studies proposed that GP and environmental cooperation (EC) motivate suppliers and customers to perform in a more desirably eco-friendly way and to decrease their unsustainable behaviour, which would lead to a positive impact on the EP of manufacturing companies (De Sousa et al., 2017; Diabat and Govindan, 2011; Simpson et al., 2007; Theyel, 2006). Indeed, conducting educational and monitoring programmes with the suppliers can assist organisations in providing materials in the final product which can be characterised as only slightly polluting the environment, thereby improving the EP of organisations (Gimenez et al., 2012). Accordingly, the following hypotheses were developed:

H2. GSCM positively affects EP

H2a. Ext-GSCM positively affects EP

H2b. Int-GSCM positively affects EP

Recently, many empirical studies discovered that a positive linkage between GSCM practices and Ec.P led companies to acquire a competitive advantage (Green et al., 2012; Laosirihongthong et al.,

2013; Rao and Holt, 2005). This was especially the case for manufacturers in developing countries (Ganeshkumar and Mohan, 2015; Younis et al., 2016). Ec.P has, understandably then, become increasingly essential and manufacturers have begun approving and adopting proactive means, for example, moving towards cleaner production and green management, side by side with GSCM, to improve their Ec.P (Zhu and Sarkis, 2007).

It is possible for companies to achieve a higher level of efficiency and a reduction in resources used, which will result in total cost savings, by means of concentration on internal GSCM that adopts eco-friendly manufacturing practices (Gimenez et al., 2012; Rao and Holt, 2005). For example, Koh et al. (2012) found that an eco-design (ECO) which is part of Int-GSCM implies that the reduction of waste and the efficient use of materials will lead to cost savings which positively affect the Ec.P of the firm. Similarly, Sroufe (2006) noted a positive linkage between ECO practices and cost reduction via the more probable sale of products in international markets, and other benefits which outweigh the costs of implementing those practices.

Ext-GSCM also proved to have a positive impact on the Ec.P of a firm (Diabat et al., 2013; Green et al., 2012). For instance, Gimenez et al. (2012) emphasised that an EC with suppliers resulted in increased production efficiency as well as savings in operational costs due to waste minimisation in the manufacturing processes. Furthermore, through minimising their toxic material utilisation, eliminating or disposing of random product components, and reducing the environmental influence of their products via Ext-GSCM and Int-GSCM, companies may gain distinct advantages which positively affect the areas of organisation, sales, and revenue (Porter and Kramer, 2006). Holt and Ghobadian (2009) observed that Ext-GSCM such as GP leads to Ec.P (cost savings and an increase in profits, sales, and market share). Similarly, Carter et al. (2000) found that GP is associated with an increase in net income and a decrease in the cost of goods sold. Accordingly, the following hypotheses postulate that:

H3. GSCM positively affects Ec.P

H3a. Ext-GSCM positively affects Ec.P.

H3b. Int-GSCM positively affects Ec.P.

The adoption of green practices is believed to improve the conditions that employees work under and the local community, where people can enjoy a healthier life (Rani and Mishra, 2014). Specifically, the implementation of manufacturing operations that are environmentally oriented and which pollute less have a positive effect on the social dimensions of staff and society, as proposed by Elkington (2004). Emphasising this point, De Giovanni (2012) proposed that several social goals can be achieved by corporations such as customer protection, transparency in the market, and environmental preservation. Organisations incorporating GSCM into their business actions may thus positively contribute to SP.

Despite the limited number of empirical studies on the relationship between GSCM practices and SP, the available empirical evidence shows that eco-friendly practices, in general, have a considerable social function such as promoting customer loyalty (De Giovanni, 2012), enhancing the corporate image (Eltayeb and Zailani, 2011), healthcare, equal opportunity, safe products and working conditions, and respect towards the law and ethical behaviour (Porter and Kramer, 2006). Accordingly, the following hypotheses postulate that:

H4. GSCM positively affects SP.

H4a. Ext-GSCM positively affects SP.

H4b. Int-GSCM positively affects SP.

3.3. Relationship between GHRM and GSCM

Lastly, this study suggests that examining the linkage between GHRM and GSCM may help to better identify the mechanisms by which they affect the components of sustainable performance. The RBV, as applied by Barney (1991), proposed that the HRM practices affect organisational performance by transforming the employees into an extraordinary, important and unique resource. The utilisation of such a resource in the development of the business means that the organisation's goals can be better supported (Ray et al., 2004). This is affirmed by Chen et al. (2009), who proposed that the utilisation of talent in supply chain operations (internal and external) contributes to an organisation's goals. Moreover, talented employees in SCM can also enhance the performance of the supply chain, which in turn leads to a sustainable competitive advantage (Ellinger and Ellinger, 2014). Of course, a competitive advantage may also be derived from the interaction mechanism of various resources (Hohenstein et al., 2014). It may be stated, then, that the literature is broadly in agreement that an effective implementation of GSCM practices depends primarily on GHRM practices (Jabbour et al., 2017). Or, to put it another way, the absence of HRM practices results in the lack of availability of engaged employees who are environmentally competent, and the conventional organisational culture can be an obstacle to the adoption of GSCM practices (Jabbour and de Sousa Jabbour, 2016). This study, therefore, extends these experimental studies through also exploring the impact on sustainable performance.

Indeed, GHRM plays a significant role in disseminating environmental ideologies and standards, and by encouraging the recruitment of staff who are talented and committed to implementing environmental ideologies and standards in the foundation of a supply chain business development (Jabbour and de Sousa Jabbour, 2016; Nejati et al., 2017). Longoni et al. (2016) confirm that GSCM practices perform a mediating role between GHRM practices and EP relationships. Taking the theoretical viewpoint of RBV allows for a more systematic investigation of the relationship between GHRM-GSCM practices and sustainable performance by specifying the link between these green practices and sustainable outcomes. Based on the above assertions, the following hypotheses were developed:

H5. The GHRM bundle positively affects Ext-GSCM practices.

H6. The GHRM bundle positively affects Int-GSCM practices.

H7. The Int-GSCM practices mediate between the GHRM bundle practices and the sustainable performance.

H7a. The Int-GSCM practices mediate between the GHRM bundle practices and the EP.

H7b. The Int-GSCM practices mediate between the GHRM bundle practices and the Ec.P.

H7c. The Int-GSCM practices mediate between the GHRM bundle practices and the SP.

H8. The Ext-GSCM practices mediate between the GHRM bundle practices and the sustainable performance.

H8a. The Ext-GSCM practices mediate between the GHRM bundle practices and the EP.

H8b. The Ext -GSCM practices mediate between the GHRM bundle practices and the Ec.P.

H8c. The Ext -GSCM practices mediate between the GHRM bundle practices and the SP.

The framework of the current study is presented in Fig. 1, where

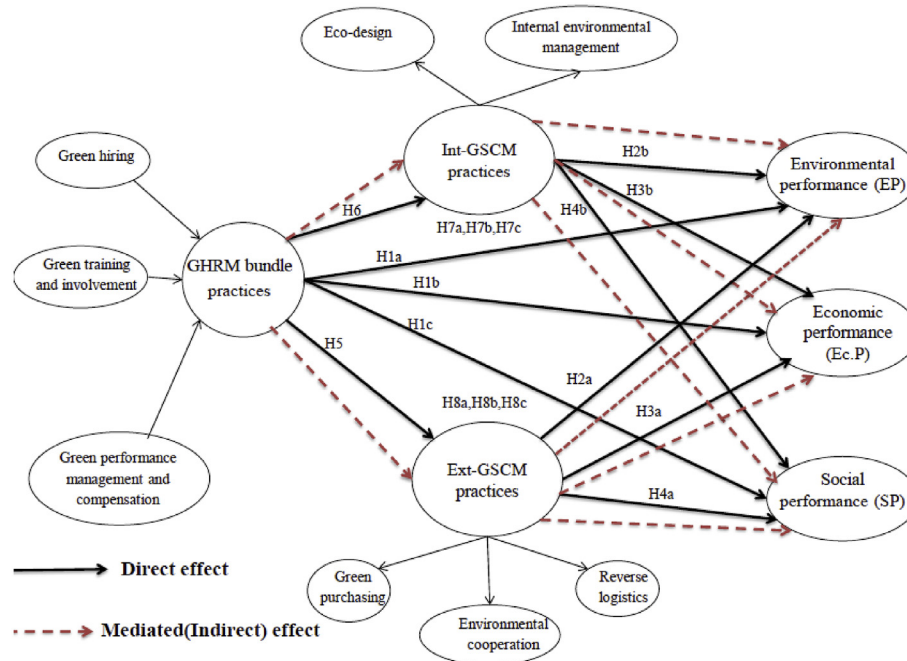


Fig. 1. Conceptual framework.

the study hypotheses are identified. The theoretical framework was empirically tested in the context of Palestine. It includes direct effects from GHRM bundle practices, Int-GSCM and Ext-GSCM towards the components of sustainable performance (i.e. EP, Ec.P and SP), as well as the mediating effect of Int-GSCM and Ext-GSCM on the relationship between the GHRM bundle and components of sustainable performance.

4. Methodology

To test these hypotheses, a multi-respondent survey was conducted to obtain the perception of participants who best understand GHRM and GSCM practices. The participants were senior human resource managers and senior supply chain managers, and they were given separate surveys. This method allowed researchers to evade any type of biases that individual respondents could be susceptible to. Having two different sets of questionnaires enabled the separate analysis of the relationship between GHRM and GSCM practices with sustainable performance. Furthermore, for cases in which a respondent did not provide any response, the measurement of the effect can be based on other respondents' feedback (Guerci et al., 2016). In this research, measures of predictor and criterion variables were retrieved from different sources, which assisted in controlling for method bias (Podsakoff et al., 2012).

4.1. Data collection

Data collection was carried out in Palestine in 2017. Manufacturing companies that operate in the production sectors (i.e. food, chemical, and pharmaceutical) which produce the highest amount of pollution and had implemented green initiatives were chosen for the survey. The Palestinian Federation of Industries (PFI) was contacted to obtain basic data on these manufacturing organisations such as location, the name of the organisation, the year of foundation, contact information, and the number of employees. Based on the database of the PFI, the total available population of manufacturing organisations was 220. To meet the

objectives of this study, it was necessary to only select manufacturers which implement green practices. For this purpose, each organisation's supply chain or human resource manager (the study survey respondents) was contacted by means of a telephone call to ascertain whether any green practices were being implemented in their organisation and to what extent. This preceded sending the survey in electronic format. It was believed that supply chain and human resource managers were best placed to give accurate information reflecting the real company situation, in particular regarding the research variables needed to test the hypothesised relationships. Out of 220 manufacturing firms, 160 of them had adopted GHRM and GSCM practices and accepted to participate in the study. To check for the validity and consistency of the questionnaire, it was administered firstly to five senior managers and expert practitioners as a pilot test before it was to be used for this study. The pilot-testing process, as deemed necessary by Masri and Jaaron (2017), gave indications to rearrange certain elements of the questionnaire and proved a useful tool. Data was collected from beginning of October 2017 to the end of January 2018 via a customised web-based survey; this was sent via email to human resource and supply chain managers in all of the targeted manufacturing firms which had agreed to participate in the survey. A total of 248 customised questionnaires were ultimately collected from 124 companies, while the remaining 36 companies did not respond. Three of the total number of respondents (i.e. 124) failed to complete the questionnaires, citing reasons such as staffing constraints, contravening company rules, and a huge amount of missing data. An average response rate of approximately 75.6% was attained, whereby supply chain and human resource managers from 121 companies returned a completed questionnaire. Respondents' quality was sufficient; most were human resource or supply chain directors or senior managers, with an average seniority of more than five years in their position. The sample size of 121 is considered adequate for performing data analysis using SEM-Partial Least Squares (PLS) (Hair et al., 2017). It can be noted that this data set is within the limits of the accepted criterion which states that the sample size must be at least 10 times larger than the

biggest number of structural paths directed towards any single construct (Chin et al., 2003). In this study, a two-tailed *t*-test was used to test non-respondent bias. Respondents were divided into two groups: those who gave an early response and those who responded late to the survey (Armstrong and Overton, 1977). Both groups did not present any statistically significant differences in terms of the variables. Common method bias was also subject to control, via the statistical test and overall survey design (Podsakoff et al., 2012).

4.2. Measurement development

In this research, GHRM bundle practices were operated as a second-order formative construct with first-order dimensions (see Fig. 1). Selecting a formative model instead of a reflective one concurs with Longoni et al.'s (2016) study, in which each construct was of first-order dimension. In addition, findings regarding endorsed methodology in past studies on human resource management also agree with this choice (Chadwick, 2010). Initially, the GHRM bundle construct consisted of three dimensions, namely, GH, GTI, and GPC, and 11 items. These original items were acquired after a review of previous questionnaires and research literature (Guerci et al., 2016; Longoni et al., 2016). All items were measured using a 5-point Likert scale, which ranged from 1 (very low extent) to 5 (very high extent).

On the other hand, both Ext-GSCM and Int-GSCM practices were operationalised as second-order reflective constructs with first-order dimensions (see Fig. 1). To measure the first-order dimensions and second-order constructs, multi-item scales were employed. These scales were utilised to ensure reliability, allow a greater variance of respondents, lower the probability of errors, and improve the validity of survey results (Fuchs and Diamantopoulos, 2009). As with choosing the formative model for GHRM bundle practices, the reflective model was selected for Ext-GSCM and Int-GSCM practices based on previous studies. This research noted some overlap between each construct's first-order dimensions, shared themes, and that the dimensions also measured the second-order construct's conceptual model (De Sousa et al., 2015; Kirchoff et al., 2016). Nevertheless, the Ext-GSCM construct was characterised by three dimensions, i.e. GP, EC, and RL, quantified by GSCM's reflective scales. GP was measured utilising five items adapted from Laosirihongthong et al. (2013) and Younis et al. (2016), whereas EC used six items, adapted from Younis et al. (2016), Zsidisin and Hendrick (1998) and Vachon and Klassen (2008). Meanwhile, RL was quantified using three items adapted from Younis et al. (2016). Firstly, the Int-GSCM construct consisted of two dimensions (ECO and internal environmental management (IEM)) and was recognised by the reflective scales utilised to evaluate these two GSCM dimensions. To measure ECO, this study employed five items adapted from Laosirihongthong et al. (2013) and Abdullah et al. (2015). Secondly, for IEM, six items adapted from Zhu et al. (2008, 2013) were applied. Based on a 5-point Likert-type scale from 1 (very low extent) to 5 (very high extent), respondents had to pick their preference.

Besides that, for EP and Ec.P, five items were adapted from Zhu et al. (2013, 2008) and seven from Zhu et al. (2005) and Green and Inman (2005), respectively. Lastly, five items were adapted from De Giovanni (2012) and Abdullah et al. (2015) for SP (see Table 2). Palestinian senior human resource and supply chain managers were requested to indicate their preference according to a 5-point Likert scale, ranging from 1 (not significant) to 5 (highly significant). Furthermore, they were asked to provide a statement representing, from their point of view, the level of performance that has been achieved by their company over the past two years. Every adapted measurement for items with its sources in this present

study is tabulated in Table 2.

It is crucial to note that in this research, ISO 14001 certification was used as a control variable to maximise the hardness and reliability of the findings. Past research determined that this variable held a notable effect on dependent variables, like the ones employed in this current study (Masri and Jaaron, 2017; Younis et al., 2016). Moreover, ISO 14001 certified firms presented a strong correlation between a company's performance and its GSCM practices, as emphasised in prior studies (Laosirihongthong et al., 2013). For instance, Lee et al. (2012) found a clear association between greening the supplier and manufacturing organisations' EP.

5. Data analysis and results

To test H1a to H8c, the PLS-SEM analysis method was applied using the SmartPLS 3.2.7 software, which is a second-generation multivariate analytical tool used to determine novel theories. As mentioned by Hair et al. (2017), PLS-SEM can concurrently identify the hypotheses and statistical properties of a conceptual framework. Presently, this technique is widely utilised in research on management (Peng and Lai, 2012).

Table 2 lists the measurement scales of reflective constructs for GHRM bundle practices (GH, GPC, and GTI), Int-GSCM (ECO and IEM), Ext-GSCM (GP, EC, and RL), and components of sustainable performance (EP, Ec.P, and SP). To specify the 11 reflective constructs' convergent credibility and internal consistency, three tests were conducted to determine the item loading, composite reliability (CR), and average variance extracted (AVE) of constructs. As recommended by Chin (1998), item loadings ranged between 0.791 and 0.958, whereas the given underlying construct factors were higher than 0.7 (see Fig. 2). Besides this, the CR values were greater than Nunnally and Burstein's (1994) threshold of 0.7. Similarly, AVE also exceeded the accepted threshold of 0.5, therefore achieving sufficient convergent validity, as posited by Fornell and Larcker (1981).

Table 3 lists the weight of all the reflective factors that form the GHRM bundle. As presented in this table, the traditional variance inflation factor (VIF) for all factors was lower than the threshold value of 3.3 (Diamantopoulos and Sigauw, 2006), showing that multicollinearity was not a problem in the research model.

After establishing the viability of research measurement properties, second-order variable scores were used for the analysis. Since it was also essential to test for discriminant validity, the squared correlation between each pair of constructs was compared, with estimates taken of their AVE (Fornell and Larcker, 1981). The validity condition for AVE estimates was fulfilled and it was higher than the squared correlation between each pair of constructs, as shown in Table 4.

Additionally, as proposed by Henseler et al. (2015), discriminant validity was also verified via the heterotrait-monotrait ratio (HTMT). Each HTMT ratio, as listed in Table 5, was less than the most restraining threshold of 0.85. This demonstrates a healthy discriminant validity property.

Furthermore, tests suggested by Peng and Lai (2012) were also performed to determine the structural model's strength and quality. All of the tests' results were satisfactory. Table 6 presents the findings for Stone-Geisser's Q^2 (all exceeded the threshold value of 0), relative effect sizes (f^2) of the GHRM bundle construct, and R^2 . The resulting goodness of fit (GoF) was 0.498.

In Table 7, the outcomes of the proposed hypotheses (direct effects) are tabulated, which include the beta and corresponding *t*-values that are crucial based on the two-tailed *t*-test and VIF. As proposed by Ramayah et al. (2016), this study's hypotheses were tested by running a bootstrapping procedure. Thus, to acquire the *t*-values, bootstrapping with 1000 resamples was employed.

Table 2
A measurement property of reflective constructs.

Reflective Constructs	Construct items	Item Loading	CR	AVE	Items source
GH	Employees are hired based on the company's environmental criteria	0.950	0.953	0.651	Guerci et al. (2016) Longoni et al. (2016)
	Employees become preferable through their environmental commitment	0.958			
GPC	Managers' environmental objective	0.791	0.923	0.705	
	Assessment of managers comprise their environmental performance	0.860			
	Assessment of employees comprise their environmental performance	0.895			
	Reward of non-monetary incentives for achieving targeted environmental performance	0.840			
GTI	Payment of variable compensation according to environmental performance	0.808	0.944	0.808	
	Arrange ecological training for employees	0.910			
	Arrange ecological training for managers	0.916			
	Environmental responsibility is part of the job description	0.897			
ECO	Employees participate in matters concerning environmental issues	0.873	0.826	0.589	Laosirihongthong et al. (2013) Abdullah et al. (2015)
	Design of products that lessens the utilisation of materials or energy	0.737			
	Design of products that allow reuse, recycling, and recovering of material and component parts	0.777			
	Design of products that prevents or decreases the usage and/or manufacture of hazardous substances	0.775			
IEM	Ensure that the products' packaging is reusable	0.763	0.938	0.764	Zhu et al. (2013) Zhu et al. (2008)
	Employ life cycle assessment to assess the products' environmental load	0.785			
	Top-level management's dedication to GSCM	0.907			
	Mid-level managers' backing for GSCM	0.854			
	Cross-functional collaboration to attain environmental improvements	0.871			
	Environmental factors are integrated into the internal performance-evaluation system	0.904			
GP	Creation of environmental reports for internal assessment	0.823	0.908	0.732	Laosirihongthong et al. (2013) Younis et al. (2016)
	Execution of total quality environmental management (TQEM)	0.882			
	Provide design specification, which includes environmental requirements for purchased items, to suppliers	0.918			
	Ensure bought products do not contain environmentally undesirable items like lead and other harmful or noxious materials	0.796			
	Selection of suppliers is based on the company's environmental criteria	0.797			
	Suppliers are expected to build and sustain an environmental management system (EMS)	0.864			
EC	Suppliers are required to utilise environmental packaging, i.e. degradable and non-hazardous	0.896	0.939	0.767	Zsidisin and Hendrick (1998) Younis et al. (2016) Vachon and Klassen (2006)
	Collaborate with suppliers and customers to develop products according to eco-design principles	0.885			
	Collaborate with suppliers and customers regarding cleaner production initiative	0.910			
	Collaborate with suppliers and customers regarding green packaging	0.868			
	Collaborate with suppliers and customers regarding the use of less energy during conveyance of products	0.819			
	Conduct joint planning to predict and solve issues concerning the environment	0.880			
RL	Make joint decisions with other supply chain members regarding ways to lower products' overall environmental impact	0.889	0.791	0.702	Younis et al. (2016)
	Practicing remanufacturing	0.850			
	Salvaging the company's end-of-life products	0.855			
EP	Employing packaging take-back system	0.808	0.929	0.723	Zhu et al. (2013) Zhu et al. (2008)
	Lower discharge of noxious chemicals into the air and water	0.865			
	Lesser waste and recycling of materials during the manufacturing process	0.838			
	Increase in the usage of renewable energy and sustainable fuels	0.896			
	Enhancement in the company's environmental state	0.832			
Ec.P	Reduction in the frequency of environmental mishaps	0.820	0.919	0.675	Zhu et al. (2005) Green and Inman (2005)
	Reduction in cost of acquiring materials	0.840			
	Reduction in cost of energy utilisation	0.851			
	Reduction in fee for treatment and discharge of waste	0.791			
	Reduction in penalty for environmental mishaps	0.900			
	Average return on sales and investment over the past two years	0.869			
	Average profit and profit growth over the past two years	0.749			
	Average growth in market share over the past two years	0.739			
SP	Employees' health and safety	0.873	0.957	0.816	De Giovanni (2012) Abdullah et al. (2015)
	Improving community health and safety	0.910			
	Development of economic activities	0.928			
	Providing inducements to engage local employment	0.945			
	Lowering the adverse impact of products and processes on the local community	0.858			

As displayed in Table 7, the relationships between GHRM bundle practices and sustainable performance, namely, EP, Ec.P, and SP, were positive, hence supporting H1a, H1b, and H1c. Next, the relationships between Int-GSCM practices and the components of sustainable performance were also positive. Therefore, H2b, H3b, and H4b are supported. On the other hand, an Ext-GSCM practice was positively associated with EP only, thus supporting H2a but not H3a and H4a. The outcomes suggest that GHRM bundle practices had a positive effect on the adoption of external and internal GSCM, hence supporting H5 and H6.

Lastly, using SmartPLS 3.2.7 software, mediation effects were examined. In this present study's model, EP, Ec.P, and SP were predictive through GHRM bundle practices; however, the effects manifested separately via several mediators, i.e. external and internal GSCM. Memon et al. (2018) have proposed that scholars must estimate specific indirect effects, rather than total indirect effects, when examining models with multiple mediators. Nevertheless, Smart PLS 3.2.7 software's latest releases comprise a new feature to evaluate multiple mediators, known as 'multiple specific indirect effects (mediation)'. This feature automatically supplies measures

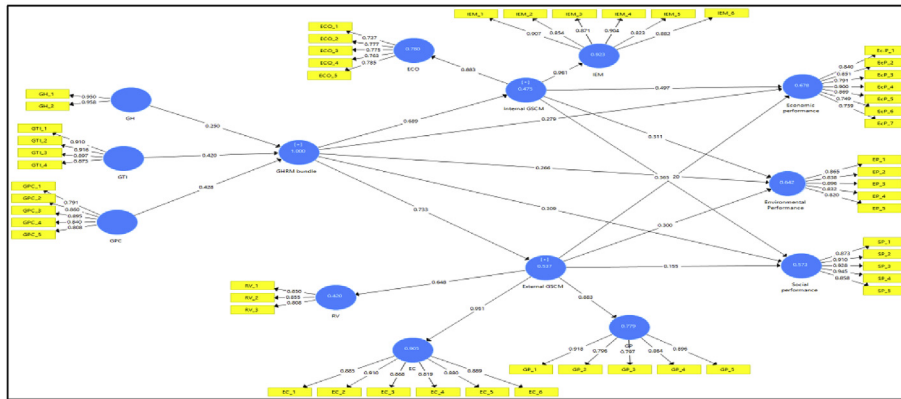


Fig. 2. Measurement model.

Table 3
Formative construct assessment.

Second-order construct	First-order construct	Weight	t-value	VIF
GHRM bundle	GH	0.264	8.093	1.718
	GTI	0.440	12.278	1.946
	GPC	0.530	14.471	2.885

of a specific indirect effect for each mediator that is mediation through Int-GSCM and Ext-GSCM, or through any number of mediators. Consequently, the evaluation of models with multiple mediators is made easier (Memon et al., 2018). Thus, the investigation of mediated relationships is one of this study's contributions. Table 8 displays the findings of the specific indirect effect for the mediating variable.

Mediation test results exposed that Int-GSCM practices mediated the relationship between GHRM bundle and sustainable

Table 6
R², Communality, and redundancy.

Construct	R ² adj	Q ²	f ² (EP)	f ² (Ec.P)	f ² (SP)
GHRM bundle	—	0.603	0.153	0.170	0.100
Int-GSCM	0.482	0.343	0.081	0.369	0.163
Ext-GSCM	0.536	0.384	0.100	0.015	0.012
EP	0.587	0.411	—	—	—
Ec.P	0.623	0.413	—	—	—
SP	0.5303	0.412	—	—	—

performance (EP, Ec.P, and SP), thus supporting H7a, H7b, and H7c. In contrast, Ext-GSCM practices mediated only the relationship between the GHRM bundle and EP; subsequently, H8b and H8c were not supported. Lastly, concerning the control variable, the findings revealed that ISO 14001 certification was significant (see Table 7). Hence, this showed that Palestinian companies have begun to pay more attention to environmental issues by starting to

Table 4
Discriminant validity of the measurement model.

Constructs	EC	ECO	Ec.P	EP	GH	GP	GPC	GTI	IEM	RL	SP
EC	0.876										
ECO	0.690	0.768									
EP	0.665	0.709	0.822								
Ec.P	0.719	0.646	0.804	0.851							
GH	0.637	0.569	0.802	0.721	0.954						
GP	0.737	0.640	0.649	0.637	0.564	0.856					
GPC	0.694	0.467	0.571	0.607	0.669	0.528	0.840				
GTI	0.665	0.48	0.628	0.614	0.676	0.597	0.817	0.899			
IEM	0.713	0.719	0.747	0.716	0.645	0.731	0.594	0.665	0.874		
RL	0.559	0.644	0.577	0.53	0.486	0.389	0.392	0.302	0.488	0.838	
SP	0.629	0.603	0.811	0.731	0.771	0.645	0.542	0.592	0.688	0.410	0.904

Table 5
Heterotrait-monotrait ratio (HTMT).

Constructs	EC	ECO	Ec.P	EP	GH	GP	GPC	GTI	IEM	RL	SP
EC											
ECO	0.781										
Ec.P	0.718	0.810									
EP	0.777	0.737	0.755								
GH	0.692	0.660	0.802	0.800							
GP	0.791	0.726	0.709	0.695	0.622						
GPC	0.751	0.537	0.627	0.662	0.741	0.573					
GTI	0.713	0.545	0.681	0.664	0.730	0.645	0.605				
IEM	0.759	0.809	0.801	0.77	0.702	0.789	0.643	0.715			
RL	0.630	0.781	0.662	0.599	0.557	0.447	0.458	0.339	0.545		
SP	0.666	0.677	0.799	0.792	0.837	0.694	0.583	0.632	0.728	0.457	

Table 7
Direct relations results.

Path	Hyp.	(β)	Std. Error	T- value	P-value	Results
GHRM bundle → EP	H1a	0.241	0.109	2.217	0.027	Supported
GHRM bundle → Ec.P	H1b	0.348	0.094	3.684	0.000	Supported
GHRM bundle → SP	H1c	0.312	0.138	2.259	0.024	Supported
Ext-GSCM → EP	H2a	0.308	0.130	2.374	0.018	Supported
Int-GSCM → EP	H2b	0.329	0.120	2.750	0.006	Supported
Ext-GSCM → Ec.P	H3a	0.034	0.142	0.239	0.309	Not supported
Int-GSCM → Ec.P	H3b	0.455	0.123	3.691	0.000	Supported
Ext-GSCM → SP	H4a	0.124	0.133	0.935	0.248	Not supported
Int-GSCM → SP	H4b	0.387	0.122	3.179	0.002	Supported
GHRM bundle → Ext-GSCM	H5	0.737	0.061	12.038	0.000	Supported
GHRM bundle → Int-GSCM	H6	0.699	0.064	10.995	0.000	Supported
ISO 14001 → EP		0.244	0.089	3.614	0.007	Supported
ISO 14001 → Ec.P		0.267	0.079	3.388	0.011	Supported
ISO 14001 → SP		0.210	0.08	4.628	0.029	Supported

Table 8
Mediation test results.

Path	Hyp	(β)	Std. Error	T- value	P-value	Results
GHRM bundle → Int-GSCM → EP	H7a	0.230	0.087	2.636	0.009	Supported
GHRM bundle → Int-GSCM → Ec.P	H7b	0.318	0.092	3.447	0.001	Supported
GHRM bundle → Int-GSCM → SP	H7c	0.271	0.096	2.815	0.005	Supported
GHRM bundle → Ext-GSCM → EP	H8a	0.227	0.095	2.388	0.017	Supported
GHRM bundle → Ext-GSCM → Ec.P	H8b	0.025	0.106	0.233	0.316	Not supported
GHRM bundle → Ext-GSCM → SP	H8c	0.091	0.104	0.881	0.279	Not supported

attain this kind of certification (i.e. ISO 14001).

6. Discussion

It is obvious that the results of this thorough study enable a deeper understanding of how the ethical obligations of business organisations towards the natural environment can be managed successfully. This study explores in some detail the efficiency of green management, including various organisational functions in relation to components of sustainable performance (i.e. EP, Ec.P, and SP). The results reveal a positive relationship between GHRM practices and EP (supporting H1a), with the likely explanation being that the successful dissemination of environmental ideologies and standards via GHRM bundles fosters the environmental management-based motivations and skills of employees. Opportunities are thereby created for employees to properly participate in the environmental development of their organisation (Cantor et al., 2012). A positive relationship is also found between the GHRM bundle and Ec.P (supporting H1b), where economic value is added to a company if it has an inspired and dedicated workforce (Weber, 2008). In addition, a positive relationship is found between the GHRM bundle and SP (supporting H1c) where implementing green practices brings the benefits of reduced costs, greater sustainability, and a renewed focus on corporate social responsibility, resulting in enhancing the reputation of the company and improving community health and safety (Vyas, 2016).

Although the results of the current study ensure that Int-GSCM and Ext-GSCM are positively associated with sustainable performance, the particular ways in which these practices are related to performance are dissimilar. Int-GSCM is positively associated with EP, Ec.P, and SP, and there may be a strategic 'fit' between such practices and the three types of performance (supporting H2b, H3b, and H4b). In fact, there is an association between Int-GSCM and a greater effectiveness in the application of inputs and assets (Schmidheiny, 1992), which in turn leads to reduced costs through product-recycling, energy saving initiatives (Zhu and Sarkis, 2004; Zhu et al., 2005), reduced re-work and waste (Kitazawa and Sarkis,

2000), and improved quality, in addition to the creation of new goods and processes (Yang et al., 2010). Besides, these practices have in common the essential role of improving the image of the organisation in front of the stakeholders (e.g. employees, suppliers, clients, and the government) (Abdullah et al., 2015). Furthermore, the organisation can achieve numerous social advantages, such as the improvement of employees' morals, and the loyalty and satisfaction of customers through the presence of a positive image (Eltayeb et al., 2011).

On the other hand, instead of being associated with Ec.P and SP, Ext-GSCM is, in fact, only associated with EP in the results (supporting H3a, but not H3b or H3c). Bowen et al. (2001) stated that Ec.P is clearly not earned from any short-term profitability, but is attained over a longer period after EP developments have taken place (Rao and Holt, 2005; Zhu et al., 2013). Undeniably, factors like a more ethical choice of suppliers, monitoring procedures and levels of cooperation with suppliers may have adverse effects on Ec.P, particularly in the short term, but effects might be positive in the long run (Lai and Wong, 2012). As supported by Longoni et al. (2016) who stated that such benefits are, of course, hard to notice, while more ethical practices probably require relational investment with suppliers, and benefits, such as lower costs or higher revenue, are not immediately obtained. Also, naturally, procurement costs for the main companies increase in the short term if the suppliers are obliged to make environmental-related investments. Nonetheless, positive long-term effects for environmentally-friendly companies are frequently observed. Actions such as the ethical selection of suppliers, for example, usually improve the reputation of an organisation, leading to an increase in sales (Geng et al., 2017; Longoni et al., 2016).

Indeed, there are two possible factors for weakness of the relationship between Ext-GSCM and SP. The first factor is the culture instilled in developing Asian economies, where recycling is not really implemented. This practice is seen as unrealistic by the industrial manufacturers on this continent (Geng et al., 2017). Similarly, it was highlighted by Lai et al. (2012) that the cooperation between these manufacturers, suppliers and stakeholders is

important in order to determine a number of external GSCM practices (e.g. recycling) that can lead to the improvement of the organisation's SP. The second possible factor is the implementation of external GSCM practices, which is insufficient to obtain better results (Zhu and Sarkis, 2006). This argument is supported by Laosirihongthong et al. (2013), who mentioned that several types of Ext-GSCM (i.e. EC) are not associated with SP due to the absence of awareness among most manufacturers in Asia regarding the effectiveness of this type of practice for improving an organisation's image.

The relationship between GHRM and GSCM practices is a major component of this study, where the impact of cross-functional environmental management systems on sustainable performance is demonstrated. The results clearly show that GHRM and GSCM do not independently influence EP, Ec.P, and SP, but do so via the expected mediation effect of GSCM practices on GHRM's sustainable performance relationship. However, the findings of the current study have shown strong and significant relationships between GHRM bundle practices and GSCM practices (i.e. Int-GSCM and Ext-GSCM) (supporting H5 and H6). These results square with the results reported recently by Nejati et al. (2017), Longoni et al. (2016), and Teixeira et al. (2016). Based on RBV (Hart and Dowell, 2011), the link between HRM and green management can help organisations to reduce the obstacles of implementing GSCM practices (Teixeira et al., 2016). Furthermore, in order to build a holistic green company, it must integrate environmental practices (i.e. GHRM and GSCM) to assist mutual learning (Mishra and Mishra, 2017). However, HRM is the main success factor in firms' green actions (Del Brío et al., 2007; Haddock-Millar et al., 2016). In this perspective, Teixeira et al. (2016) highlighted the significance of development, empowering staff and carrying out environmental training in supporting GSCM in the organisation.

In respect to mediation, the results also explain how EP is enhanced by the dissemination of environmental ideologies and standards, as well as by the application of Int-GSCM and Ext-GSCM to 'GHRM bundle-shaped employees' who are environmentally engaged, competent and inspired (supporting H7a and H8a). This is supported by Paulraj (2011) and Sarkis et al. (2010), which suggest that internal resources should guide the utilisation of GSCM practices. This study, therefore, connects with the wider discussion on the development of environmental management systems cross-functionally. The results of the current study are, in fact, consistent with the hypotheses proposed in previous important theoretical studies arguing that cross-functional integration is a prerequisite for effective environmental management (e.g. Boiral, 2003; Wong, 2013). More specifically, the results of this study principally support the hypothesised mediation model, in which researchers affirm that the cross-functional design and management of GHRM and GSCM practices are necessary. In fact, the alignments of human resource practices are important and crucial to the greening of firms, as they reduce barriers to GSCM adoption. In other words, GSCM requires more attention from green training programmes (Sarkis et al., 2010; Lin and Ho, 2011), which leads to improving the EP of the organisation.

In respect to Ec.P, the results of the current study show a positive relationship between GHRM practices and Int-GSCM utilisation, and that this leads naturally to a positive relationship between GHRM practices and Ec.P (supporting H7b). The findings also confirm the association between GHRM bundles and Ec.P by means of the enhancement of Int-GSCM, as an example of one intangible competitive advantage which is ultimately derived from Int-GSCM (Longoni et al., 2016). It should be stated, however, that few empirical studies have empirically tested this mediating relationship, which makes a comparison with much of the previous empirical research difficult. Mishra and Mishra (2017) argued that

the joint implementation of GHRM and GSCM provides environmental competitive advantages for firms via improved sales and enhanced innovation. They also emphasised that these practices help firms with cost-saving, due to minimising main cost centres (i.e. minimising talent loss and staff turnover). The theoretical basis of this mediation relationship is that GHRM practices can enhance the firm's Ec.P by spreading environmental ideologies inside firm operations (i.e. supply chain practices) (Longoni et al., 2016; Nejati et al., 2017). Indeed, GHRM plays a significant role in disseminating environmental ideologies and standards, and offers employees the chance to implement environmental ideologies and standards in the foundation of SC business development (Jackson and Seo, 2010; Ahmad, 2015; Jabbour and de Sousa Jabbour, 2016) that is able to produce better Ec.P. Furthermore, GHRM has become important in the field of business management due to companies' increasing grasp of the idea that green initiatives are able to both benefit the environment and to increase the appeal and retention of talent pool (Govindarajulu and Daily, 2004; Patel, 2014). Similarly, the results show a positive relationship between GHRM bundle practices and Int-GSCM utilisation where it leads to a positive relationship between GHRM bundle practices and SP (supporting H7c). The possible explanation is the many benefits the firm will attain from the joint adoption of GHRM and GSCM, such as a positive image, brand improvement, increased employee productivity and an engaged workforce (Mishra and Mishra, 2017). From previous findings, we can conclude that interconnecting GHRM bundle practices with corporate social responsibility will clearly show employees the importance of greening the firm through the desire to introduce the necessary changes besides building a robust ecosystem.

On the contrary, the results of the study failed to support the idea that Ext-GSCM plays a mediating role on the GHRM bundle's relationships with Ec.P and SP (i.e. H8b and H8c are not supported). Given that GHRM and GSCM are relatively new approaches (Jabbour and de Sousa Jabbour, 2016; Longoni et al., 2016; Masri and Jaaron, 2017), especially in Palestine, the possible explanation for such a result is 'resistance to change phenomenon' (Nejati et al., 2017), which is considered as the main barrier to environmental change processes (Lozano et al., 2016), especially when adopting GSCM (Govindan et al., 2016). Literature confirms that the difficulty of abandoning old habits and the prevailing culture are the common features of resisting change (Tichy, 1983; Watson, 1971). Thus, senior management should identify and predict any resistance that may occur to guarantee successful and sustainable change (Nejati et al., 2017). However, Jabbour et al. (2010) confirmed that only green-proactive organisations have ability to minimise resistance to change towards sustainability via environmental training practices. Hence, supply chain managers must pay attention to this GHRM practice (Jabbour and de Sousa Jabbour, 2016). Another possible explanation for such a result is the costly adoption of GHRM practices. This was found by Masri and Jaaron (2017) to be the top barrier of GHRM practices' implementation among manufacturing firms in the Palestinian context.

7. Final remarks

As discussed in the literature review, both GHRM and GSCM research studies have theorised and empirically demonstrated that specific practices which were aimed at developing an organisation's performance actually result in superior sustainable performance. While it might be noted that the GHRM and GSCM fields both emerged and developed in parallel, it could also be noted that this was at the expense of neglecting the relationship between GHRM practices, GSCM practices and sustainable performance (Jabbour and de Sousa Jabbour, 2016; Longoni et al., 2016). This

neglect raises a critical issue for conducting cross-functional studies (Fisher et al., 2010) and demonstrates the need for the deployment of green management in human resource and supply chain departments. This is necessary in order to show, particularly, the role of GHRM for internalising green ideologies among staff members and in supply chain practices, thereby providing a firm with a competitive advantage. The fundamental hypothesis of the current research is that a key social responsibility of the manufacturing organisation is the balance between Ep, Ec.P, and SP. This research, therefore, selected the ecological concepts and examined how ecological ideologies and standards can be disseminated in an organisation to alleviate a wide range of environmental concerns. In accordance with the objectives of this study, researchers in the field affirm that both GHRM and GSCM positively influence sustainable performance, which, in turn, verifies the unlikely trade-off effects on the three kinds of performance (i.e. EP, Ec.P, and SP). Secondly, this study affirms that GHRM and GSCM do not independently influence performance, but both exert their impact jointly. In fact, GSCM is found to have a mediating role as a means that describes the linkage between GHRM and sustainable performance. Instead of using a set of stand-alone management systems, our results are in line with the idea that organisations should manage their cross-functional implementation within various management systems and organisational units for effective environmental management. Finally, the following sub-sections highlight the contributions of the study to existing literature (i.e. theoretical implications), the managerial implications that are directed to help decision-makers, and the limitations of the study and future research suggestions.

7.1. Theoretical implications

This study can be considered a response to the RBV literature by addressing the current need to test the combined impact of resources (i.e. GHRM and GSCM practices) on sustainable performance and by identifying exactly what may initiate an improved capability (Longoni et al., 2016; Jabbour and de Sousa Jabbour, 2016). This research, therefore, offers proof that GHRM is a valid mechanism that can be utilised by firms to enhance GSCM implementation, which, in turn, can positively influence their sustainable performance. In addition, this research both affirms and improves the fundamental understanding stated in the previous literature. Primarily, it provides empirical evidence for the statement that the implementation of environmental management in the human resource and supply chain aspects enhances sustainable performance. This study, therefore, serves as an extension to the prior meta-analyses which had indicated that HRM practices (Jiang et al., 2012) and SCM practices (Zimmermann and Foerstl, 2014) can offer a competitive advantage to firms. Next, this research facilitates the cross-functional implementation of green management by providing evidence that sustainable performance can be enhanced by creating a resource (i.e. engaged, competent and inspired staff) employed in GSCM processes through GHRM. Therefore, this research emphasises the demand for environmental plans which develop GSCM practices in combination with GHRM practices. Hence, this study supports other studies that have underlined the importance of green HRM towards successful green SCM (Longoni et al., 2016; Nejadi et al., 2017; Teixeira et al., 2016; Jabbour and de Sousa Jabbour, 2016).

In addition, this research adds a relationship that has not yet been explored or studied in the manufacturing industries of developing countries, in the context of integrating the green practices of human resource and supply chain aspects with sustainable performance to provide more sustainable firms through the adoption of GHRM and GSCM practices. Second, it extends

research on sustainable performance by jointly investigating how the main GHRM-GSCM practices in manufacturing firms can be interconnected to ultimately achieve sustainable performance (i.e. EP, Ec.P, and SP). Indeed, the identification of these links specifies theoretical prioritisation and validation of GHRM and GSCM practices in a manufacturing context, hence expanding our understanding of how manufacturing firms should strategically link their human resource and supply chain functions to improve their environmental sustainability. Third, given that empirical studies linking GHRM and GSCM are rare (Jabbour and de Sousa Jabbour, 2016; Longoni et al., 2016; Nejat et al., 2017), this research adds value to the literature, bringing evidence from a developing country's perspective (i.e. the Palestinian context) which complements the existing evidence from developed countries. Hence, this study also extends GHRM – GSCM research to a more diverse set of countries. Finally, it can be claimed that this study makes a contribution to the literature by testing what, until now, was considered a western-oriented tool in the context of Asia, where there has been a definite lack of research focus within this theoretical framework.

7.2. Managerial implications

From a practical point of view, this study can contribute to achieving the strong sustainable performance of manufacturing firms by directing their managers to link environmental strategic objectives with specific HRM and SCM practices. This linkage can generate the deep involvement of staff in shaping environmental practices. Primarily, an empirically based argument is outlined for organisations to invest in a model of environmental management which appeals to human resource managers and supply chain managers, as such an action may enhance the company's sustainable performance. Second, the study's results serve as a guideline for managers to stress synergetic investments in GHRM, such as initiatives to improve employee motivation and knowledge. The managers should then continue with dedicated investments in GSCM and, consequently, the creation of a cross-functional approach to green management. Third, the results of this research also provide advice to managers who seek concurrent improvement of sustainable performance. It should be taken into consideration that the internal GSCM practices positively influence sustainable performances, while external GSCM practices only influence a firm's EP. The integration of environmental standards beyond organisational limits does not, therefore, thoroughly demonstrate an organisation's capability, and so special attention may be needed on this matter. For example, supply chain managers must pay attention to HRM practices. Also, the top management must be aware that resistance to change can be an obstacle GSCM implementation; this barrier can be avoided through green hiring and selection, alongside providing sufficient awareness and environmental training for employees. It may be said that the real contribution of this study is that there is empirical evidence for manufacturers to understand which actions to adopt in terms of having a bigger impact on the TBL of sustainability. Fourth, based on this research, it is possible to propose specific improvements in the employees' training procedures in manufacturing organisations. For example, it is imperative that part of employees' training and education includes an indicator on hours of green training, as suggested by GRI (2016). Hence, the environmental training indicator must be taken in consideration in the process of firms' reporting on their impact on the TBL of the sustainability.

7.3. Study limitations and future research

Some limitations have been identified in this study. These

limitations may serve as the foundation for future research. First, given that all of the participating manufacturing organisations in this study came from the same country (i.e. Palestine), and since the regulatory environments, national culture and institutional background could influence GHRM and GSCM practices and their performance, this may limit generalisability of the results. A replication of this study, nevertheless, can be applied in other countries in future lines of research, which would provide this under-researched field with welcome new contributions. Based on this, future research might take a specific type of supply chain into consideration. An organisation may focus more on local or international supply chains; in different settings, the application of GHRM and GSCM and its results may be affected. By solving these limitations, a new direction could be offered for future research. Second, the measurement approach applied in this study is limited; the application of GHRM and GSCM practices is measured by evaluating the opinions of managers. Hence, future research might examine the employees' opinions together with the level of exposure or complexity of such practices. To evaluate the application of GHRM and GSCM practices and its results in an unbiased manner, one could even triangulate the opinions of organisational members with external audits given by appropriate rating agencies or NGOs. However, few theorists examine both environmental and social aspects together regarding SCM sustainability (Jia et al., 2018; Marshall et al., 2015; Wang and Sarkis, 2013) and HRM sustainability (Diaz-Carrion et al., 2017). It is therefore recommended that longitudinal studies be conducted in the future, with the inclusion of social aspects in the concepts of GHRM and GSCM, by adopting a broader definition for the term 'green', which would mean adopting environmental and social initiatives (e.g. in GSCM, in GP, this could include the practice of choosing suppliers based on the social criterion of not using slave or child labour). Besides, future qualitative research could emphasise the mechanisms and processes that generate the relationships, such as the coordination and integration mechanisms across functions that ensure improved sustainability performance results. Further, other sides of the GHRM-GSCM relation could be studied by extending the current research results. Future research could focus on other sets of practices and/or other types of relationship, such as moderation. This empirical study is clearly designed to study the impact of general human resource practices that cover the entire organisational workforce and establish pre-conditions for the application of GSCM practices. Future research could study whether specific human resource interventions that focus on supply chain employees who are in GSCM-related positions would be consistent with a moderation mechanism. Also, research suggests the utilisation of alternative theoretical foundation to investigate GHRM-GSCM relationship. Instead of using a strategic perspective, a behavioural approach, such as the RBV, can be applied to investigate the individual-level processes that connect GHRM, GSCM, and organisational performance (Jackson et al., 2014; Cantor et al., 2012).

This research development could be augmented with the implementation of qualitative or multilevel research design. As a result, it is suggested that quantitative research, supported by exploratory research techniques such as in-depth interviewing, are still important when researching this topic since the mixed approach (quantitative with qualitative) has not yet been conducted in this area.

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Green innovation and environmental performance: The role of green transformational leadership and green human resource management

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ABSTRACT

Drawing upon the resource-based view and the ability-motivation-opportunity theory, we examined how green human resource management interplays on to the linkages amongst green transformational leadership, green innovation and environmental performance. Using a survey questionnaire, we collected triadic data from 309 manufacturing sector small and medium-sized enterprises (SMEs). We used covariance-based structural equation modeling (SEM) to examine hypotheses in this study. Results of the study suggest that green HRM practices mediates the influence of green transformational leadership on green innovation. We also found that green HRM indirectly through green innovation influences firm's environmental performance. Overall, the findings of our study support all hypotheses of direct and indirect effects and have several theoretical and practical implications. Finally, our study significantly advances theory and suggests that HRM-performance relationship neither depends upon the additive effect of green transformational leadership and green innovation as antecedent and mediator, respectively, nor on their interactive effect but a mix of both combinational forms (ie., additive and interactive) to affect firm environmental performance. Overall, our study contributes and advances the previous studies wherein in leadership plays critical role to influence the HRM practices and that in turn to predict green innovation in the organization.

1. Introduction

Extant literature on organizational sustainability and sustainable uses of resources focused on large than small and medium size firms (Fassin et al., 2011), whereas small and medium-sized enterprises (SMEs) that together produce large portion of the environmental impacts from commercial activities remain under researched in the academic literature (Boiral et al., 2019; Tang and Tang, 2012). However, increased pressure from stakeholders to implement environmental management initiatives (Yu et al., 2017; Yu and Ramanathan, 2015; Chen and Chang, 2013) has become rule of business for firms across industry and geography to engage in green process and product development. It calls upon firm to rely on intangible resources to address the intricacy of environmental sustainability issues and respond in a manner to handle varied stakeholder pressures (Singh and El-Kassar, 2019; Dubey et al., 2015). Previous studies suggest that employees across function and levels in organization exert significant

influence on environmental performance (Del Giudice and Della Peruta, 2016; Dubey et al., 2015; Lewis et al., 2014) but the key role of the top management becomes critical as s/he has large latitude to make influence on the firm environmental performance (Singh and El-Kassar, 2019; Hambrick and Quigley, 2014).

Environmental management systems in organization depends upon developing and sustaining their internal competences and capabilities (Biscotti et al., 2018; Russo 2009; Yin and Schmeidler 2009) and wherein SMEs have been found as major defaulters due to shortfalls of employees' abilities and motivation combined with required organizational capabilities to address complex challenges of environmental sustainability (Boiral et al., 2014). We posit that leadership and HRM (Leroy et al., 2018) are involved in developing firm's internal competences and capabilities that are essential for people management in SMEs but from different perspectives (Leroy et al., 2018). At the same time, the past studies suggest that organizational culture (Brettel et al., 2015), employee's voice (Elsetouhi et al., 2018) alongwith employees'

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psychological traits (Palmer et al., 2019) explains SMEs performance. However, we propose that leadership which emphasizes understanding, predicting and controlling of personal and interpersonal dynamics of how employees affect each other towards shared goals (Northouse, 2015) and HRM practices that takes care of systems and processes to influence employees in an orderly manner on a bigger scale (Lievens, 2015) could be best predictors to enhance green innovation and green performance in SMEs, especially in society like the UAE which is relatively high on power-distance (AlMazrouei et al., 2016; Abdulla et al., 2011).

We speculate that top management of the SMEs should practice green transformational leadership (Chen and Chang, 2013) and green human resource management practices (Jia et al., 2018; Renwick et al., 2013) to create and support internal competencies necessary for green innovation (Zhou et al., 2018; Chen and Chang, 2013) to attain environmental performance (Chen and Chang, 2013; Chen et al., 2006). Our study attempts to find answers to two relevant research questions namely, (a). How green HRM affects green innovation performance of SMEs?, and (b). Does green transformational leadership relevant for implementation and use of green HRM practices for SMEs' green innovation and performance? We draw upon resource-based view (RBV: Barney, 1991) and the ability-motivation-opportunity (AMO) theory (Appelbaum et al., 2000) to explain how green transformational leadership as strategic resources and green human resource management practices help attract, develop, retain, and sustain green employees help SMEs to engage in green innovation for superior environmental performance (Kaur et al., 2019; Leal-Millán et al., 2016).

Our study contributes to advance green HRM-performance outcomes link of SMEs in the context of increased pressure from the stakeholders to take care of both built and physical environment. Firstly, our study contributes to advance both the RBV and the AMO theoretical lenses in the context of SMEs on how green transformational leadership and green HRM practices create internal competencies to work on green process and product innovation for sustained environmental performance. We believe that the RBV provides a guiding paradigm for better leverage the AMO theory to understand, predict and control human resources in the organization. Secondly, this study suggest that green transformational leadership directly as well as indirectly through green HRM practices affects green process and product innovation. Thirdly, our study offers an empirical explanation on why and how green HRM practices are necessary for both green innovation and environmental performance of the SMEs. Finally, our study contributes to advance key aim of Technological Forecasting and Social Change journal to bring together social, environmental and technological factors to explain and predict firm green performance.

The remainder of the paper is arranged wherein next section presents theory and hypotheses. Section 3 and Section 4 deal with methods and results followed by discussion, implications and limitations of the study in Section 5.

2. Theory and hypotheses

We draw upon the *resource-based view (RBV) of the firm* and the *ability-motivation-opportunity (AMO) theory* to examine and explain the HRM-performance link in the context of the manufacturing sector SMEs in the UAE. The link between human capital and firm performance is not new and have their roots in the extant literature in HRM and strategy (Takeuchi et al., 2007; Barney, 1991). *Resource-based view (RBV)* of the firm suggest that competitive advantage and performance depends upon how firms leverage their strategic resources that are valuable, rare and difficult to imitate by the rivals in the markets (e.g., Barney, 1991). Furthermore, if the critical resources are rare and pricy for rivals to replicate or to substitute it with alternative resources that can accomplish the similar tasks, the organization achieves lasting superior performance and continuous competitive advantage from those strategic resources (e.g., Amit & Schoemaker, 1993). While applying

RBV to the HRM-performance link, we consider leadership and employees as a critical resource similar to any other firm's resources, where the foremost aim of the green human resource management (GHRM) practices is to develop, motivate, and provide opportunities to exhibit superior job behaviors for firm's sustained competitive advantage and superior performance (Boxall and Steeneveld, 1999). We argue that human resource satisfies the above criteria of the RBV for generating and supporting higher performance and competitive advantage, as human capital is normally embedded in firm's multifaceted social systems and that make human capital to take on organization specific features useful enough for a particular firm than for the rivals in the markets (Takeuchi et al., 2007).

Alongwith the RBV, we used the *ability-motivation-opportunity (AMO) theory* to examine the HRM-performance link which suggests that employees' abilities, motivations, and opportunities contribute to organizational performance; this is an integrating perspective illustrating why and how leaders and strategic HRM practices promote firm performance (Appelbaum et al., 2000). Ability-Motivation-Opportunity (AMO) theory (Appelbaum et al., 2000) is frequently used in HRM performance research (Bos-Nehles et al., 2013). As per the AMO theory, HRM practices influence employee's ability (e.g., through recruitment & selection, training & development), motivation (e.g., rewards, incentive, and compensation), and opportunity (e.g., teamwork, empowerment) to contribute to firm performance (Gerhart, 2005). In this study, we applied AMO theory differently than focusing on employee's job attitudes and behaviors emanating from application of HRM practices (e.g., Appelbaum et al., 2000; Guest, 2011), we expect that production manager's ability, motivation and opportunity will predict HRM-Innovation-Performance link. Drawing upon the AMO theory, we argue that GHRM practices in organization aims at attracting, motivating, rewarding and sustaining employee job behaviors towards environmental management goals and objectives through green process and product innovation for superior green firm performance (Boselie et al., 2005). Furthermore, using the AMO theory (Appelbaum et al., 2000), GHRM helps firms with an overarching architecture through its green recruitment & selection, training & development, performance-based rewards, employee empowerment practices, etc. to attract, train, motivate, and retain green human talent for enhancing green firm performance through continuous innovations in process, products, and services (Gerhart, 2005).

The section below deals with hypotheses formulation and we have used both the RBV (Barney, 1991) and the AMO (Appelbaum et al., 2000) theoretical lenses to build arguments and propose several hypotheses to be empirically examined in this study.

2.1. Green transformational leadership

Transformational leadership promotes higher firm performance, but what mediates in between these two constructs remains unresolved and are of special interest to the researchers (Para-González et al., 2018; García-Morales et al., 2012). Such an interest on the linkage between transformational leadership and firm performance become pertinent especially when firms should be innovative in its processes and products to gain competitive advantage and superior firm performance (e.g., Della Peruta et al., 2018; Donate and de Pablo, 2015). In this study, we define green transformational leadership (GTFL) as a leadership behavior wherein key goal of leadership is to provide clear vision, inspiration, motivation to the employees and also support their developmental needs towards achievement of environmental goals of the organization (Mittal and Dhar, 2016; Chen and Chang, 2013). GTFL motivate employees to acquire new knowledge (Le and Lei, 2018; Han et al., 2016) and get them involve and engaged in green process & product innovation related activities that permits firm to introduce green products and / or services into the market (Andriopoulos, and Lewis, 2010) and to improve their environmental performance (Dranev et al., 2018; Martinez-Conesa et al., 2017). Therefore, past

studies suggest for further researches on what mediates between transformational leadership and innovations (Le and Lei, 2019; Para-González et al., 2018; Xiao et al., 2017; Gumusluoglu, and Ilsev, 2009) and HRM practices and firm performance (Para-González et al., 2018; Heffernan et al., 2016).

Drawing upon the RBV, leadership is viewed as a critical resource in environmental management in the organization (Zhou et al., 2018; Guest and Teplitzky, 2010). Amongst different types of leadership, transformational leadership entails creating innovative climate, inspiring, motivating and encouraging coworkers to have trust in and/or identify with the vision of leader that affects firm innovation and performance (Ng, 2017; Boehm et al., 2015; Mittal and Dhar, 2015). Previous studies suggest that GTFL is relevant and important to firm performance (Ng, 2017) as her/his followers are more productive at individual, team, and firm level (Barrick et al., 2015) as they excel in innovativeness, extra-role, and in-role task behaviors (Chen et al., 2013; Choi, 2009). In the context of stakeholder pressure on firm to pursue environmental management (Song and Yu, 2018; Mittal and Dhar, 2016), several past studies suggest for firms to practice green transformational leadership (GTFL) as it encourages and motivates coworkers to exhibit green job behaviors to attain green performance (Chen and Chang, 2013; Chen et al., 2006). Furthermore, the GTFL supports and encourages employees' green passion (Jia et al., 2018), green creativity (Jia et al., 2018; Chen and Chang, 2013), green innovation (Zhou et al., 2018; Chen and Chang, 2013) and green firm performance (Chen and Chang, 2013; Chen et al., 2006).

2.1.1. Green transformational leadership and green human resource management

Transformational leaders have a clear vision about what the firm's current and future course of actions amidst dynamic markets (Bass and Avolio, 1995). Leaders should create an innovative vision, have strong belief in that vision, articulate and communicate it clearly to the employees so that the later to believe in leaders' visions and be excited about it (Zhu et al. (2005). Zhu et al. (2005) suggest that transformational leadership drives higher level of motivation, trust, cohesion, commitment, and performance. Studies have shown that the intellectually inspired dimension of transformational leadership positively influences performance management, talent management, and employee efficiency (Jia et al., 2018; Carton et al., 2014). On the other hand, firm's green human resource management (GHRM) which refers to green side of human resource management (HRM) practices whose goal is help enterprise to acquire, develop, motivate, and sustain green employee job behaviors at workplace (Dumont et al., 2017; Haddock-Millar et al., 2016; Renwick et al., 2013). GTFL personifies beliefs and values of the top management, and has a decisive influence on firm's GHRM (Jia et al., 2018; Renwick et al., 2013). Therefore, we speculate that to attain firm green innovation and green performance, GTFL in organization play key role on the formulation of supportive green human resource management (GHRM) policies and practices (Jia et al., 2018) to help firm delivers on its strategies and visions (Carton et al., 2014) to achieve green performance. In other words, GTFL's emphasis on considering individual needs of their employees may persuade them to create and install GHRM practices to keep their followers motivated and empowered. As a result, we expect that GTFL have a larger role to play on supporting positive GHRM practices such as recruitment & selection, training & development, performance appraisal and management, and compensation & incentive systems as a means whereby GTFL inspires, stimulate and motivate followers to achieve organizational goals (Zhu et al., 2005). Using the AMO theory (Appelbaum et al., 2000), we posit that GTFL leverages GHRM in a manner to enhance followers' abilities and motivations and provides opportunities engage in environmental management related activities (Haddock-Millar et al., 2016; Berrone and Gomez-Mejia, 2009; Eiadat et al., 2008) for green innovations and environmental performance (Dumont et al., 2017; Haddock-Millar et al., 2016; Chen and Chang, 2013; Chen et al., 2006).

Therefore, we predict that:

- H1. GTFL positively influences employee's green ability.
- H2. GTFL positively influences employee's green motivation.
- H3. GTFL positively influences employee's green opportunity.

2.2. Green human resource management

Extant literature suggests that human resource management (HRM) system has progressed from old-fashioned form of work such as low level of employee involvement, to a more participative and supportive processes wherein employee gets opportunities to develop skills, knowledge and attitude (Singh et al., 2019; Lengnick-Hall et al., 2009). In an era of increased awareness on environmental management and sustainable development of the resources (Phillips, 2018; Cavicchi, 2017; Roos and O'Connor, 2015), the green human resource management (GHRM) refers to HRM practices aimed at environmental and ecological influence of the firms and it is linked with firm environmental strategy and green behaviors of employees (Renwick et al., 2013). We argue that GHRM is integral to sustainable HRM literature and focuses on firm environmental management practices wherein green HRM acts as a platform to connect HRM practices to environmental management activities of the firm (Dumont et al., 2017; Masri and Jaaron, 2017). Therefore, GHRM mirrors organization's strategic orientation toward environmental protection and asks top management to pay attention to organizational processes and practices that emboldens people to take part in green job behaviors to reduce environmental pollutions at the workplace (Oh et al., 2016; Mishra et al., 2014; Berrone and Gomez-Mejia, 2009). In other words, GHRM encompasses incorporation of organization's ecological management goals to the HR processes namely, recruitment & selection, training & development, performance management & evaluation, rewards & recognition (Muller-Carmem et al., 2010; Renwick et al., 2008).

2.2.1. Green HRM and green innovation

Green innovation refers to developing environmentally friendly products and processes (Albort-Morant et al., Cepeda-Carrión, 2016) through adoption of organizational practices namely, greener raw materials, use of fewer materials during the design of products using eco-design principles and aim at reducing emissions, reduce the consumption of water, electricity, and other raw materials (Gunasekaran and Spalanzani 2012). Several past studies suggest that organizations with green innovativeness are highly successful (Albort-Morant et al., 2017) and have better overall performance than their rivals have, as they leverage their green resources and capabilities to respond quickly and appropriately to customers' needs (Albort-Morant et al., 2018; Del Giudice et al., 2018c; Allameh, 2018) and add intangible values & assets into the organization. Several past studies suggest that HRM positively and significantly influences technological and product innovation (Wei et al., 2011; Jiménez-Jiménez and Sanz-Valle, 2008; Verburg et al., 2007). HRM practices with focus on promoting a culture of commitment than compliance have positively influence on firm's innovative orientation (Verburg et al., 2007). Furthermore, Wei et al. (2011) suggest that strategic HRM positively influences product innovation in organizations, which have developmental culture and flat organizational structure.

At the same time, Seeck & Diehl (2017) in a review of the past studies on the HRM-Innovation note that as compared with product and technological innovation, the HRM does not have strong influence on administrative and process innovation (Seeck and Diehl, 2017). Therefore, previous studies suggest mixed findings on to the linkage between HRM and innovation in organization. Drawing upon the RBV (Barney, 2001) and the AMO (Appelbaum et al., 2000), we predict that organization which values and leverages potential of its human talent

will go about to institutionalize GHRM practices for the purpose of attracting, motivating and providing opportunities to green human resources to leverage their potentialities for green process and product innovation. Hence, we propose that:

H4. Employee's green ability positively influences green innovation.

H5. Employee's green motivation positively influences green innovation.

H6. Employee's green positively influences green innovation.

2.3. Green innovation and environmental performance

Environmental performance relates to organizational initiatives to meet and exceed societal expectations vis-à-vis the natural environment (Chan, 2005) in a manner to go beyond mere compliances with rules and regulations (Chen et al., 2015). It encompasses environmental effects of organizational processes, products, and resource consumption in a manner that best fit with legal environmental requirements (Dubey et al., 2015). Previous studies suggest that environmental performance depends upon the quality of environment-friendly products, green process and product innovation, and incorporation of ecological sustainability matters into business operations and product development (Oliva et al., 2019; Chen et al., 2015; Dubey et al., 2015; Darnall et al., 2008).

Green innovation is associated with firm environmental management agenda and that the green innovation stimulates environmental performance (Adegbile et al., 2017; Kammerer, 2009; Chen et al., 2006). Furthermore, green product and process innovation not only reduce negative environmental impact of the business but they also increase firm's financial and social performance through waste & cost reduction (Weng et al., 2015). Previous studies suggest that green innovation should not be perceived as firm's reactive measures towards stakeholder pressures though a proactive organizational intentions and practices to augment environmental performance to gain competitive advantage (Kratzer et al., 2017; Lin, Tang, & Geng, 2013; de Burgos-Jiménez et al., 2013). Using the RBV, we predict that green process and product innovation are critical organizational resources that firm uses to enhance its environmental performance and earn goodwill amongst key stakeholders. Therefore, we predict that:

H7. Green innovation positively influences environmental performance.

2.3.1. Green transformational leadership and green innovation: mediating role of green HRM

Leadership matters in any organization (Leroy et al., 2018) and human capital are firms' greatest resources (e.g., Cillo et al., 2019; Del Giudice et al., 2018a; Bradley and McDonald, 2011). Leadership focusses on understanding, predicting and controlling both personal and interpersonal dynamics of how people impact each other towards shared goals (Northouse, 2015), whereas, the HRM takes care of organization's systems and processes to influence employees in a orderly way, typically on a bigger scale (Lievens, 2015). Therefore, we believe that leadership and HRM together are involved in managing people at workplace but from different perspectives (Leroy et al., 2018). The first strand of extant literature suggest that leaders play vital role of mediating variable in ratifying the practices recommended by HRM to achieve employee motivation and performance (Gilbert et al., 2011; Nishii et al., 2008; Piening et al., 2014; Sikora et al., 2015). The second strand of extant HR literature indicate on leadership to play role of moderator between HRM practices and outcome variables (Vasilaki et al., 2016, 2011). Finally, the third strand of HR literature suggest leadership as antecedent of HRM-outcome relationships (Jia et al., 2018; Renwick et al., 2013). However, we believe that leadership to play vital role as antecedent than mediator or moderating role in HRM-Innovation-Performance linkages in SMEs as leadership to

influence HRM practices which influences innovation and superior performance.

Previous studies suggest that transformational leadership plays important role in innovation in the organization (Zuraik, and Kelly, 2019; García-Morales et al., 2012; Gumusluoglu and İlsev, 2009; Elkins and Keller, 2003). García-Morales et al. (2012) is a study found support for the influence of transformational leadership on innovation through development of key competencies and capabilities through collective decisions-making process to achieve collective goals. Transformational leadership commit themselves openly to continuous learning and use collective vision to breed bigger awareness and recognition of organizational purpose and mission amongst its people (García-Morales et al., 2012). Transformational leaders drives innovation within organization and positively influence market successes of innovations in products and services (Gumusluoglu and İlsev, 2009) through inspirational motivation and intellectual stimulation (Elkins and Keller, 2003). Furthermore, for transformational leadership to fuel innovation though providing freedom to employees to choose what they want to work on and how to go about achieving their goals (Jung et al., 2008).

Top-management encouragement, especially supervisory support, promotes employee environmental actions – designing eco-friendly product through reduced resources and reducing pollution (Mazzelli et al., 2019). GTFL fully exemplifies beliefs, attitudes, values and behaviors of top management, and has a vital impact on firm's GHRM practices (e.g., Renwick et al., 2013). Therefore, we predict that GTFL plays critical role towards formulation of GHRM policies and practices (Marshall et al., 2005), as GTFL leverages GHRM practices for talent management, performance management, and employee efficiency (e.g., Bass and Riggio, 2006) and to deliver on firm's strategies and visions (Carton et al., 2014). Furthermore, Jia et al. (2018) suggests that GHRM mediates the influence of transformational leadership on organizational green outcomes. As a result, we posit that GTFL influences adoption of GHRM practices to communicate proenvironmental image to enhance reputation of the firm in the eyes of all its key stakeholders. Therefore, we propose that:

H8. GTFL indirectly but positively influences green innovation through employee's green ability.

H9. GTFL indirectly but positively influences green innovation through employee's green motivation.

H10. GTFL indirectly but positively influences green innovation through employee's green opportunity.

2.3.2. Green HRM and environmental performance: mediating role of green innovation

GHRM increases employees' environmental awareness (Renwick et al., 2008, 2013), green creativity (Jia et al., 2018; Chen and Chang, 2013), and green firm performance (Chen and Chang, 2013; Chen et al., 2006). Previous studies suggest that GHRM influences green innovation (Zhou et al., 2018; Chen and Chang, 2013) and green firm performance (Guerci et al., 2016; O'Donohue and Torugsa, 2016) but these areas of research inquires remain largely scarce and needs more empirical inquiries especially when firms experience increased pressure from their key stakeholders to engage in eco-friendly management practices. Furthermore, extant literature suggest that firm should hire potential employees by drawing upon their environmental beliefs & values and knowledge (Renwick et al., 2013) through green recruitment and selections system to ensure that new recruits appreciate and comprehend firm's environmental beliefs and values (Jackson and Seo, 2010) by drawing upon prospective employees' environmental beliefs, values and knowledge (Renwick et al., 2013). Similarly, green training & development (Singh & El-Kassar, 2019; El-Kassar and Singh, 2018; Renwick et al., 2013), performance management & appraisal (Renwick et al., 2013), green rewards & compensation (Jabbour and de Sousa Jabbour, 2016; Arulrajah et al.,

2015) stand out as core HRM practices to support superior environmental performance. We argue that green training & development programs aimed at developing proficient skills of employees for green workplace analysis, recycling, waste management, and energy efficiency (Singh & El-Kassar, 2019; Renwick et al., 2013) along with institutionalizing eco-friendly objectives, responsibilities, and evaluation in the performance management system (PMS) (Renwick et al., 2013; Jabbour and de Sousa Jabbour, 2016) enhances environmental performance.

Previous studies suggest that HRM bundles or systems influences innovation (e.g., Fu et al., 2015; Wei et al., 2011; De Winne and Sels, 2010; De Saá-Pérez and Díaz-Díaz, 2010; Jiménez-Jiménez and Sanz-Valle, 2008; Verburg et al., 2007). We posit that HRM bundles or systems affect administrative, process, and product innovation (Jiménez-Jiménez and Sanz-Valle, 2008) and including even the start-ups which have lesser human capital wherein HRM systems significantly fuels innovation (De Winne and Sels, 2010). Furthermore, HRM practices promotes employee commitment than compliance to organizational processes and systems (Verburg et al., 2007). Furthermore, Zhou, Hong, & Liu, (2013) suggest differential influence of commitment and collaboration oriented HRM practices on firm innovation wherein the former enhances internal innovative capability and the later drives innovation through building and nurturing social networks with external sources. On the other hand, green innovation is a strategic resource for the environmental performance (Singh and El-Kassar, 2019; El-Kassar and Singh, 2018; Kammerer, 2009; Chen et al., 2006) and firm leverages it to attain its environmental management goals. Green product and process innovation significantly reduces negative environmental impact of the business, if any, and increases firm performance – financial, social and environmental performance through huge waste & cost reduction that saves money, time, and resources (e.g., Del Giudice et al., 2018b; Weng et al., 2015). Therefore, using the AMO theory (Appelbaum et al., 2000) and RBV (Barney, 2001), we predict that GHRM indirectly influences firm environmental performance through the mediating role of green process and product innovation. Therefore, we propose that:

H11. Employee's green ability indirectly but positively influences environmental performance through green innovation.

H12. Employee's green motivation indirectly but positively influences environmental performance through green innovation.

H13. Employee's green opportunities indirectly but positively influences environmental performance through green innovation.

We present here conceptual research model (Fig. 1), based on the extensive literature review and the hypotheses formulation, that we empirical examined in our study.

3. Methods

3.1. Sample and procedure

We approached 669 manufacturing sector SMEs in the United Arab Emirates (UAE). As and when a particular SME, those who were approached, volunteered to participate in this study, one of the co-authors visited it in person and met with the Chief Operating Officer (COO), the human resource (HR) manager, and the Production manager and they filled-in the questionnaire on the spot and gave it back to us the same day. The Chief Operating Officer (COO) filled in survey questionnaires

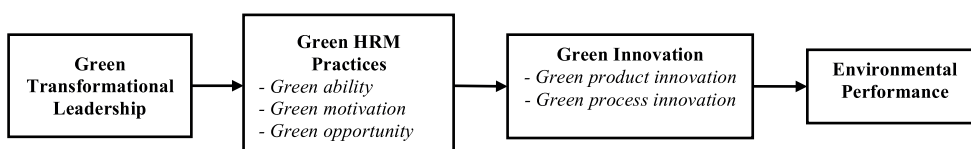


Fig. 1. Conceptual research framework.

Table 1
Non-response bias test.

Construct	Levene's test	Sig.
Green Transformational Leadership (GTFL)	0.534	0.465
Green Ability (GABL)	0.380	0.538
Green Motivation (GMOT)	0.226	0.635
Green Opportunities (GOPP)	0.003	0.957
Green Process Innovation (GPRI)	0.010	0.922
Green Product Innovation (GPDI)	1.167	0.281
Green Performance (GPERF)	0.460	0.498

on green transformational leadership (GTFL) and environmental performance (EPRF), whereas, the human resource (HR) manager and the production manager filled in survey questionnaire on green human resource management (GHRM) practices and green innovation (GINNOV), respectively. The survey questionnaire was rated on seven-point rating scale (wherein 1 = strongly disagree and 7 = strongly agree) by the COO, the HR manager, and the production managers. We note that one of the co-authors had to make several phone calls to the manufacturing SMEs to get their consent to participate in this study and also to give us appointment on a particular date & timing for the visit in person to get the questionnaire filled-in on the spot from each of the triads (i.e., the COO, the HR manager, the Production manager). Overall, the data was collected in two waves and each of the waves lasted for a month. In this study, we used translation-back translation procedure – from English to Arabic and back to English, as per Brislin (1986), as majority of the respondents were Arabic speaking.

Before proceeding for data analysis to examine hypotheses, we performed the Levene's test for the homogeneity of variance between early (wave 1) and late (wave 2) respondents and found that the obtained Levene's statistics were non-significant (Table 1). Therefore, the dataset of this study was free from non-response biases and we can generalize the results of this study to the larger population (Becker and Ismail, 2016; Cochran, 1977; Armstrong and Overton, 1977). Thereafter, we used average full collinearity VIF (AFVIF) to test for the common method biases (CMB) wherein AFVIF and found to be in the acceptable range and <3.3 (Kock, 2017) and that indicates that the CMB was not an issue in the dataset. The Cochran's sample size formula was used to examine for minimum size of sample required to proceed with the study (Cochran, 1977; Bartlett et al., 2001) and found that this study should have minimum 209 sample (with margin error = 0.03 and alpha value = 0.01) to proceed with data analysis and test the hypotheses. Thus, our study with 309 SMEs wherein the sample in this study consisted of 309 triads of the respondents (the COO, the HR Manager, and the Production Manager) pass the minimum required sample size to examine the hypotheses. Table 2 presents sample details. The COOs consisted 67.31% male and 32.69% female, and approximately 77% of them had minimum bachelor level degrees in science, technology, & business. Similarly, the HR managers consisted of 57.61% male and 32.39% female respondents and 64.07% had minimum bachelor level degree in science, technology, business, & humanities. On the other hand, the Production managers consisted of 80.26% male and 19.74% female respondents and 56.31% had minimum bachelor degree in science, technology, and engineering. Finally, over 55% of SMEs in the study had 200 and more employee counts during the time of data collection for our study.

Table 2
Sample and Organization Details.

The Chief Operating Officer (n = 309)	Percentage	Production Manager (n = 309)	Percentage	HR Manager (n = 309)	Percentage	SMEs	Percentage
Age (in Years)	48.30	Age (in Years)	36.28	Age (in Years)	37.65	Year when born	
						2000–2007	149(48.22%)
						2008–2012	160(51.78%)
Gender		Gender		Gender		Employee Counts	
Male	208(67.31%)	Male	248(80.26%)	Male	178(57.61%)	50–100	48(15.53%)
Female	101(32.69%)	Female	61(19.74%)	Female	131(32.39%)	101–200	89(28.80%)
						201–300	153(49.52%)
						> 301	19(6.15%)
Educational Qualification		Educational Qualification		Educational Qualification			
Bachelor	238(77.02%)	Bachelor	174(56.31%)	Bachelor	198(64.07%)		
Master	71(22.98%)	Master	135(43.69%)	Master	111(43.69%)		

3.2. Measuring instruments

Green transformational leadership (GTFL). We adopted six items scale of GTFL from [Chen and Chang \(2013\)](#). The sample item includes, ‘the leadership in my organization emphasize achievement of environmental goals’. The Cronbach alpha for the GTFL scale in this study was 0.904 ([Appendix 1a](#)). The confirmatory factor analysis (CFA) results suggest that the goodness-of-fit-indices of the measuring instrument of GTFL ($\chi^2/df = 1.279, p < 0.249; CFI = 0.998; TLI = 0.996; SRMR = 0.016; RMSEA = 0.029$) were in acceptable range.

Green HRM (GHRM). We adapted thirteen items GHRM scale from [Sun et al. \(2007\)](#) and [Renwick et al. \(2013\)](#) and they belonged to across three key brackets as per the AMO theory – green ability, green motivation, and green opportunity (e.g., [Appelbaum et al., 2000](#)). The sample item include, ‘employee gets reward for acquiring specific environmental competencies’. The Cronbach alpha for the green ability, green motivation and green opportunity were 0.898, 0.839, and 0.848, respectively ([Appendix 1a](#)). The CFA suggest that the GHRM measuring instruments had goodness-of-fit-indices ($\chi^2/df = 2.827, p < 0.000; CFI = 0.961; TLI = 0.951; SRMR = 0.033; RMSEA = 0.075$) in the range.

Green Innovation (GINNOV). We adopted seven items GINNOV scale consisting of four items for green product innovation and three items for green process innovation from [Chen et al. \(2006\)](#). The sample item includes, ‘use of materials that produce least amount of pollution’. The Cronbach alpha for green product and green process innovation were 0.884 and 0.842, respectively ([Appendix 1b](#)). The goodness-of-fit-indices of GINNOV measuring instrument were in the acceptable range ($\chi^2/df = 2.670, p < 0.001; CFI = 0.986; TLI = 0.978; SRMR = 0.023; RMSEA = 0.071$).

Environmental performance. We adopted the environmental performance (EPERF) with five items from [Melnyk et al. \(2003\)](#) and [Daily et al. \(2007\)](#). The sample item consisted was “Environmental activities in my organization has significantly improved product and/or process

Table 3
Testing for discriminant validity.

	Mean	Std. Dev.	GTFL	GABL	GMOT	GOPP	GPDI	GPRI	FGPERF
GTFL	5.33	0.872	0.713						
GABL	5.22	0.831	0.652**	0.772					
GMOT	5.17	0.814	0.657**	0.660**	0.752				
GOPP	5.15	0.928	0.658**	0.609**	0.630**	0.806			
GPDI	5.01	0.897	0.661**	0.625**	0.621**	0.643**	0.812		
GPRI	5.05	0.907	0.636**	0.698**	0.627**	0.610**	0.657**	0.803	
EPERF	5.08	0.934	0.656**	0.681**	0.692**	0.663**	0.691**	0.682**	0.781

**Correlation is significant at the 0.01 level (2-tailed).

#1 Wherein, GTFL = Green Transformational Leadership, GABL = Green Ability, GMOT = Green Motivation, GOPP = Green Opportunity, GPDI = Green Product Innovation, GPRI = Green Process Innovation, EPERF = Environmental Performance.

#2 Diagonal value (bold & italic) are the square roots of AVE.

quality”. The Cronbach alpha was found to be 0.896 ([Appendix1b](#)). The goodness-of-fit-indices of EPERF scale were in the acceptable range ($\chi^2/df = 1.239, p < 0.288; TLI = 0.997; CFI = 0.999; SRMR = 0.014; RMSEA = 0.027$).

4. Results

4.1. Measurement scale validation

The Cronbach alpha was used to calculate reliability coefficient of the measuring instruments in this study ([Hair et al., 2006](#)) and it ranges from 0.839 to 0.904 ([Appendices 1a & 1b](#)). The construct validity of the measuring instruments were assessed through their convergent and discriminant validity. As per [Fornell and Larcker \(1981\)](#), the construct (s) has convergent validity, if the individual measuring item loads on its corresponding construct with standardized loading ranging from > 0.50 to ≥ 0.70 ([Niemand and Mai, 2018](#)), combined with scale composite reliability (SCR) greater than 0.70, and average variance extracted (AVE) should be atleast 0.50 and above. All the measurement scales that we used in this research inquiry satisfy to the requirements ([Fornell and Larcker, 1981](#)) and all of the constructs in the study have high convergent validity ([Appendix 1](#)) as the individual item loaded on their respective construct in the range of ≥ 0.686 to 0.837, had $SCR \geq 0.844$ to 0.898, and the AVE was ≥ 0.509 to 0.659. Thereafter, we tested for the discriminant validity as suggested by [Fawcett et al. \(2009\)](#) and found that standardized loading of individual item ranges in between 0.686 to 0.837 ([Appendices 1a & 1b](#)) and the square root of AVE for the construct was greater than obtained correlations amongst the construct in the study ([Table 3](#)). Thus, we note that all the measuring instruments had both convergent ([Fornell and Larcker, 1981](#)), and discriminant validity ([Fawcett et al., 2009](#)).

Table 4
Testing for direct effect.

Direct effect	Standardized direct effect	Standard error	t value	Sig. level	Hypothesis testing
GABL <—GTFL	0.652	0.028	29.422	<i>P</i> < 0.000	H1 accepted
GMOT <—GTFL	0.657	0.018	30.132	<i>P</i> < 0.000	H2 accepted
GOPP <—GTFL	0.658	0.015	30.206	<i>P</i> < 0.000	H3 accepted
GINNOV <—GABL	0.272	0.059	5.573	<i>P</i> < 0.000	H4 accepted
GINNOV <—GMOT	0.288	0.095	5.601	<i>P</i> < 0.000	H5 accepted
GINNOV <—GOPP	0.40	0.098	8.955	<i>P</i> < 0.000	H6 accepted
EPERF <—GINNOV	0.616	0.022	25.599	<i>P</i> < 0.000	H7 accepted

Table 5
Testing for indirect effect.

Indirect effect	Standardized Indirect Effect	Sig. level	Hypothesis testing
GINNOV <—GABL <—GTFL	0.077	<i>P</i> < 0.002	H8 accepted
GINNOV <—GMOT <—GTFL	0.075	<i>P</i> < 0.002	H9 accepted
GINNOV <—GOPP <—GTFL	0.144	<i>P</i> < 0.000	H10 accepted
EPERF <—GINNOV <—GABL	0.042	<i>P</i> < 0.002	H11 accepted
EGPERF <—GINNOV <—GMOT	0.059	<i>P</i> < 0.001	H12 accepted
EGPERF <—GINNOV <—GOPP	0.084	<i>P</i> < 0.000	H13 accepted

4.2. The structural model

We used covariance-based structural equation modeling (SEM) to examine direct (Table 4) and indirect hypotheses (Table 5) of this study.

Testing for direct effect. Table 4 depicts that H1 [GABL <—GTFL]; H2 [GMOT <—GTFL]; and H3 [GOPP <—GTFL] are supported ($\beta = 0.652; t = 29.422, p < 0.000$); ($\beta = 0.657; t = 30.132, p < 0.000$); and ($\beta = 0.658, t = 30.206, p < 0.000$), respectively. Therefore, it means that green transformational leadership (GTFL) positively and significantly influences the green HRM (GHRM) practices namely employee green ability, green motivation, and green opportunity. Similarly, Table 4 illustrates that H4 [GINNOV <—GABL]; H5 [GINNOV <—GMOT]; and H6 [GINNOV <—GOPP] are supported ($\beta = 0.272; t = 5.573, p < 0.001$); ($\beta = 0.288; t = 5.601, p < 0.000$); and ($\beta = 0.40; t = 8.955, p < 0.000$), respectively. It means that green HRM (GHRM) practices namely employee green ability, green motivation, and green opportunity positively and significantly predict green innovation (GINNOV). Finally, H7 [EPERF <—GINNOV] is supported

Appendix 1a
Testing for convergent validity.

	Indicators	Std Loading	Variance	Error	Cronbach Alfa	SCR	AVE
Green Transformational Leadership (GTFL)					0.904	0.886	0.509
	I inspire subordinates with environmental plan.	GTFL1	0.808	0.653	0.347		
	I provide subordinates a clear environmental vision.	GTFL2	0.833	0.694	0.306		
	I encourage subordinates to work on environmental plan	GTFL3	0.686	0.471	0.529		
	I encourage employees to attain environmental goals	GTFL4	0.781	0.61	0.39		
	I consider environmental beliefs of my subordinates.	GTFL5	0.79	0.624	0.376		
	I stimulate subordinates to think & share their green ideas.	GTFL6	0.771	0.594	0.406		
Green Human Resource Management (GHRM)					0.898	0.898	0.596
	Great effort goes in to select right person.	GABL1	0.774	0.599	0.401		
	Hiring only those who possess environmental values.	GABL2	0.769	0.591	0.409		
	Considerable importance given to green staffing process.	GABL3	0.764	0.584	0.416		
	Every employee undergoes mandatory environmental training	GABL4	0.736	0.542	0.458		
	Environmental training is designed to enhance employee's environmental skills & knowledge.	GABL5	0.774	0.599	0.401		
	Employees to use environmental training in their jobs.	GABL6	0.812	0.659	0.341		
					0.839	0.838	0.565
	Performance appraisal records environmental performance.	GMOT1	0.788	0.621	0.379		
	Performance appraisal includes environmental incidents, responsibilities, concerns and policy.	GMOT2	0.719	0.517	0.483		
	Employee gets reward for environmental management.	GMOT3	0.771	0.594	0.406		
	Employee gets reward for acquiring specific environmental competencies.	GMOT4	0.726	0.527	0.473		
					0.848	0.847	0.65
	Employees are involved to become environmental friendly.	GOPP1	0.783	0.613	0.387		
	Using team-work for resolving environmental issues.	GOPP2	0.835	0.697	0.303		
	Employees to discuss environmental issues in team meetings.	GOPP3	0.799	0.638	0.362		

($\beta = 0.616; t = 25.599, p < 0.000$) as in Table 4. As a result, the result suggests that green innovation (GINNOV) positively and significantly affect environmental performance (EPERF). Thus, the findings of the study supports all the direct hypotheses.

Testing for indirect effect. We used covariance-based SEM to assess for the mediation related hypotheses in this study (Iacobucci et al., 2007). The results in the Table 5 illustrates that H8 [GINNOV <—GABL <—GTFL]; H9 [GINNOV <—GMOT <—GTFL]; and H10 [GINNOV <—GOPP <—GTFL] are supported ($\beta = 0.077, p < 0.002$); ($\beta = 0.075, p < 0.002$); and ($\beta = 0.144, p < 0.000$), respectively. These results suggest that green HRM (GHRM) practices namely employee green ability, green motivation, and green opportunity positively and significantly mediates on the influence of green transformational leadership (GTFL) on green innovation (GINNOV). Similarly, Table 5 depicts that H11 [EPERF <—GINNOV <—GABL]; H12 [EGPERF <—GINNOV <—GMOT]; and H13 [EGPERF <—GINNOV <—GOPP] are supported ($\beta = 0.042, p < 0.002$); ($\beta = 0.059, p < 0.001$); and ($\beta = 0.084, p < 0.000$), respectively. The findings illustrate that green innovation (GINNOV) positively and significantly mediates the effect of green HRM (GHRM) practices on environmental performance (EPERF). Therefore, the results in Table 5 suggest that all the indirect hypotheses namely H8, H9, H10, H11, H12, and H13 of the study are accepted.

5. Discussion and conclusion

The study investigated interplay of green transformational leadership, green HRM, and green innovation on environmental performance. Our study supports and advances previous studies wherein green

Appendix 1b

Testing for convergent validity.

	Indicators	Std Loading	Variance	Error	Cronbach Alfa	SCR	AVE
Green product Innovation					0.884	0.885	0.659
<i>My company uses materials that</i>							
...produce least pollution.	GPD11	0.837	0.701	0.299			
... consumes less energy and resources.	GPD12	0.816	0.666	0.334			
...to design environment friendly product.	GPD13	0.775	0.601	0.399			
...are easy to recycle, reuse, and decompose.	GPD14	0.818	0.669	0.331			
Green Process Innovation					0.842	0.844	0.644
<i>The manufacturing processes of my company effectively reduces...</i>							
...hazardous substance or waste.	GPR11	0.782	0.612	0.388			
...consumption of coal, oil, electricity or water.	GPR12	0.829	0.687	0.313			
...use of raw materials.	GPR13	0.796	0.634	0.366			
Environmental Performance					0.896	0.887	0.611
<i>Environmental activities significantly...</i>							
...reduced overall costs.	EPERF1	0.779	0.607	0.393			
...reduced the lead times.	EPERF2	0.755	0.57	0.43			
...improved product / process quality.	EPERF3	0.821	0.674	0.326			
...improved reputation of my company.	EPERF4	0.808	0.652	0.347			
...reduced waste within the entire value chain process.	EPERF5	0.741	0.549	0.451			

transformational leadership to influence green HRM practices (e.g., Jia et al., 2018; Carton et al., 2014; Renwick et al., 2013) and green HRM affects green innovation (e.g., (Singh and El-Kassar, 2019; El-Kassar and Singh, 2018; Albort-Morant et al., 2016) in an organization. The findings of our study also advances literature in the field (e.g., Santoro et al., 2019; Chen et al., 2015; Dubey et al., 2015; Weng et al., 2015) wherein green product and process innovation results in improved firm environmental performance (e.g., Kim and Phillips, 2013). Furthermore, the results of the study supports the hypothesis that green HRM practices mediates the influence of green transformational leadership on green innovation. Such finding of our study contributes and advances the previous studies (Jia et al., 2018; Renwick et al., 2013) wherein in leadership plays critical role to influence the HRM practices and that in turn to predict green innovation in the organization. We also found that green HRM indirectly through green innovation influences environmental performance of the SMEs. Overall, the obtained results in this study support all direct and indirect hypotheses and have several theoretical and practical implications.

5.1. Theoretical implications

The results of our study have three main implications to advance theory. First, our study contributes to advance the RBV (Barney, 1991) and the AMO theory (Appelbaum et al., 2000; Guest, 2011) to understand and explain what causes firm green innovation and environmental performance. Basing our arguments on the results of this study, we suggest that GTFL is a strategic resource that firm should leverage to shape and implement GHRM which in turn to influence green innovation and environmental performance. While applying RBV to the HRM-performance link, we suggest that leadership and employees are critical resource as any other organizational resources that should be valued in a manner that it becomes difficult for the competing firms to imitate (e.g., Takeuchi et al., 2007; Barney and Wright, 1998; Barney, 1991). Similarly, our study suggests and advances the AMO theory (Appelbaum et al., 2000) wherein we suggest that firm should design and implement GHRM practices to attract, train, motivate, and retain green employees to enhance green innovation and environmental performance (Gerhart, 2005) under the continuous monitoring role of GTFL. Therefore, our study integrates the RBV and the AMO theory and illustrate why and how leaders and green HRM practices promote green innovation and firm green performance (e.g., Guest, 2011; Takeuchi et al., 2007; Appelbaum et al., 2000; Barney and Wright, 1998; Barney, 1991).

Second, leadership and HRM play critical role in unleashing human potential (Leroy et al., 2018) but from different perspectives. Previous

studies differ on whether leadership in organization play role of antecedent (Jia et al., 2018; Renwick et al., 2013), mediator (Piening et al., 2014; Sikora et al., 2015), and moderator (Vasilaki et al., 2016) on the HRM-outcome relationships. Our findings suggest that GTFL plays critical role as antecedent of the GHRM to cause green innovation for enhanced firm environmental performance. Furthermore, we suggest that firm should use GTFL to install and implement GHRM policies and practices to enhance employee's green abilities and motivations and provide them with opportunities at workplace to engage in environmental management related activities (Berrone and Gomez-Mejia, 2009; Eiadat et al., 2008) to enhance green innovation and environmental performance (Renwick et al., 2013; Chen and Chang, 2013).

Third, we found that green innovation on its own as well as under the influence of GHRM practices influence firm environmental performance. As such, we suggest that GHRM practices through green hiring, training, performance-based rewards, empowerment, etc. help firm to attract, retain, and sustain green employees towards green innovation in process, products, and services (Gerhart, 2005) for sustained superior environmental performance. Therefore, our study suggests that firm should embed green human resource practices in organization's multi-faceted social systems to make human capital to take on organization specific features useful enough for a particular firm than for the competing firms in the markets (Takeuchi et al., 2007). Results of our study suggest that firm should have proactive GHRM architecture to attract, develop, and retain green employees for green innovation and improve environmental performance to gain competitive advantage over their rivals in the markets (Lin et al., 2013).

Finally, our study significantly advances theory and suggests that HRM-performance relationship neither depends upon the additive effect of green transformational leadership and green innovation as antecedent and mediator, respectively, nor on their interactive effect but a mix of both combinational forms (ie., additive and interactive) to affect firm environmental performance.

5.2. Practical implications

Our study offers several key suggestions to leaders and managers on how to make green innovation happen and leverage it for superior environmental performance to beat rivals in the markets.

First, we suggest that investing in environmental management is beneficial to firm to earn good image in the eyes of stakeholders, as the later has become more demanding and pressurizing firms to go green in all its process, products and/or services. Results of our study suggest that firm should emphasize and reinforce green leadership behaviors

necessary for implementing green HRM practices. Green HRM practices are essential for acquiring, developing and sustaining employees who bring to work green beliefs and values to help support firm's strategy to compete with competitors through green process and green products. Therefore, we suggest that firm's transformational leadership make employees with green ability and motivation feel comfort through supportive environment and provide them opportunities to realize their green potentialities to help firm make green innovation in its processes and product to stay relevant and competitive in the markets.

Second, firm should invest in green HRM practices and consider it as strategic asset to channelize human potential towards its environmental management activities. We had posited that GHRM mirrors firm's strategic orientation toward environmental management and encourages employees to exhibit green job behaviors to reduce environmental pollutions. Therefore, based on the findings of our study, we suggest that top management should work on integrating firm's environmental management goals with green HRM policies and practices to support and sustain green process and product innovation. Furthermore, we suggest that green HRM practices need developmental culture and flat organizational structure to support and enhance green innovation for sustained competitive advantage.

Third, our study suggests that environmental performance depends upon the quality of green process and green product innovation. Therefore, we suggest that green process and product innovation should not be a knee jerk reaction to stakeholder pressure but proactive measures aimed at reducing negative environmental impact, if any, to enhance environmental performance. Furthermore, our study suggest that leaders and managers in organization should perceive green innovation as a strategic resource and leverage it to attain firm's environmental management goals. Such an arrangement can work wonder for green innovation vis-à-vis environmental performance if the green HRM practices receives unconditional support and commitment of the top management. To sum it up, we suggest that leaders and managers should institutionalize environmental management responsibilities in the performance appraisal and management system for employees to continuously display job behaviors namely green workplace analysis, recycling, waste management, and energy efficiency. All these organizational efforts and support to employees will help organization to

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at [doi:10.1016/j.techfore.2019.119762](https://doi.org/10.1016/j.techfore.2019.119762).

Appendices

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enhance and sustain its environmental performance.

Therefore, our study offers numerous practical implications for managers, leaders and policy makers on how to attain and sustain superior environmental performance through green transformational leadership, green HRM practices, and green innovation.

5.3. Limitations and directions for future research

Our study has limitations and we present them alongwith direction for future research. First, we conducted this study in the manufacturing sector SMEs in the UAE and it limits the generalization of our study to the non-manufacturing sector SMEs. Therefore, we suggest that future research should extend our conceptual research framework to the non-manufacturing sector SMEs in the UAE. Second, this study did not use employee level construct namely environmental beliefs and values to find its moderating role on the HRM-performance outcomes. As a result, we propose that researches in future should advance our research framework to include employee's environmental beliefs and values as moderator on to the influence of green HRM on green innovation. Third, this study investigated the internal factors only vis-à-vis adoption of SMEs' environmental strategy. We suggest that the future study in SMEs in the UAE should investigate both internal and external factors vis-à-vis in the adoption of the environmental strategy in SMEs for deeper understanding of formulating, implementing and sustaining proactive environmental strategies. Finally, our study sampled organizational members' perception to measure green innovation and environmental performance. We suggest that future research should sample perception of both internal and external stakeholders to better understand and explain SMEs' green innovation and environmental performance.

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EFFECTS OF GREEN HRM PRACTICES ON EMPLOYEE WORKPLACE GREEN BEHAVIOR: THE ROLE OF PSYCHOLOGICAL GREEN CLIMATE AND EMPLOYEE GREEN VALUES

JENNY DUMONT, JIE SHEN, AND XIN DENG

As an emerging concept, green human resource management (green HRM) has been conceptualized to influence employee workplace green behavior. This research empirically tested this link. We first developed measures for green HRM, and then drew on the behavioral HRM and psychological climate literature along with the supplies-values fit theory, to test a conceptual model integrating the effects of psychological green climate and individual green values. Results revealed that green HRM both directly and indirectly influenced in-role green behavior, but only indirectly influenced extra-role green behavior, through the mediation of psychological green climate. Individual green values moderated the effect of psychological green climate on extra-role green behavior, but it did not moderate the effect of either green HRM or psychological green climate on in-role green behavior. These findings indicate that green HRM affects both employee in-role and extra-role workplace green behavior; however, this occurs through different social and psychological processes. © 2016 Wiley Periodicals, Inc.

Keywords: green behavior, green HRM, individual green values, psychological green climate

Companies that have strong green policies in place generally benefit from increasing sales and branding recognition (Wee & Quazi, 2005; Yang, Hong, & Modi, 2011) as well as desirable employee outcomes (Salem, Hasnan, & Osman, 2012). As it is employees who are the agents that implement organizational green policies, it is necessary for organizations to promote and ultimately change employee behavior so that such behavior is

aligned with organizational green goals (Daily, Bishop & Govindarajulu, 2009; Ones & Dilchert, 2012; Ramus & Steger, 2000). Increasingly, organizations are adopting green human resource management (green HRM) practices, that is, “HRM aspects of green management,” to promote employee green behavior in the workplace (Renwick, Redman, & Maguire, 2013, p.1). Green HRM is defined by Kramar (2014) as “HRM activities, which enhance positive environmental

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outcomes” (p. 1075). However, despite increasing levels of academic literature conceptualizing the correlations between green HRM and employee workplace green behavior (e.g., Jackson & Seo, 2010; Kumari, 2012; Renwick et al., 2013), this linkage has thus far not been adequately empirically explored.

A number of studies, such as Jabbour and Santos (2008) and Jabbour, Santos, and Nagano (2008), along with papers published in the special issue of *Human Resource Management* (Vol. 51, No. 6, 2012), have examined the contributions of HRM practices to organizational environmental performance. Empirical studies, such as Harvey, Williams, and Probert (2013) and Paillé, Chen, Boiral, and Jin (2014), have shown that HRM policies and practices are related to individual-level employee pro-environmental behaviors. However, Harvey et al. (2013) is a case study that utilized a small sample of airline pilots. The small sample in this study did not allow the effect of HRM to undergo rigorous enough testing. The Paillé et al. (2014) study, however, focused on general HRM, rather than green HRM. The HR behavioral literature suggests that different HRM practices may influence the same employee behavior through different social and psychological processes (Jiang, Lepak, Hu, & Baer, 2012). As such, how and when green HRM influences employee workplace green behavior remains largely unknown.

The current study is aimed at addressing the gap in the literature by exploring the effects of green HRM on employee workplace green behavior, referring to “scalable actions and behavior that employees engage in that are linked with and contribute to” (Ones & Dilchert, 2012, p. 87). Drawing on the literature from three different perspectives, we developed and tested a conceptual model depicting the social and psychological processes through which green HRM influences individual green behavior. More specifically, from the behavioral HRM perspective (Wright, Dunford, & Snell, 2001) we argued that green HRM would be significantly related to employee green behavior. It is argued that organizational policies and practices, such as HRM, shape employee psychological climate, that is, individuals’ perceptions of the work environment (Burke, Borucki, & Kaufman, 2002; Schneider, Ehrhart, & Macey, 2013). Consistent with the psychological climate literature, organizational

green HRM practices would lead to psychological green climate perceptions, which are in turn significantly related to individual workplace green behavior. Moreover, we invoked the supplies-values fit theory (Edwards, 1996, 2007) to explore the role of individual green values in moderating the relationships between green HRM/psychological green climate and employee workplace green behavior. In doing so, the current study provides insights into how and when green HRM promotes employee workplace green behavior. The theoretical framework for this study is shown in Figure 1.

This study intended to make several theoretical contributions. First, it adds to the knowledge base of the HRM behavioral literature by exploring employee workplace outcomes of green HRM, which has not been empirically studied sufficiently, to provide a better understanding of the concept and its consequences. The green HRM narrative is still in its infancy with inferences about its effect on employee workplace outcomes only broadly reaching the conceptualization stage (see, e.g., Cherian & Jacob, 2012; Jabbour, 2011; Renwick et al., 2013). Hence, this research extends the current theorizing in an emerging field of HRM.

Second, because Daily and Huang’s (2001) call for a greater understanding of the human element of environmental management theory, there are a growing number of studies that have begun exploring factors that promote employee green behavior. However, employee workplace green behavior has surprisingly attracted far less research attention than individual green behavior outside the workplace (Paillé & Boiral, 2013). Moreover, past workplace green behavior studies have mainly explored the effect of organizational sustainability programs (Paillé, Boiral, & Chen, 2013; Norton, Zacher, & Ashkanasy, 2014) and leaders’ influence (Ramus & Steger, 2000; Robertson & Barling, 2013). Previous research has not yet adequately accounted for the effect of employee engagement when implementing organizational policies and practices. It is argued that

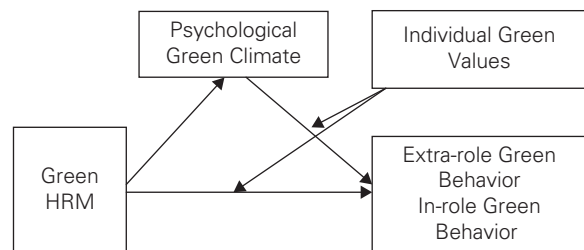


FIGURE 1. The Conceptual Model

for employees to acquiesce to a green behavioral mantra, they must engage with the organization and its resolve to implement green practices and policies (Robertson & Barling, 2013; Unsworth, Dmitrieva & Adriasola, 2013), as green HRM practices are expected to play an important role in this engagement process. Thus, this study also contributes to the organizational behavior literature in relation to understanding the antecedents of individual workplace green behavior.

Third, the HRM behavioral literature suggests that HRM might not directly influence employee work outcomes, but rather it does this through the virtue of social and psychological processes (Jiang et al., 2012). A recent green HRM review by Renwick et al. (2013) identified a lack of understanding of the linking mechanisms between employee participation in environmental initiatives and organizational and employee outcomes as a major literature gap. This study explored the mediation of psychological green climate in the green HRM–employee workplace green behavior relationship, a mediation path that has not been previously studied. Psychological climate is the individual-level perceptions of the work environment (Burke et al., 2002). Although somewhat related, psychological climate and culture are different constructs, with culture being a more stable, deep, and long-term construct than climate (Ashkanasy, 2007). We also probed conditional indirect effects of green HRM on employee green behavior by investigating the moderating role of individual green values in the multiple stages of the mediation of psychological green climate. This research therefore answers the call of Renwick et al. (2013) by developing an enhanced understanding of the underlying mechanisms of green HRM.

Finally, employees have different levels of discretion over evincing in-role and extra-role behavior in the workplace (Williams & Anderson, 1991). Norton et al. (2014) revealed that organizational sustainability policies influence employee in-role and proactive green behavior differently, for example, through different social and psychological processes. Thus far, little distinction has been made in the literature between employee in-role green behavior and green behavior that is beyond formal job duties (Boiral & Paillé, 2012; Manika, Wells, Gregory-Smith, & Gentry, 2013; Paillé et al., 2014). As a consequence, further research is needed to fill this important literature gap. In this study, we ventured into green HRM and its consequences by exploring in-role and extra-role green behaviors, two distinctive, yet related, criterion variables. In doing so, this study aimed to provide valuable insight into the nuanced effects of green

HRM on employee green behaviors, both as a part of job roles and formal duties and beyond.

Theoretical Backgrounds and Hypotheses Development

Green HRM

With companies now changing their business strategies and efforts toward a more environmentally focused agenda, HR must adjust its mandate and expand its scope by incorporating environmental management so as to transform how it performs its core HR functions (Angel Del Brio, Junquera, & Ordiz, 2008). Boudreau and Ramstad (2005) suggested that HR has the ability to measure and influence employee sustainability-related behavior, attitudes, knowledge, and motivation. Hence, organizations can utilize HRM to effectively deliver and implement environmentally sustainable policies (Renwick et al., 2013). Existing studies have identified a range of green HRM practices. For example, for green HRM to be an effective force in eliciting employee workplace green behavior, it should ensure that the firm has recruitment strategies aimed at attracting employees who have similar environmental values and beliefs as the organization; development, performance, and reward practices that take into account individual environmental performance; and effective training programs that develop environmental awareness, attitudes, skills, and knowledge (Cherian & Jacob, 2012; Daily & Huang, 2001; Milliman & Clair, 1996; Renwick et al., 2013).

Green Behavior

Employee green behavior is pro-social in nature (Chou, 2014); and from a pragmatic perspective, routine workplace green behavior should include both in-role and extra-role green behavior (Ramus & Killmer, 2007), as both forms of behavior contribute to organizational outcomes through value creation. How behavior is ultimately classified, such as whether such behavior is in-role or extra-role, is dependent on the organization and the expectations that the organization has of its employees (Paillé & Boiral, 2013). There could be instances in many jobs that require employees to behave “green,” such as jobs that require employees to ensure that toxic waste is not poured into local water systems or that hazardous material

HR has the ability to measure and influence employee sustainability-related behavior, attitudes, knowledge, and motivation. Hence, organizations can utilize HRM to effectively deliver and implement environmentally sustainable policies.

is disposed of in accordance with organizational policies and government regulations. These types of behaviors would be expected of the employee and, therefore, form part of a person's formal job duties. However, extra-role green behavior is more cryptic in nature and could be as simple as suggestions to improve organizational environmental performance through turning off computers at the end of the day and turning off lights when not in use (Paillé & Boiral, 2013). While both in-role and extra-role green behavior is considered important for achieving organizational green goals (Norton et al., 2014), they may have different antecedents as employees have different levels of discretion over when and how to exhibit these behaviors in the workplace (Hoffman & Dilchert, 2012; Williams & Anderson, 1991).

Psychological Green Climate as a Mediator in the Green HRM–Employee Workplace Green Behavior Relationship

Green HRM will facilitate employees' completion of in-role green tasks and elicit employee extra-role green behavior in the workplace.

The HRM behavioral literature suggests that HRM influences organizational performance through its effect on employee work attitudes and behavior (see Becker & Huselid, 2006, for a review; also see Wright et al., 2001). The HRM behavioral literature also suggests that employee consequences of HRM are largely dependent on HRM attributions (Nishii, Lepak, & Schneider, 2008). Green HRM affects employee workplace green behavior for the following reasons. First, green HRM practices, such as disseminating the information about the organization's green focus and emphasizing individual green values in recruitment and selection, and promoting green values through training, are likely to increase employee green cognition (Renwick et al., 2013). Second, work and job design that meet environmental requirements and green training practices designed to improve employee knowledge, skills, and competence are key processes to encourage employees to conduct green activities (Pless, Maakby, & Stahl, 2012). Third, the HRM attribution literature suggests that employees' perception of why the organization adopts certain HRM practices determines the effectiveness of HRM practices on employee work behavior (Nishii et al., 2008). A formalized and openly communicated set of green HRM practices and policies overtly demonstrates to employees the organization's commitment to being green and will likely result in the employee acting in accordance with the organization's green policies. Finally, promotion, appraisal, and

rewards that take into account green performance motivate employees to engage in and contribute to green activities (Renwick et al., 2013). Hence, green HRM will facilitate employees' completion of in-role green tasks and elicit employee extra-role green behavior in the workplace. As such, we developed the following hypotheses:

Hypothesis 1a: Green HRM is positively related to employee workplace in-role green behavior.

Hypothesis 1b: Green HRM is positively related to employee workplace extra-role green behavior.

The behavioral HRM literature recognizes that HRM may not directly affect employee behavior; rather, its influence is transmitted through various underlying mechanisms (Jiang et al., 2012). In this study, we proposed that psychological climate is a social and psychological process through which green HRM influences employee workplace green behavior. Psychological climate captures "individual perceptions of work environment characteristics" (Burke et al., 2002, p. 326) or "employees' perceptions of their organizations" (Patterson et al., 2005, p. 380). Green climate has been described in the literature as the climate that applies to corporations that achieve sustainable objectives by implementing a range of pro-environmental policies (Chou, 2014; Norton et al., 2014; Paillé et al., 2014; Ramus, 2002). Psychological green climate, therefore, is the perception an individual has of the organization's pro-environmental policies, processes, and practices that reflect the organization's green values.

Psychological climate is the result of employee social interactions, whereby employees determine the values of organizational policies, practices, and procedures that they both encounter and observe in the workplace (Kuenzi & Schminke, 2009). It is suggested that employees digest and interpret the organization's HRM practices and policies, and will in turn form their perceptions of the organization and its values (Bowen & Ostroff, 2004; Ferris et al., 1998; Kaya, Koc, & Topcu, 2010; Nishii et al., 2008). It is during this cognitive process that employees will develop their views regarding the psychological climate of the organization. When an organization projects a strong environmental agenda, the firm signals to employees the values and ethics that are central to the organization (Rangarajan & Rahm, 2011). By adopting green HRM practices, the organization sends a message to employees about its concern of the environment beyond pure economic gains, and also seeks to engage employees in green-related decisions and activities (Renwick et al., 2013). Chou

(2014), supported by Manika et al. (2013), suggested that employees are less likely to engage in environmental behavior in the workplace if they are not personally responsible for the energy costs or the equipment used. Therefore, it is important for organizations to clarify green responsibilities in the workplace with proper job design and appraisal; appropriate rewards for green behavior, which helps to clarify workplace green responsibilities; and enhance employee awareness of green values to encourage employee involvement in green activities. Hence, green HRM will be positively related to employee psychological green climate.

The climate literature suggests that employee behavior is largely influenced by perceptions that employees have about the organization (Schneider et al., 2013). Day and Bedeian (1991) demonstrated that organizational climates were able to predict, to some extent, employees' job performance with respondents who perceived their organization as unambiguous and supportive of risk, performing better than employees who worked for organizations perceived as enigmatic. An extensive literature review by Parker et al. (2003) confirmed that a multitude of research on psychological climate showed that psychological climate is significantly related to job satisfaction, burnout, and in-role and extra-role job performance. Rupp, Ganapathi, Aguilera, and Williams (2006) theoretically argued that an employee's perception of social programs, such as corporate social responsibility initiatives, triggers employee behavioral, attitudinal, and emotional responses. A recent study by Norton et al. (2014) found relationships between the perceived presence of organizational environmental policies and employee behaviors, with both task-related and proactive green behavior mediated by green climate. Based on these discussions, it can be argued that psychological green climate mediates the green HRM–employee workplace green behavior relationship. Therefore, we developed the following hypotheses:

Hypothesis 2a: Green HRM indirectly influences employee workplace in-role green behavior through the mediation of psychological green climate.

Hypothesis 2b: Green HRM indirectly influences employee workplace extra-role green behavior through the mediation of psychological green climate.

Moderating Effect of Individual Green Values

Contemporary values literature has underscored the importance of individual values in explaining

individual attitudes and behavior (Davidov, Schmidt, & Schwartz, 2008; Low, 2013). Two major theories, that is, the value-belief-norm (VBN) theory (Stern, Dietz, Abel, Guagnano, & Kalof, 1999) and the supplies-values fit theory (Edwards, 1996, 2007), largely underpin the ways in which individuals' values affect their behavior. The VBN theory posits that personal values, beliefs, and norms will affect employee work behavior (Stern et al., 1999). Empirical studies, such as Andersson, Shivarajan, and Blau (2005), Chou (2014), and Schultz et al. (2005), have reported a significant impact of personal environmental values on individual environmentally friendly behavior. These findings all point to a direct relationship between personal green values and employee green behavior.

The supplies-values fit theory posits that if personal values are congruent with those supplied by the organization, this will have a positive effect on employee work attitudes and behavior (Edwards, 1996, 2007). While it may be self-evident that some conflicting values would likely exist between an individual and the organization in which he or she works, it is in the best interests of an organization to strive for shared, congruent values (Paarlberg & Perry, 2007). A shared ideology that aligns individual values with that of the organization is expected to result in optimal employee outcomes, such as strengthened organizational identification and meaning of work, and positive work attitudes and behavior (Edwards, 1996; Edwards & Cable, 2009; Paarlberg & Perry, 2007). The stronger an individual connects with his or her organization, through aligned values and identification, the greater the likelihood that the employee would commit to achieving organizational goals and objectives (Cohen & Liu, 2011). Therefore, as identified by Day and Bedeian (1991), employee behavior is the interplay of both the person and the environment.

According to Rupp et al. (2006), employees make explicit judgments about their organization's socially responsible policies and behavior, and it is these judgments that determine whether the employees' psychological needs are fulfilled. The central themes of the supplies-values fit theory (Edwards, 1996, 2007), therefore, would support the model proposed in this study in that if an organization supplies an environment conducive to an employee's values, and as a result the employee's green values were congruent with that of the organization, it would be expected that the employee would be more likely to exhibit green workplace behaviors. Conversely, if employees' values are incongruent with those of the organization or the organization does not supply an environment that matches the need of the

employees, then employees would be less likely to demonstrate green behavior in the workplace. That is to say, individual green values and organizational green values interactively influence employee workplace green behavior. Green HRM practices and psychological green climate reflect the result of employees' judgments of the organization's green values. Hence, individual green values will moderate the effects of green HRM and psychological green climate on workplace green behavior. Therefore, we developed the following hypotheses:

<i>Individual green values and organizational green values interactively influence employee workplace green behavior.</i>	<i>Hypothesis 3a: Individual green values will moderate the effects of green HRM on employee workplace (1) in-role green behavior and (2) extra-role green behavior, such that the effects will be stronger when individual green values are high and weaker when low.</i>
<i>Individual green values and organizational green values interactively influence employee workplace green behavior.</i>	<i>Hypothesis 3b: Individual green values will moderate the effects of psychological green climate on employee workplace (1) in-role green behavior and (2) extra-role green behavior, such that the effects will be stronger when individual green values are high and weaker when low.</i>

Methods

Sample and Procedures

The data for this study were collected from a Chinese subsidiary of an Australian multinational enterprise, which manufactures paper-packaging products, primarily for the food industry. The company has ratified four primary green indicators including energy consumption, solid waste generation, water consumed per kilogram of products, and percentage of waste recycled. The researchers' interviews with the general manager, the HR manager for North Asia operations, the HR manager for the Chinese operations and the environment, and the environmental and safety officer revealed that the firm had adopted a range of green HRM policies and practices.

The questionnaire was distributed to and collected directly from employees and their direct supervisors during working hours, with time off provided by management to complete the questionnaire in early 2014. Full anonymity for all participants was assured, with organizational staff having no access to the completed questionnaires, and the researchers only having employee identification through an employee

code number. No name or other identification was requested or supplied on the questionnaire. Each respondent received a survey that had his or her personal employee code on the front page. Supervisors completed a separate survey for each of their subordinates at a separate, prearranged time slot. The researchers subsequently paired the surveys by matching the corresponding employee codes on both the employee and supervisor surveys. The company had 641 employees in total, with 59 employees participating in focus group discussions. Employees who had not participated in the focus groups and were able and on hand to participate, based on shift work and personal availability, took part in the survey. In total, 390 employees completed and returned the survey, yielding a response rate of 60.5%. Removing two incomplete surveys, 388 surveys were usable. On average, respondents had 11.53 years of education ($SD = 2.95$) and worked with the firm for 6.22 years ($SD = 4.3$). The mean age was 36.30 ($SD = 8.35$), and 57.5% of respondents were female.

Measures

The questionnaire was developed in English. Two bilingual academics translated the questionnaire into Chinese and back-translated into English independently, with any ambiguities resolved through further discussions. Focus group consultations were conducted to explore the applicability of the measures for the study variables. We used 5-point Likert scales for all study variables, ranging from 1 = strongly disagree to 5 = strongly agree.

Variables (Employee Rated)

Green HRM

There are no existing empirically validated measures for the latent variable "green HRM." As such, the researchers followed a number of procedures to develop the measures. First, the researchers identified nine key green HRM practices through a systematic review of the existing green HRM and green management literature. Next, the research team had several discussions and agreed to reduce the number of the statements to seven with "taking initiatives to promote green values" and "providing support to encourage employees to care about the environment" being removed. Third, to ensure the measures reflected the context on which this study was based, the researchers conducted the above-mentioned interviews. Interviewees were asked if they understood the reasons why the company adopts certain HRM practices, what these

HRM practices were, and how these practices affected employee work attitudes and behavior. Subsequent interviews resulted in the item “my company considers candidates’ green attitudes in recruitment and selection” being removed from the statement list because the company did not have this practice in place at the time of the interviews.

At the next step, the researchers conducted three focus group discussions prior to the formal questionnaire being presented to employees. The participants were asked to rate the relevance of the measuring statements to their own experience on a 5-point Likert scale, from 1 = not at all to 5 = very much. The results showed that all measuring statements scored above 4, indicating that the green HRM measure was useable with the sample. Demographic information of the 59 focus group participants is; 50.8% were male; average age was 35 years old; average tenure at the organization was 7.5 years; and education levels were as follows: 15 participants attended university, 36 attended secondary school, and eight attended trade school.

Exploratory factor analysis was then performed on the measure for green HRM using one half of the sample. The coefficients all exceeded .30. The Kaiser-Meyer-Olkin value was .80, and the Bartlett’s test of sphericity was significant ($p < .001$). These results supported the factorability of the correlation matrix. The principal axis factoring extracted one factor with eigenvalue exceeding 1 (eigenvalue = 3.05, explaining 43.40% of variance). The individual factor loadings all exceeded .70. A confirmatory factor analysis (CFA) was performed on this variable using the other half of the sample. The results supported the single dimensional structure ($\chi^2_{(9)} = 25.02, p < .001$; comparative fit index [CFI] = .97; incremental fit index [IFI] = .97; root mean square error of approximation [RMSEA] = .06). The alpha coefficient for this scale was .88. The six items and factor loadings are shown in Table I.

Psychological green climate was measured using five items from Chou (2014). A sample item is “Engaging in and supporting green and sustainable initiatives is important in this company.” The alpha coefficient was .86.

Individual green values were measured using three items from Chou’s (2014) personal environmental norms scale. A sample item is “I feel a personal obligation to do whatever I can to prevent environmental degradation.” The alpha coefficient was .83.

Control Variables

It is suggested that demographic variables would influence individual green behavior (Abrahamse & Steg, 2009). As a result, we controlled for gender, age, education, position, and tenure.

Variables (Rated by Supervisors)

In-role and Extra-role Employee Green Behavior

In-role and extra-role green behavior is measured using the respective three-item scales developed by Bissing-Olson, Iyer, Fielding, and Zacher (2013). A sample item for in-role green behavior is “This employee adequately completes assigned duties in environmentally friendly ways,” and for extra-role green behavior is “This employee takes initiatives to act in environmentally friendly ways at work.” The principal axis factoring extracted two factors with eigenvalue exceeding 1 (eigenvalue 1 = 2.74, explaining 40.13% of variance; eigenvalue 2 = 1.71; explaining 15.86% of variance). We performed CFAs to explore whether in-role and extra-role green behaviors are distinctive constructs. Results revealed that the two-factor model was a better fit ($\chi^2_{(43)} = 99.76, p < .001, CFI = .96, IFI = .96, RMSEA = .06$, Akaike information criterion [AIC] = 753.23) than the one-factor model ($\chi^2_{(44)} = 136.40, p < .001, CFI = .91, IFI = .90, RMSEA = .09, AIC = 869.64; \Delta\chi^2_{(1)} = 15.84, p < .001$). Alpha coefficients for in-role and extra-role green behavior were .86 and .85, respectively.

TABLE I The Measure for Green HRM

Item	Factor Loading
My company sets green goals for its employees.	.71
My company provides employees with green training to promote green values.	.74
My company provides employees with green training to develop employees’ knowledge and skills required for green management.	.77
My company considers employees’ workplace green behavior in performance appraisals.	.73
My company relates employees’ workplace green behaviors to rewards and compensation.	.72
My company considers employees’ workplace green behaviors in promotion.	.70

Analytical Strategy

We conducted structural equation modeling using MPlus 7.2 to test the hypotheses by following the two-step procedure suggested by Anderson and Gerbing (1988). At Step 1, we conducted a series of CFAs with maximum likelihood estimation to examine the discriminant validity of the latent variables. At Step 2, we compared the fit indicators of the structural partial mediation models and the full mediation models. According to Bentler and Bonett (1980), the goodness-of-fit values for CFI and IFI larger than .90 are acceptable, and exceeding .95 indicates a good fit. A value below .06 for RMSEA indicates a good fit into data (Beauducel & Wittmann, 2009). A model with the smallest AIC is the most parsimonious (Akaike, 1987). Due to the fact that our hypothesized models are a moderated mediation construct, we followed the approach recommended by Edwards and Lambert (2007) to test the mediated effects at varied levels of the moderator, and the moderated effects at multiple stages of mediation. Indirect effects were tested with confidence intervals (CIs) using 1,000 bootstrap sampling (Shrout & Bolger, 2002).

Results

The CFA results showed that the proposed five-factor model including green HRM, psychological green climate, individual green values, in-role green behavior, and extra-role green behavior was a good fit to the data ($\chi^2_{(265)} = 463.75, p < .001, CFI = .97, IFI = .97, RMSEA = .05, AIC = 1,264.766$). Comparatively, it was a better fit than other, more parsimonious models such as the four-factor model collapsing in-role and extra-role green behavior ($\chi^2_{(269)} = 492.27, p < .001, CFI = .86, IFI = .86, RMSEA = .08, AIC = 1,363.48, \Delta\chi^2_{(4)} = 28.52, p < .001$); the three-factor model collapsing green HRM and psychological green climate ($\chi^2_{(272)} = 645.89, p < .001, CFI = .83, IFI = .83, RMSEA = .09, AIC = 1,468.77, \Delta\chi^2_{(7)} = 182.14, p < .001$); the two-factor model collapsing green HRM, psychological green climate, and individual green values ($\chi^2_{(274)} = 679.59, p < .001, CFI = .75, IFI = .75, RMSEA = .11, AIC = 1,686.80, \Delta\chi^2_{(9)} = 215.84, p < .001$); and one-factor model by loading all variables on a single factor ($\chi^2_{(275)} = 1,060.91, p < .001, CFI = .55, IFI = .56, RMSEA = .14, AIC = 3,108.33, \Delta\chi^2_{(10)} = 597.16, p < .001$). These results supported that the five study variables are distinctive constructs.

Means, standard deviations, correlations, and reliabilities of the study variables are presented in Table II. The relationships of the two criterion variables with the predictor variables were in the expected directions. In-role green behavior was weakly correlated with extra-role green behavior

TABLE II Means, SD, Correlations, and Reliabilities of the Study Variables

	M	SD	1	2	3	4	5	6	7	8	9	10
1. Gender	1.58	.49	—									
2. Position	1.77	1.26	-.06	—								
3. Education	11.53	2.94	-.09	.59**	—							
4. Age	36.30	8.35	.11	.05	-.28**	—						
5. Tenure	6.22	4.30	-.02	.14**	-.08	.41**	—					
6. Green HRM	2.26	.91	.02	.02	.07	-.04	-.01	(.88)				
7. Psychological Green Climate	2.23	.80	.03	.15**	.14*	.03	-.04	.61**	(.86)			
8. Individual Green Values	1.65	.68	.13*	.26**	.28*	.06	-.04	.36**	.42**	(.83)		
9. In-role Green Behavior	2.41	.82	.15*	.14**	.13**	.03	-.03	.37***	.29**	.13**	(.86)	
10. Extra-role Green Behavior	2.84	.78	.15*	.41**	.06**	-.03	-.09	.25*	.39**	.29**	.18*	(.85)

Note: n = 388, * p < .05, ** p < .01(2-tailed), Cronbach's alphas are reported in the parentheses on the diagonal.

($r = .18, p < .05$); indicating they are correlated but distinctive constructs.

Hypothesis Test

Hypotheses 1a, 1b, 2a, and 2b constitute partial mediation models, in which green HRM directly and indirectly influences employee workplace in-role and extra-role behavior through the mediation of psychological green climate. When psychological climate was not included in the models, the main effects of green HRM were significant for in-role green behavior ($\beta = .31, p < .001$) and extra-role green behavior ($\beta = .20, p < .01$) after gender, position, education, age, and tenure were controlled for. Subsequently, Hypotheses 1a and 1b received support.

After controlling for demographic variables, the hypothesized partial mediation model for in-role green behavior fit into the data well ($\chi^2_{(152)} = 273.6, p < .001, CFI = .99, IFI = .99, RMSEA = .03, AIC = 12,935.905$), and fit better than the alternative full mediation model ($\chi^2_{(153)} = 300.7, p < .001, CFI = .89, IFI = .89, RMSEA = .08, AIC = 13,509.30, \Delta\chi^2_{(1)} = 27.1, p < .001$). The full mediation model for extra-role green behavior fit into the data well ($\chi^2_{(114)} = 192.1, p < .001, CFI = .97, IFI = .97, RMSEA = .05, AIC = 12,300.35$), and fit better than the hypothesized partial mediation model ($\chi^2_{(113)} = 218.16, p < .001, CFI = .91, IFI = .90, RMSEA = .06, AIC = 12,359.90, \Delta\chi^2_{(1)} = 26.06, p < .001$). Therefore, the partial mediation model for in-role green behavior and the full mediation model for extra-role green behavior were the preferred models. Green HRM was significantly related to in-role green behavior ($\beta = .20, p < .01$), but not significantly related to extra-role green behavior ($\beta = .06, p = .12$). Green HRM was significantly associated with psychological green climate ($\beta = .37, p < .001$). Psychological green climate was significantly related to in-role green behavior ($\beta = .23, p < .01$) and extra-role green behavior ($\beta = .33, p < .001$).

The indirect effect of green HRM on in-role green behavior through the mediation of psychological green climate was .09. The 1,000 bootstrap sampling revealed that the distribution of the product of coefficients 95% CIs being .002–.18, not containing zero. The indirect effect on extra-role green behavior was .12. The result of the 1,000 bootstrap sampling showed that 95% CIs for the distribution of the product of coefficients ranged between .03 and .22. None of the CIs contained zero. Thus, green HRM directly and indirectly affected in-role green behavior through the mediation of psychological green climate. Hypothesis 2a consequently received support. Psychological green climate fully mediated the

green HRM-extra-role green behavior relationship. Hypothesis 2b was partially supported.

Hypothesis 3a predicted that individual green values and green HRM would interactively influence employee workplace in-role and extra-role green behavior. Hypothesis 3b predicted that individual green values and psychological green climate would interactively influence employee in-role and extra-role green behavior. To test these hypotheses, we created the product terms “psychological green climate*individual green values” and “green HRM*individual green values” using the mean centered approach to reduce multicollinearity (Aiken & West, 1991). We added these two product terms as well as individual green values to the preferred models. After controlling for the main effects of green HRM and individual green values, the two product terms “green HRM*individual green values” ($\beta = .03, p = .16$) and “psychological green climate*individual green values” ($\beta = .04, p = .10$) were not significantly related to in-role green behavior. The product term psychological green climate*individual green values was significantly related to extra-role green behavior: $\beta = .16, p < .05$.

The interactive effect of individual green values and psychological green climate on extra-role green behavior is further illustrated in Figure 2. It shows that the effect of psychological green climate on extra-role green behavior was stronger when the level of individual green values was high, and the effect was weaker when the level of individual green values was low. We conducted path analyses under both high (i.e., 1 SD above the mean) and low (i.e., 1 SD below the mean) levels of individual green values. The simple paths at low and high levels of individual green values for in-role green behavior are shown in Figure 3, and those for extra-role green behavior are shown in Figure 4. Hence, Hypothesis 3a was not supported, and Hypothesis 3b was only partially supported.

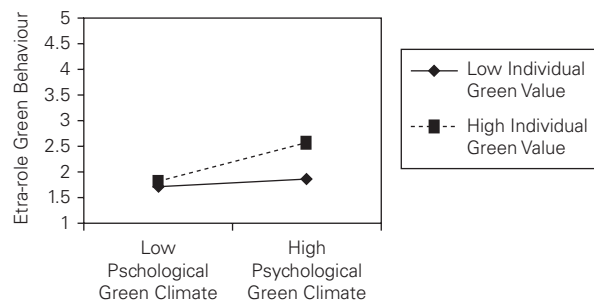
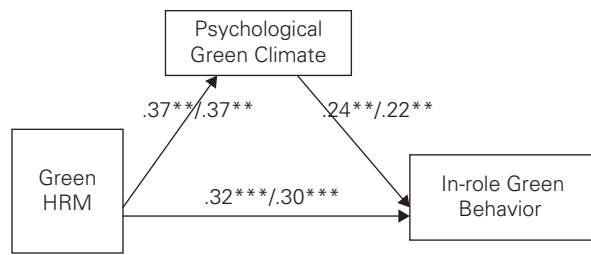
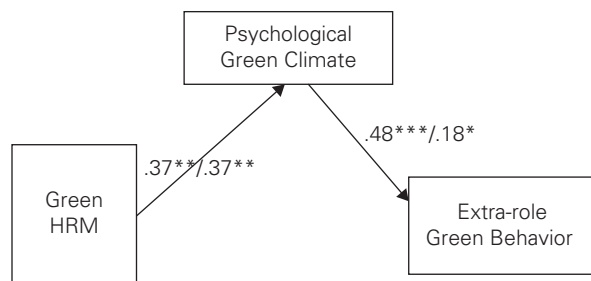


FIGURE 2. Interactive Effect of Individual Green Values and Psychological Green Climate on Extra-role Green Behavior



Note: High individual green values/low individual green values.

FIGURE 3. Path Analysis of Individual Green Values for In-role Green Behavior



Note: High individual green values/low individual green values.

FIGURE 4. Path Analysis of Individual Green Values for Extra-role Green Behavior

Discussion

The past few years have witnessed growing academic interest in HRM's role in environmental management (Jackson & Seo, 2010; Renwick et al., 2013). The current study takes a step further to empirically explore employee workplace green behavioral outcomes of green HRM. To achieve this research objective, we first developed measures for green HRM. Second, we utilized the behavioral HRM (Becker & Huselid, 2006; Jiang et al., 2012; Nishii et al., 2008) and organizational climate (e.g. Burke et al., 2002) literature to examine how green HRM predicts employee workplace green behavior through the mediation of psychological green climate. Third, we applied supplies-values fit theory (Edwards, 1996, 2007) to explore the moderating effect of individual green values on the relationships of green HRM and psychological green climate with employee green behavior.

The results show that green HRM was directly and indirectly related to in-role employee workplace green behavior, but only indirectly related to extra-role green behavior, through the mediation of psychological green climate. This finding provides empirical evidence to support the

behavioral HRM literature from the following perspectives: (1) HRM practices influence organizational performance through the impact on employee workplace behavior (Becker & Huselid, 2006; Wright et al., 2001); (2) attributes of HRM practices determine what employee behavior is likely to be affected (Bowen & Ostroff, 2004; Nishii et al., 2008); and (3) HRM may influence employee workplace outcomes through certain underlying mechanisms (Jiang et al., 2012), such as organizational climates (Burke et al., 2002).

The result also shows that individual green values moderate the effect of psychological green climate on extra-role green behavior. This finding provides some support to the supplies-values fit theory (Edwards, 1996, 2007), indicating that congruence between individual values and values overtly demonstrated by the organization results in positive employee workplace outcomes. However, no evidence was found that individual green values moderated the effects of green HRM and psychological green climate on in-role green behavior. These findings indicate that the ways in which green HRM influences in-role and extra-role green behavior over which employees have different levels of discretion are different.

This study contributes to the literature in several ways. The development of the green HRM measure is a significant contribution to the HRM and green management literature. This measure was developed through a literature review as well as using empirical validation. As such, it provides a useful platform to move forward to develop a more cross-culturally generalized measure for green HRM. As green HRM is an emerging concept, its actualization in the literature is minimal, with researchers only recently embracing its management potential. Existing publications on green HRM (e.g., Cherian & Jacob, 2012; Daily & Huang, 2001; Jabbour, 2011; Jackson & Seo, 2010; Renwick et al., 2013) have largely attempted to conceptualize employee workplace outcomes of the green HRM. A handful of empirical studies have explored the HRM–employee pro-environmental behavior relationship. However, these studies either focused on general HRM rather than green HRM (e.g., Paillé et al., 2014) or used small samples (e.g., Harvey et al., 2013, is a single-case study). Hence, there is a lack of adequate theory-based empirical studies on employee workplace outcomes of green HRM. This research adds to the knowledge base of the HRM literature in relation to employee workplace consequences of green HRM, as well as the social and psychological processes through which it exerts influences on employees' behaviors.

One interesting finding of this study is that both in-role and extra-role green behaviors are related to organizational green HRM practices; however, this occurs through different social and psychological processes. We interpret this finding in the way that employee in-role green behavior is officially appraised, recognized, and related to rewards and is therefore routine workplace behavior, and as such is directly affected by green HRM practices. Because extra-role green behavior is not officially appraised and rewarded, these behaviors are principally influenced by individual perceptions of organizational green climate resulting from the adoption of, rather than influenced directly by, green HRM practices.

Moreover, our study extends the supplies-values fit theory (Edwards, 1996, 2007) by providing empirical evidence of the moderating effect of individual green values on the psychological green climate–extra-role green behavior relationship. This finding is consistent with past studies, such as Bissing-Olson et al. (2013) reporting that pro-environmental attitude moderates the effect of daily effect on proactive pro-environmental behavior. It is necessary to note that our study, however, does not support the findings in the Bissing-Olson et al. (2013) study, which found that pro-environmental attitude moderates the effect of daily effect on task pro-environmental behavior. We interpret our findings in the way that it would be expected that employees would have less discretion resulting from personal values over job duties than over extra-role behavior (Williams & Anderson, 1991). The findings in relation to different moderating effects of individual green values and different mediating effects of psychological green climate are important as they provide a better understanding of the nuanced social and psychological processes through which green HRM influences individual workplace green behavior, and, more generally, different antecedents of in-role and extra-role employee workplace green behaviors. These findings provide a new perspective on the HRM–employee workplace outcome relationships and open up an interesting avenue for further research.

Implications for Practices

Although this research was conducted in the national context of China, it has significant implications for management in general, due to the fact that green management has become a contemporary global issue (Norton et al., 2014). A growing number of researchers (e.g., Jackson & Seo, 2010; Kumari, 2012; Renwick et al., 2013) have suggested that organizations should adopt green HRM practices to effectively and successfully implement

organizational green policies. In support of these researchers, the current study provides empirical evidence of positive relationships of green HRM with employee in-role and extra-role workplace green behavior, through the mediation of psychological green climate. Based on the findings of the current study, organizations should put green HRM practices in place if they decide to set up and seek to successfully achieve a green goal agenda. More specifically, they should design work tasks to meet organizational green policy requirements and consider providing employees with adequate green training and educational opportunities. Such training serves multiple purposes. First, it helps to equip employees with the necessary skills and expertise for the successful implementation of green management goals. Second, it increases employee awareness and cognition of green management and organizational green values. Organizations should properly appraise employee green behavior, and link this behavior to promotional opportunities, pay, and compensation, for employees to be encouraged and motivated to participate in green activities, and to contribute to green management objectives. These green HRM practices are likely to ensure that organizational green initiatives will be effectively implemented.

This research did not include “considering attitudes toward green management in recruitment and selection” in the measure for green HRM due to the participating firm not having this practice in place. However, this research reveals that individual green values moderate the effect of psychological green climate on employee extra-role green behavior, which as Paillé and Boiral (2013) suggested, is crucial to achieving organizational green goals. Also, researchers such as Renwick et al. (2013) argued that recruiting employees with a positive green attitude is an essential green HRM practice. Hence, it is important for organizations to take measures to increase congruence between employees green values and the values supported and promoted by the organization. One way to do so, we suggest, is to consider individual green values and disseminate the information about organizational green agendas during the recruitment and selection process. Also, and perhaps more important, organizations should effectively communicate their green policies and environmental values to existing and potential employees, so that employees are able to

Organizations should effectively communicate their green policies and environmental values to existing and potential employees, so that employees are able to develop accurate and informed perceptions of the organization.

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Research Limitations and Further Research Directions

This study has several limitations that need to be addressed. First, green HRM and green management practices vary between firms, industries, and economies. The participating firm of this study is an Australian multinational enterprise operating in China. HRM practices of multinational enterprises are subject to the effect of country of origin (Ferner, 1997); hence, the sample of the study may be not representative of wider Chinese industries. Also, the requirements for, and standards of, green management at the national level in China may be different from other countries. Although concerns about the nonrepresentativeness of our sample are to some extent eased by the fact that China is now making a substantial effort to transition to a green economy, we suggest that future research that replicates ours would be valuable if conducted in cross-level settings to increase generalizability of our research findings. In this case, cross-cultural research is especially important for developing a more globally relevant measure for green HRM.

Second, any HRM practices may take time to exert maximum influence on employee workplace outcomes. The data for the current study were collected at one point in time. As such, this research design may not enable the effect of HRM to be fully explored. To address this limitation, future research may consider conducting longitudinal studies by investigating the changes to employee green behavior resulting from the adoption of green HRM.

Third, the HRM literature suggests that HRM influences employee work outcomes through multiple underlying mechanisms (Jiang et al., 2012). It was not possible for our study to account for every mediator or moderator that could influence the green HRM–green behavior relationship. Future studies that explore alternative predicting variables, for example, from the human capital

(skill enhancement) and motivational (job satisfaction) perspectives, would be valuable to this line of inquiry.

Fourth, multilevel modeling is currently gaining growing popularity in HRM research (Shen, 2015). This is because perceptions of HRM practices tend to be similar among employees in the same organization and different between different organizations, and, consequently, employee outcomes of HRM practices are subject to organizational contextual effects (Shen, 2015). As such, it may be necessary to explore the green HRM–employee green behavior relationship at higher levels, such as the unit level or the organizational level. Due to the limited number of units in our sample, we were not able to adopt the multilevel approach in this study. We suggest that future studies consider employing the multilevel approach to take into account organizational contextual effect in HRM research.

Finally, this research only explored employee workplace green behavior as the criterion variable. From the motivational HRM perspective, a set of HRM practices may lead to multiple employee workplace outcomes (Jiang et al., 2012). Consequently, it is possible that the effect of green HRM may go beyond employee green behavior. However, the existing green HRM literature has only conceptualized the linkage between green HRM and employee or organizational green outcomes. The effect of green HRM on nongreen work attitudes and behavior has been largely neglected. We therefore call for future research to explore employee nongreen attitudinal and behavioral outcomes of green HRM. Such research will make greater contributions to the HRM literature on the effect of HRM on employee workplace outcomes.

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Gestión de recursos humanos sustentable: perspectiva de los profesionales

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Gestão sustentável de recursos humanos: perspectivas dos profissionais

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Abstract

Purpose – Identifying and analyzing aspects related to sustainable human resources (HRs) in an emerging, Iberoamerican location (Monterrey, Mexico). Documenting employee experiences regarding sustainable practices of HR in their companies to understand the enacted meaning of sustainable HR management (HRM). This study aims to seek answers to understand the ways environmental sustainability is present in HR subprocesses and the ways companies regard HRs from a sustainability perspective.

Design/methodology/approach – This exploratory research has a qualitative approach. The authors collected and summarized semi-structured interviews with 31 key informants that work fully or partially in HRs in a large, industrialized city in an Iberoamerican, emerging economy (Monterrey, Mexico).



Findings – The main findings based on responses from HR professionals are as follows: HR activities may contribute to the sustainability of the business and its physical environment; HR can create a culture of care for the resources, but training and development activities are not currently used optimally; and in addition to the economic sustainability of the employers, social and environmental sustainability are also within HR's influence sphere.

Originality/value – This study contributes to the emerging literature on sustainability in HRM, due the dearth of information related to “green” or environmental practices in HRM. This study reports specifically on the ways this perspective adds value within Mexican enterprises, but the authors are confident that these findings also generalize across industries, enterprises and regions.

Keywords Sustainable human resources, Corporate social responsibility, Green human resource management, Mexico

Paper type Research paper

Resumen

Propósito – Identificar y analizar aspectos relacionados con la sustentabilidad de los recursos humanos de empresas en una localidad iberoamericana emergente (Monterrey, México). Documentar las experiencias de los trabajadores respecto a las prácticas sustentables de recursos humanos en sus empresas para comprender el significado de la administración de Recursos Humanos (RR.HH.) sustentable en la práctica. Hemos buscado respuestas respecto a las maneras en que la sostenibilidad ambiental está presente en los subprocesos de RR.HH. y las maneras en que las organizaciones utilizan una perspectiva de sostenibilidad en la gestión de recursos humanos.

Metodología – Esta investigación exploratoria tiene un enfoque cualitativo. Recolectamos y resumimos treinta y un entrevistas semiestructuradas con informantes clave que trabajan total o parcialmente en una ciudad grande e industrializada perteneciente a una economía iberoamericana emergente (Monterrey, México).

Hallazgos – Nuestros principales hallazgos basados en las respuestas de los profesionales de RR.HH. son: a) las actividades de RR.HH. pueden contribuir a la sostenibilidad del negocio y su medio ambiente físico, b) RR.HH. puede crear una cultura de cuidado de los recursos, pero las actividades de formación, entrenamiento y desarrollo no se utilizan actualmente de forma óptima, y c) Además de la sostenibilidad económica de las organizaciones, la sostenibilidad social y medioambiental también están dentro de la esfera de influencia de RR.HH.

Originalidad – Este estudio contribuye a la literatura emergente sobre sostenibilidad en la gestión de recursos humanos, debido a la falta de información relacionada con las prácticas “verdes” o ambientales de RR.HH. En este documento reportamos específicamente sobre las formas en que esta consideración de valor en RR.HH. sostenible dentro de las empresas mexicanas, sin embargo, está claro que estos hallazgos tienen una importancia más amplia en todas las empresas y regiones.

Palabras Clave – Recursos humanos sustentables, Responsabilidad social corporativa, Recursos humanos, México

Tipo de papel – Trabajo de investigación

Resumo

Objetivo – Identificar e analisar aspectos relacionados à sustentabilidade dos recursos humanos em empresas de uma localidade ibero-americana emergente (Monterrey, México). Observar as experiências dos trabalhadores de práticas sustentáveis de RH em suas empresas para entender o que significa na prática a gestão sustentável de RH. Buscamos respostas sobre as formas como a sustentabilidade ambiental está presente nos subprocessos de RH e as formas como as organizações utilizam a perspectiva da sustentabilidade na gestão de recursos humanos.

Metodologia – Esta pesquisa exploratória tem abordagem qualitativa. Coletamos e resumimos trinta e uma entrevistas semiestructuradas com informantes-chave que trabalham total ou parcialmente em uma grande cidade industrializada pertencente a uma economia emergente ibero-americana (Monterrey, México).

Resultados – Nossos principais achados com base nas respostas dos profissionais de RH são: a) as atividades de RH podem contribuir para a sustentabilidade do negócio e seu ambiente físico, b) o RH pode criar uma cultura de cuidado com os recursos, mas as atividades de educação, treinamento e desenvolvimento atualmente não são utilizadas de forma otimizada, e c) Além da sustentabilidade econômica das organizações, a sustentabilidade social e ambiental também estão dentro da esfera de influência do RH.

Originalidade – Este estudo contribui a literatura emergente sobre sustentabilidade na gestão de recursos humanos, devido à falta de informação relacionada às práticas “verdes” ou ambientais de RH. Neste estudo

reportamos especificamente sobre o valor dos RH nas empresas mexicanas, no entanto, fica claro que essas descobertas podem ser generalizadas a outras indústrias, empresas e regiões.

Palavras-Chave – Recursos humanos sustentáveis, Responsabilidade social corporativa, Recursos humanos, México

Tipo de papel – Artigo de pesquisa

Introduction

The highly, increasingly competitive environment experienced by businesses worldwide is focused on profitability, achieving results with maximum efficiency and using technology and other innovations in as effective ways as possible (Ulrich, 2000; Morales and Salvador, 2006; Curado, 2018), which often results in pollution and overuse of natural resources. On the other hand, Business, Management and Organization studies are complicit in the creation and intensification of climate-changing conditions (Goworek *et al.*, 2018); organizations also have the obligation and responsibility to care for and protect the environment (Gadenne *et al.*, 2009; Cambra-Fierro *et al.*, 2008) and to be conscious of the importance of corporate social responsibility (Ciocirlan, 2008).

The human resource management (HRM) function must be a source of simple, useful and practical work schemes that help enterprises to improve its “green” or sustainable practices (Worley and Lawler, 2006). It should pay special attention to the processes of attracting human talent, reward systems and the adequate and efficient use of diverse personnel operations that ensure achieving business’ objectives. But improving productivity should not be the only aim; also accomplishing the long-term viability of the organization and its stakeholders, including the natural environment (Losey *et al.*, 2005; Bayo-Moriones and Ortín-Angel, 2006).

Companies need to be concerned with their environment in addition to their financial health. Moreover, they should take care of the physical and material resources at their disposal, so that everyone in the organization is aware of the responsibility they have toward society and other stakeholders, internal or external to the organization. Interest in sustainable management has increased as scholars have focused on the roles of corporate sustainability, defined as a business approach that creates and sustains the long-term value of a company (Hristov *et al.*, 2020; Jerónimo *et al.*, 2020). Corporate goals in reducing CO₂ emissions, lowering the use of energy (often measured as kwh per ton of production), as well as the intake of fossil fuels are a few of the relevant measures that have become more prevalent in the past decades due to climate change on our planet and the ostensible effect that corporations have on pollution.

Concern for better use of resources, the need for social equity and for global economic growth have also increased recently. There have been adjustments to diverse business practices to put these concerns into action. Henriques and Sadorsky (2006) have documented actions made by countries with emerging economies. Aptly named “sustainability,” this new way of thinking is impacting all sectors around the world (Henriques and Sadorsky, 1999).

Still, most of these contributions have originated in developed countries, where living standards are higher and diffusion of information is more likely to lead to a consensus on the meanings and foci of this important phenomenon. For this reason, we set out to investigate the interpretation given to “Sustainable HRM” or “Green HRM” by HR practitioners within Monterrey, Mexico, a large, industrial and progressive city in an emerging country.

This paper is divided into three main sections. In the first section, the origin and development of the concept of sustainability are reviewed, along with its relevance for the HR management area. Then, we show a qualitative analysis of the processes related to sustainability taking place in HR departments and sub-functions in the companies of our

sample. Finally, we display our conclusions as well as limitations of this study and suggestions for future research.

Literature review

Nowadays, the term “sustainability” is used in many aspects of our daily lives, the concept has been developing around the world to raise awareness of the catastrophic effects that the ecosystem is experiencing. Consequently, many organizations are taking rigorous steps to depollute and disinfect society through their environmental management systems (Malik *et al.*, 2021). Scientific evidence leaves little doubt about the necessity to change toward more sustainable ways of living: concepts, guidelines, programs, transnational protocols and normative claims of promoting sustainability are on the rise (Seele, 2016). Hence, we see commentary and work on sustainable processes, sustainable businesses, sustainable management, sustainable communities, etc. Clearly, this concept is used in very broad and sometimes ambiguous fashions.

The term “sustainability” was formally used in 1987 by the United Nations (UN) World Commission on Environment and Development, also known as the Brundtland Commission. Gladwin *et al.* (1995) define it as “a development form that responds to the present needs without jeopardizing future generations’ capacity to satisfy their own needs” which leads the future of the business models in accordance with the UN. Beyond the definition of sustainability, three big pillars support the concept in which this paper is based: economy, environment and society.

This conceptualization caused controversy, as it was considered very broad. Some questions that arose include: How can a unit develop if it will remain the same? What exactly is meant by “needs”? (White, 2013). To answer this, new points of view appeared, further developing this concept. An argument is that the way this problem is being addressed, as a definition problem, will not help accomplish its goals. In reality, it is a prediction problem. Another criticism is that it fails to consider the time–space relationship in which this definition must apply (Costanza and Patten, 1995; Sheehan *et al.*, 2014; Lozada and Mintu-Wimsatt, 1996). The idea that these authors present is clear: “A sustainable system is that which survives or persists”; nonetheless, they also mention that it is important to define when a system can be considered to have persisted (prediction) and delimit, in time and space, the system to be “sustained” (relationship time-space). Systemic thinking is a prerequisite when discussing sustainable development, we need to see work as holistic (Reiman and Väyrynen, 2018). Other authors address this definition accentuating its probabilistic nature: “Sustainability means transforming our way of living to maximize the opportunities that allow the environmental and social conditions to support human security, its health and wellness” (McMichael *et al.*, 2003). “Sustainability is the possibility that all forms of life flourish forever” (Ehrenfeld, 2005).

The concept of “Sustainable Human Resource Management” (SHRM) or “Green Human Resources Management” appears even less clearly than the concepts mentioned before. Basically, our review of the literature shows two different approaches to this term. The first considers the social and human results that enable an organization’s continuity, an approach to organizational sustainability as its goal. The second perspective has an environmental origin, meaning that it refers to HR activities that promote positive environmental results and implies ethical behaviour, as well as workers’ human and social development (Jackson *et al.*, 2011; Sheehan *et al.*, 2014; Kramar, 2014; Gupta, 2014; Opatha and Arulrajah, 2014). Green HRM focuses on encouraging practices and actions to improve the environmental records of companies (Aust, Matthews and Muller, 2019). Therefore, employee green behavior includes initiatives and actions such as saving energy by turning off lights when

leaving an office, avoiding waste by correcting documents electronically rather than printing them out, using resources efficiently by adopting teleconference technologies, rather traveling to meetings, recycling, etc. (Norton, 2017). Nowadays, the development of new technology, including digital technologies such as e-health services, robotics or emission reduction solutions could help individuals, organizations and nations achieve a more sustainable planet considering sustainable development goals (Seele and Lock, 2017). Green HRM involves several practices that companies implement to protect the environment and satisfy stakeholder pressures on environmental issues (Guerci *et al.*, 2016).

In other work, the term “sustainable HRM” seems to have originated to complement High-Performance Work Systems. Within the sustainability literature, we find some implications such as workers’ wellness and quality of life (Barnes, 2012; Gahan and Buttigieg, 2008; Zhang *et al.*, 2014), as well as work–life balance (Muster and Schrader, 2011). The objective is to make good use of workers’ abilities and efforts, as well as promote their motivation to reach the maximum possible profit for the business without sacrificing employee wellness. Thus, sustainable HRM arguably emerged as a theoretical construct to extend the field of HRM to include employees’ efforts to achieve improved organizational financial performance and reduce employee health-related hazards simultaneously (Mariappanadar and Kramar, 2014).

From that perspective, green HRM means achieving organizational sustainability through the development of practice and strategic HR policies that also support the three pillars of sustainable development (Boxall, 2003; Shih *et al.*, 2007; Theriou and Chatzoglou, 2009). As for the evolution of HRM, Freitas *et al.* (2011) propose that it must be more strategic, giving relevance to the people within the organization, helping staff achieve planned objectives through an integration in all organizational areas, where success is achieved through innovation, diversity and effective environmental management (Reihaneh *et al.*, 2013).

HRs mostly work within the social pillar, as SHRM is interested in workers as “people,” developing mechanisms to improve their abilities (Marescaux *et al.*, 2019). It is more than job creation, as it provides benefits and profits for the company. This way of thinking allows workers to develop their abilities because of the importance they take within this philosophy. Therefore, their work performance is strengthened, contributing to the development of their organization’s economic activity (Buciuniene and Kazlauskaitė, 2012; Roos *et al.*, 2004).

One of the most important strengths of sustainability in this area is the commitment that can be created among workers and the firm due to value congruence (Albrecht, 2012; Cañibano, 2013; Jose and Mampilly, 2012). Once again, the image of the company to society plays an important role. If the company carries out sustainable practices, there is a higher probability that its workers will feel comfortable working there, as they know that their actions are consistent with their values (e.g. the factories do not pollute the environment). The company might also make a product that helps protect the environment. Likewise, environmental protection-related training forms one of the major green initiatives around the globe to enhance employee commitment and satisfaction (Amrutha and Geetha, 2021). Satisfaction with personnel’s employability was higher as organizations reported more implemented HR practices (Ybema *et al.*, 2020).

Also, to decrease ethical dilemmas among people within a company, it is necessary to change organizational cultures. This change is likely to affect most stakeholders. If at first their concern for the environment was not strong, after seeing that the company cares for the environment, their perspective and attitudes are likely to change (Bohdanowicz *et al.*, 2011).

On the other hand, employee attitude is one of the main weaknesses for the implementation and development of sustainable policies within an organization. Oftentimes, resistance to change and to the undertaking of new work procedures can be a key factor to any proposal, and the role of management in these situations is very important (Bohdanowicz *et al.*, 2011; Cherian and Jacob, 2012).

HRM is the backbone within any organization, regardless of size and industry. It is useless to have the best machines, and input to produce the best goods and services, if no one takes care of their efficient operation and management. If an organization considers and wants to act within the parameters of sustainability, then the fulfillment and commitment toward this objective must be transmitted to every person involved in the business; all this to achieve the desired results.

Methodology

Next, we describe the activities performed for our qualitative investigation.

Objectives

The objectives of this investigation are as follows:

- identify and analyze the aspects related to HR sustainability that businesses in an emerging environment (Monterrey, Mexico) currently have;
- understand the importance given to the HRs function by people in business organizations; and
- document experiences of workers regarding sustainable practices of HRs in their companies.

Research questions

We used the following questions as a basis to interview participants in our study:

- Q1. Does an environmental position really exist in HR processes?
- Q2. What is currently happening in your company regarding HRs from a sustainability perspective?
- Q3. What are the most influential strategies and HRs practices regarding sustainability?

Research context

We collected information by means of a semi-structured interview. The work of Hernández-Sampieri *et al.* (2014) regarding qualitative data collection and analysis suggests that, in a qualitative investigation there is data that is not structured – product of the interviews and questionnaires applied – that must be organized according to certain topics, criteria or patterns that correspond to the research objectives. The complete list of questions can be found in the [Appendix](#).

Participants are currently working in the HR area in companies within the Monterrey metropolitan area in Mexico. This project focused on a Latin American area to understand the unique opportunities offered for management research (Aguinis *et al.*, 2020) due the large management and sustainability challenges to Latin American (Hernandez-Pozas *et al.*, 2021). A questionnaire with twelve questions was developed and structured to learn the opinions

and experiences that people have about HRs processes from a sustainable perspective in their companies. A group of students from a private higher education institution applied the questionnaire in these workplaces, taking about 20–30 min per interview.

Results and discussion

The sample includes 31 respondents; 8 belong to trading businesses, 6 to manufacturing businesses, 15 to service businesses, and 1 to the public sector. A total of 18 respondents work in the HR area, 6 have additional management responsibilities and the remaining 7 are from commercial and administrative areas. With respect to gender, we had 15 males and 16 female participants. Finally, regarding time worked in their organizations, 9 have less than 4 years in their company, 7 have 4–8 years, seven have 9–12 years and the remaining 4 have more than 12 years of seniority. [Table 1](#) summarizes the selected demographic characteristics of our sample.

Organization/Person feature	n	(%)
<i>HRM formally present</i>		
Yes	26	83.9
No	5	16.1
<i>HR-specific employees</i>		
None	5	16.7
1 to 5	15	50.0
6 to 15	5	16.7
>= 15	5	16.7
No answer	1	
<i>Tenure in HR</i>		
<= 5 years	3	10.7
6 to 15 years	5	17.9
16 to 25 years	8	28.6
>= 25 years	12	42.9
No answer	3	
<i>Number of employees</i>		
< 100	12	38.7
100 – 249	7	22.6
250 – 999	2	6.5
> 1,000	10	32.3
<i>Industry</i>		
Retail	8	25.8
Manufacture	6	19.4
Services	15	48.4
Public or Government	2	6.4
<i>Ownership</i>		
Domestic	19	61.3
Foreign	12	38.7
<i>Main Market</i>		
Local or Regional	7	22.6
Domestic or National	6	19.4
International/Exports	18	58.0
	N = 31	100.0

Table 1.
Characteristics of the
sample

In this section, we present our analyses of the responses obtained from participants in our study. Sample or illustrative quotes from their answers are presented as is our interpretation. Our analyses are focused on organizational actions with respect to the environment, supporting HR practices in all subfunctions, such as recruitment, selection, rewards, job analysis, training, motivation, performance management and use of technology for HR purposes.

The environment

The topic commonly referred to as “green” or the environment is one of the pillars of sustainability; the other two are the economy and society. Companies that carry their processes in environmentally friendly ways – including HRM processes – are considered socially responsible organizations. Publications on socially responsible HRM primarily analyze equity and inclusiveness in society. They emphasize that employers should guarantee equity in recruitment, compensation, promotion, training and appraisal (Piwowar-Sulej, 2021a). The concept of “Green Human Resource Management” is related to activities that:

- impact the organization’s results and that contribute to the maintenance of the environment;
- generate awareness of sustainability;
- create a culture of stewardship or concern for current resources; and
- look after the economic, social and environmental well-being of the organization:

It is a system where work is done at the same time the environment is being taken care of; it is a new way to create a culture for workers to take care of the environment, like non-smoking policies, collecting batteries, saving water, recycling, and the need to help the nearest community.

It is important to include in HRM the policies that need to be followed for the protection of the environment, in the job descriptions, onboarding processes, training, procedures and work instructions, as well as in the fulfillment of legal requirements. As HRM continually strives to improve its operating procedures, many strategies can be put into action to slow down or repair ecological damage. For many of our respondents, Green HRM is an approach in which culture, processes and operation work together for the preservation of the environment and have a positive impact on it. Beneficial effects and outcomes have been identified for organizations, such as a decline in pollutant emissions and waste (Yusliza *et al.*, 2019).

They are a set of actions in favor of the preservation of the environment, through internal policies of the organization, to create a consciously involved cultural change that makes good use of resources and reduces the impact that productive processes have on the environment. Also, to make the workforce aware of being environmentally friendly, optimizing resources and promoting care and preservation culture. Finally, green HR means attracting talent and generating onboarding efforts aligned with the corporate philosophy and corporate values that are congruent with environmental stewardship, as well as searching for training and everyone’s development through growth processes in which they can receive financial and non-financial rewards, in accordance with the improvement proposals generated for all members of the organization.

On the other hand, 13 participants mentioned that there are no HR practices in their workplaces related to sustainability, while eighteen indicated there were HR activities and that the workforce is involved. Some examples include the following:

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- “Paperless work,” digital document storage and the use of information technology and electronic media in some HR processes;
 - recycling campaigns;
 - campaigns for the care and efficient use of both water and electric energy;
 - projects with renewable energy through the installation of solar panels and energy-efficient lighting;
 - having smoke-free facilities;
 - carpooling or using company-owned cars;
 - classification of waste residue, devices (in internal and external cafeterias) where glass, pet and aluminum are separated, with the purpose of recycling;
 - organization-sponsored events such as “ecological walks” and “reforestation activities”; and
 - a “green wall” within the company’s premises, where workers’ efforts on the environment and preservation of resources are publicized.

Human resource development

Our respondents suggested that HR development practices that focus only on current needs are not in line with the SHRM principles of a long-term perspective. There is also a visible lack of employee participation in the process of making training-related decisions, which is another principle of sustainable HRM (Piwowar-Sulej, 2021b). Nevertheless, some companies have made great strides in their green HR processes. In some organizations, the responsibilities of the worker towards the environment are listed in the job description; in others, there is a management system compliant with ISO 14001, or there is a formalized program to raise workforce awareness on actions related to recycling.

Regarding goals or environmental indicators that workers have within participating companies, 23 (74%) stated that they have no indicators or metrics but have someone responsible for ensuring that actions regarding environmental care are carried out daily. Oftentimes, a manager ensures that other employees are aware of the consequences that their actions have in the environment-and that such actions are not neglected or forgotten, through periodical meetings. As for the other eight (26%), they do have indicators, which we have included in responses about indicators or metrics concerning environmental care:

- adequately managing resources;
- adopting and controlling environmental commitments with suppliers;
- training and sensitizing collaborators about environmental practices;
- raising awareness of the importance of recycling as a daily life activity;
- decreasing paper usage, separating waste (organic and inorganic), collecting PET;
- attitude towards security and professionalism to avoid fuel spills that bring serious environmental damage;
- decreasing hazardous residue generation;
- decreasing electrical energy intake;
- achieving saving on consumables;
- focusing (as a priority) in energy saving;
- keeping the clean industry certificate;

- having the adequate storing place for chemical containers to protect the environment, special maintenance equipment and recharging of extinguishers (NOM 154, an industrial norm observed in Mexico);
- reducing CO₂ emissions in the operations area;
- reducing the intake of kWh/Ton of production;
- reducing the intake of fossil fuels; and
- using other raw materials;

Another question that we asked was whether there are any employee rewards to support an environmental perspective. A total of 23 respondents (74%) answered no, while eight (26%) mentioned that their organizations do have a reward scheme for workers who achieve the required goals. Nonetheless, the rewards are non-financial: awards ceremony for working areas, gifts (e.g. a small tree or plant) for their participation in events within a themed week, such as “security” or “earth week,” a free afternoon once a trimester for the departments that waste less paper.

Green ideas that are presented by company collaborators are taken into account and points are given for these ideas (either individually or in a team) which can be exchanged –after achieving a specific number or a pre-established goal- for different awards such as lunch bags, iPads, cups, keychains, among other promotional articles of either the company or the awareness campaign on the theme of green culture.

Selection and recruitment

In terms of talent attraction, 12 interviewers responded they do not have preferences to recruit new workers with a “green profile,” as they do not have such a profile in the company. They described themselves as traditional companies, more concerned about recruiting employees with technical abilities and knowledge required for the job. On the other hand, of the nineteen participants that said they do prefer to recruit people with a “green” profile, they shared that the business culture could be modified, as it is a growing trend in which companies consider social responsibility as part of their job. A study of Canadian organizations finds those with more active green commitment profiles correlate positively with staff as a source of pressure (Paillé *et al.*, 2020) and employee participation in environmental policies is imperative (Unsworth *et al.*, 2020)

It was also mentioned that:

Yes, it would be very important to have people that are sensitive to these topics since their importance has been constantly growing; and the way to do so would be at the time of writing job descriptions for recruiting purposes.

In addition, it was suggested that, when asking for documentation or requirements needed to start working in the company, a paragraph be added describing skills and abilities related to caring for the environment. Other participants indicated that it is necessary to identify these potential employees, because they help maintain ISO 14001 certification through actions that benefit both the environment and the company, after all managers should carefully think about human assets when implementing an ISO 14001 practice (Daily *et al.*, 2007).

Using a “green perspective” in the recruitment process is becoming critically important; the way to identify such candidates is through in-depth interviews to identify values, practices and potential cultural fit of the candidates. Among the diverse methods used to attract talent, we found that eleven participants mentioned they did it through internet

sources such as job boards (e.g. OCCmundial, www.occ.com.mx/), the company's website and LinkedIn vacancies or running computer searches as a function of the job profile. Seven participants reported using social networks (Twitter, LinkedIn, Facebook) where desired profiles are published and the best candidates are filtered, followed by face-to-face interviews. The other thirteen did not express a preference for a particular method, as they use all recruiting strategies such as the newspaper, radio, announcements within the company, flyers, word of mouth, college job boards, job agencies, etc.

During job interviews, in that same recruiting process, 24 respondents prefer having face-to-face interviews, because they are considered more personal, and more details can be observed; only two reported a preference for online interviews. Five participants mentioned they interview their candidates in both ways. For example, first a telephone interview is made and then – depending on their location – a video chat takes place and finally, if chosen as a short-listed candidate, a face-to-face interview might be scheduled.

Training

Another important aspect deals with training practices dealing with the environment. To the question regarding whether this is an organizational priority, we found out that, in ten of the companies interviewed, the practice is not. Training is oriented to skill development and the environment is far from taking a relevant role in these organizations.

It isn't a priority because we can't find in a lot of companies something such as a culture or conscience about the current situation of our planet; it is important to consider that this topic needs more diffusion. A lot of times, employees carelessly use services. They don't know their cost. They simply use them without being aware of their true value.

On the other hand, twenty participants mentioned that environmental training practices are indeed a priority within the company. They mentioned that:

[...] environmental training is mandatory not only because of the different operating norms Mexican companies have, but because taking care of the environment provides the company with a vision of social responsibility towards its workers, meaning that if you care for the environment, you therefore care for your staff.

Other relevant answers include:

The company has environmental policies, and it is necessary that all staff know them.

Training must be a priority as more and more laws and trends are supporting these topics; thus, it is important for the company to adapt to these changes.

Motivation

Another aspect that was also mentioned in the interview was how staff could be motivated to participate in the company's social responsibility programs. Many of our informants said that the easiest thing would be economic incentives (bonuses, rewards, gifts, raffles, off-days, recreational activities and meetings either with coworkers or collaborators' families), but from a financial perspective, this is very expensive. It generates an additional expense to HRs processes, and the effect is at best temporary.

Performance management

It is very important to design and include objectives and indicators about these processes to include them in employees' job descriptions and later include them as part of the periodic

performance evaluation. When employees reflect upon and raise awareness about the importance of caring for the environment – for both people and the company – all that interact with the organization win. Answers suggest that, after including sustainability-related processes, letting employees know the importance their actions have in the community and in their company, results can improve. Creating the spaces to reflect upon the consequences of their jobs and welcoming their ideas enables the realization that positive results can be obtained through everyone's collaboration.

The company, in particular the HRs area, must raise awareness in its staff through verbal and visual messages that make improvements perceptible. Using internal communication programs and channels shows employees the effects and benefits of their support. Finally, reward programs for employees who show participation in diverse sustainable initiatives may be the way to cement these processes. The recruitment process is a multi-personal relationship or “gathering people,” and attaches importance to the needs of sustainable development of the company (Zhou, 2021). One of our interviewees stated:

The strategy that is used in the company is emotional campaigns; meaning that sensitization is given about a current problem such as natural disasters, illness, and environmental problems. Through e-mails and internal communication campaigns that issue is shared with all the staff. There is a department in charge of that function and the company expects them to have activities to support this theme.

From a stakeholders' perspective, who do you think should be the key drivers of green practices in the business? (Clients, collaborators, managers, government, collaborators' family, neighbors). Answers to this question included: “managers and directors” (18 respondents), “everyone must participate” (8) and five answers where only one respondent selected the option: clients, the HR area, a person, family, the new company's collaborators.

Managers and directors because they are key people to set the example and motivate collaborators; show with actions and not only words, but they are also the leaders that are constantly being observed.

They must be convinced of the importance of promoting and developing green practices in the company so that they can also apply them in their family environment. It must be like a waterfall, so that all members of the organization are invited to take green practices up to all areas of their life.

All environmental management system and/or of social responsibility begins with the company's philosophy which must be deployed by level or hierarchical structure.

Human resource technologies

Do you consider the company have a fully electronic HR function? A total of 11 participants said “yes,” while 16 said “no.” Routine activities and manual processes are often used, and they turn into paperwork in the organization. The other four did not give an answer. From the answers given in the interview, the following can be highlighted:

One of the benefits of HR processes being automated is that the department is paperless because processes are carried away in an electronic manner, personnel requisitions online, paper pay slips aren't handed out anymore, worker records are kept electronically, access control is also made electronically, and training control received by personnel is controlled through electronic records.

A few years ago, the company went from being a family business to being listed in the stock market. This forced us to make processes transparent through a technological platform and

human resources processes weren't the exception. Their lines were focused in corporate, for this reason, subsidiaries receive nowadays policies, rules, processes, inductions, and instructions through a human resources portal that is managed from the central offices.

Most comments (94%) agree that the current role of HRs is in fact a very important factor to support green practices, whereas the remaining 6% said that the company's collaborators can support green HR practices and that others do it together with other areas as a strategy.

Conclusion

Sustainability is a relatively new topic, still under development. It has promoted numerous changes in both academic studies and business processes. There are challenges that need to be identified and addressed if a culture of sustainability is to be achieved. According to Galpin *et al.* (2015), a change in the mindset of management teams and organizational objectives is required; the development of this mindset involves the integration of all members of a company, from employees to stakeholders. The new ideas and values of a company must be disclosed to them, so they do not appear bizarre and are therefore rejected (Crews, 2010; Gupta and Kumar, 2013). The possession of potential and valued knowledge does not provide direct benefits to an organization, but its practical application is required to reap the benefits (Shahzad *et al.*, 2020).

Despite many technological and organizational advancements, we found little evidence of formal programs of social responsibility in our (admittedly limited) sample of organizations. They focus on developing activities related to taking care of the environment. The HR function needs to design more effective initiatives.

On the other hand, the relevance that the need for these corporate sustainability practices brings to the table, includes in most cases major investments (Jeffers, Lin, Romero and Degaetano, 2014). Implementing and formalizing incentives, as well as rewards programs for personnel would be a way to "walk the talk." Employees are then more likely to become an important ally, while implementing HR practices to strengthen sustainability and address goals of initiatives such as ISO 14001.

Limitations and future research

While this study contributes to the emerging literature on sustainability, we now list its most salient limitations. Responses originate in Monterrey, one city located in an emerging, Iberoamerican economy, Mexico. The generalizability of our findings is thus limited, as this study in other locations might reveal other dimensions of sustainability that are not present in this location.

We should also highlight the lack of metrics or other quantitative indicators to evaluate the level of a business sustainability and the HR processes with an approach to "green" HR practices. This is an element that needs to be developed to make reliable, periodic comparisons, and therefore, improve the strategies put in place. It is obvious that much remains to be done to take care of our planet using a systematic, professionalized organizational approach.

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Appendix. Interview questions

1. How do you define "Green Human Resources Management"?
2. Do you consider the company makes green human resources practices? *If the answer is NO go to question 6*
3. Could you mention some examples of green human resources practices the company current makes?
4. Do company's workers have environmental goals and/or indicators? Mention, explain and give examples.
5. Are there rewards for workers from an environmental perspective?
6. In terms of attraction of talent, would you rather recruit new collaborators with a green profile? Why? How could you do it?
7. What methods do you use to recruit new candidates? (Internet, social networks, job market) Mention and explain.
8. During a job interview, do you prefer face-to-face interviews or online interviews (e.g. skype)? Mention and explain.
9. Do you consider that environmental training practices are a priority to the company? Mention and explain.
10. How is training carried out?
11. How can staff be motivated to participate in the company's social responsibility programs?
12. Who do you think should be the key drivers of green practices in the business? (Clients, collaborators, managers, government, collaborators' family, neighbors) Mention and explain.
13. Do you consider the company to have full electronic HR function?
14. Do you think the current role human resources have is in fact a very important factor to support green HR practices?

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Fostering employee's pro-environmental behavior through green transformational leadership, green human resource management and environmental knowledge

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ABSTRACT

The study examines the role of green transformational leadership (GTL) in fostering pro-environmental behaviors (PEBs) through green human resource management (GHRM). In addition, a moderating role of environmental knowledge is also investigated. The partial least squares structural equation modeling (PLS-SEM) technique is employed to test the hypothesized relationships. The findings revealed the significance of GTL in predicting employees' PEBs through the mediating role of GHRM. Further, the moderating role of environmental knowledge is also confirmed. This study presents a thorough and synergistic comprehension of the process through which PEBs can be promoted. In doing so, the study offers a deeper understanding of the interconnected mechanisms that promote PEBs and eventually guide organizational practice.

1. Introduction

Climate change is a serious global issue. As per Inter-Governmental Panel on Climate Change, between 1980 and 2012, there was a 0.85-degree Celsius rise in temperature, which had a negative impact on total grain yields (as a 1.8C increase in the temperature reduces 5 percent yield) (Islam *et al.*, 2021). In addition, between 1981 and 2002, the warm climate resulted in a 40-megaton decline in wheat, maize, and other crops. The loss of polar ice has resulted in a 19-centimeter rise in sea level due to the warm weather (Islam *et al.*, 2021). According to studies, greenhouse gas emission has seen a sharp increase between 2000-2010, and if this emission continues at the current rate, there might be an increase of 1.5 degrees Celsius in temperature by the end of the century. According to the World health organization, climate change causes over 150,000 deaths annually (WHO, 2022), and it is expected to cause 250,000 additional deaths per year between 2030-2050 (WHO, 2021).

In recent research, organizations have been held accountable for climate change as they continue to emit carbon dioxide and harmful chemicals into the air and water (Robertson and Barling, 2017). Therefore, environmental activists and scientists expect organizations to

implement green and sustainable practices. Implementation of such strategic practices depends on organizational leaders (Peng *et al.*, 2021). The significance of organizational leaders in influencing employees' and organizational outcomes is well documented in the literature (Hannah *et al.*, 2008). Therefore, a number of scholars began to explore environmental leadership. Former studies instanced the characteristics of an effective leader in the environmental sector, while recent scholars attempted to probe the influence of leadership behaviors (Afsar *et al.*, 2016). Out of many leadership models and theories, transformational leadership theory is pertinent for the comprehension of environmental management, as transformational leaders are seen to be more effective in enhancing environmental performance (Peng *et al.*, 2021). In line with this theme, Robertson and Barling (2013: 177) introduced green specific transformational leadership (GTL). GTL is defined as "a manifestation of transformational leadership in which content of the leadership is all focused to encourage pro-environmental and green initiatives." Literature shows enough evidence that GTL facilitates PEBs (Peng *et al.*, 2021).

The literature suggests the significance of employees' workplace pro-environment behaviors (PEBs) in enhancing an organization's environmental performance (Li *et al.*, 2020). Employees' realization of the

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importance and seriousness of environmental issues can better respond to such challenges by performing pro-environment actions, with the goal to minimize resource wastage and save operational costs. Given these widespread impacts, it's no surprise that numerous scholars have identified and advocated for empirical studies to investigate employees' PEBs at the workplace (Shah et al., 2021). However, limited studies probed the determinants of PEBs in the Pakistani context, where issues and challenges related to the environment are particularly salient to firms today. To fill this gap, we developed and tested a framework that proposes that organizations' green objectives can be achieved through leadership and human resource management practices.

Therefore, the study's objective is to examine the direct effect of GTL on PEBs and then the indirect mechanism by which GTL can affect PEBs. In this regard, the current study investigates the mediating role of green human resource practices (GHRM) in the relationship between GTL and PEBs. Scholars defined GHRM as human resource management activities that contribute to environmental management (Ansari et al., 2020; Renwick et al., 2016). It is suggested that employees' awareness and commitment to environmental protection and preservation increases as the firm adopts the GHRM activities (Pham et al., 2019). Furthermore, we believe that the impact of GHRM on PEBs may be more substantial if the employees are aware of environmental issues and consequences. Thus, this research examines a mechanism through which employees' environmental knowledge (EK) intervene in the GHRM-PEBs link.

In so doing, this study contributes in several ways. First, the current study adds to the knowledge base by examining the effects of GTL and GHRM on behavioral outcomes of employees in the workplace, which has lacked empirical studies and therefore requires more scholarly attention. Furthermore, the literature on GHRM is still emerging, and its impact on employee outcomes is still in the infancy stage (Pham et al., 2020).

Second, a thorough comprehension is indispensable in understanding the process through which employees' green behavior can be influenced, as still there is a lack of agreement on the mechanisms (Dumont et al., 2017). To fill this research gap, the authors looked into the role of green GHRM in mediating the relationship between GTL and PEBs. Despite initial research on the internal mechanism of GTL predicting employees' PEBs, further theorizing and research are necessary to gain a deeper understanding of the interconnected mechanisms that promote PEBs.

2. Literature review and hypotheses

2.1. Green transformational leadership (GTL)

Among all the leadership theories and models, transformational leadership has been most extensively studied due to its diverse impacts on employees' behaviors (Robertson and Barling, 2013a). Bass (1998) categorized transformational leadership into four behaviors: idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration (Avolio and Bass, 1988).

Literature suggests that each of these behaviors could be applied to influence a diverse range of employee outcomes and behavior, including pro-environmental behaviors. Idealized influence refers to being a role model and displaying a charismatic personality that everyone would like to follow. In exhibiting idealized influence, transformational leaders follow a core set of green values, convictions, and commitment towards a collective good, which then will be idealized and practiced by the followers. Inspirational motivation centers on the ability of leaders to inspire and motivate their subordinates to forgo individual gains for the collective good. In the context of the current study, we conceptualize green inspirational motivation as the leaders' abilities to motivate and stimulate their subordinates to perform green and environmentally friendly behavior. Environmental intellectual stimulation refers to leaders' abilities and commitments to stimulate their subordinates to challenge assumptions and solicit ideas to overcome environmental

issues in innovative ways. The fourth dimension of transformational leadership is individual consideration; leaders exhibiting environmental individual consideration exhibit compassion, empathy, and care for their subordinates' individual needs and wellbeing; in doing so, the leaders develop a strong relationship with followers through which the leaders can transfer their pro-environmental values. In a nutshell, green transformational leaders, through their idealized charismatic personality, inspire and motivate their subordinates to perform pro-environmental actions.

2.2. Green human resource management (GHRM)

GHRM is a term that applies to human resource management activities that are geared toward a firm's environmental and ecological impact. GHRM is linked with the organizations' environmental policy and employee ecological conduct (Renwick et al., 2013). GHRM is significant to the literature on sustainable human resource management in a way that it accentuates to a greater extent on business environmental management practices. GHRM act as a channel between HRM practices and firm environmental management practices (Dumont et al., 2017). Thus, GHRM reflects the organization's strategic commitment to environmental sustainability and calls on top management to pay close attention to organizational processes and strategies that encourage employees to engage in green job activities that help to minimize environmental emissions (Mishra et al., 2014). In other words, GHRM entails the integration of an organization's environmental management objectives into its human resource systems, particularly the aspect such as performance management, incentives, training and development, and recruitment and selection (Muller-Carmem et al., 2010).

2.3. Pro-environmental behaviors (PEBs)

Environmental conservation and sustainability have emerged as a key organizational objective in recent years, with firms striving to seek business operations that comply with environmentally friendly practices and operations. One way to achieve environmental sustainability is for employees to participate in PEBs on a more consistent and frequent basis. PEBs apply to any quantifiable responsible environmental practices that assist businesses in being environmentally friendly (Wesselink et al., 2017) or employees' intention to participate in sustainable, green, and environmental actions (Scherbaum et al., 2008). PEBs are typically unremunerated extra-role behaviors that employees exhibit for the benefit of their organizations (Ramus and Killmer, 2007). For example, workers can save resources by turning off unnecessary electrical equipment, using stairs instead of lifts, using double-sided papers for printing, and getting rid of unnecessary waste to protect the natural environment. Businesses have started emphasizing employee programs to improve environmental efficiency (Baughn et al., 2007). The effectiveness of an organization in developing and enforcing numerous firm-level pro-environmental programs is contingent upon the PEBs of its employees (Robertson and Barling, 2013b). Additionally, PEBs contribute directly to the firms' financial and non-financial success (Wesselink et al., 2017).

2.4. GTL and PEBs

Social psychology literature narrates that individuals learn behaviors by observing others and then try to exhibit similar patterns of behavior. Following this notion, we believe that transformational leaders, by exhibiting green behaviors, can influence their follower's behavior because organizational leaders are placed as role models (Brown et al., 2005). Given the importance and significant role of transformational leaders in influencing employees' behavior, Robertson and Barling (2013) extended the use of transformational leadership in the environmental management context. Similar to task-orientated leadership, green transformational leaders focus on long-term and sustainable

development by integrating individuals' green values with organizational environmental values and inspiring individual self-driven pro-environmental behaviors. Similar to traditional transformational leadership, environment-specific or green transformational leadership is also divided into four behaviors; green individualized consideration, green idealized influence, green intellectual stimulation, and green inspirational motivation (Robertson and Carleton, 2018). Specifically, green idealized influence is a leadership characteristic demonstrated by leaders who set an example and act as an environmental role model, influencing the employee green behavior through their charisma.

Green inspirational motivation refers to a leadership characteristic denoting the ability of a leader to encourage employees to transcend their short term self-interest and to strive to achieve green goals; green intellectual stimulation denotes the leaders' ability to motivate their employees to challenge old ideas and use new methods to solve environmental problems; and green individualized consideration refers to the leadership behavior demonstrated by leaders in valuing their employees' contributions to green issues and helping them develop green skills (Robertson and Carleton, 2018). GTL can inspire workers to see the relevance and practicality of green behavior through green idealized influence and green inspiring motivation, allowing them to understand that green conduct is supported and anticipated by the business. At the same time, GTL may grow workers' thinking capacity about environmental concerns, enhance employees' environmental knowledge, and assist employees in constantly developing environmental skills via green intellectual stimulation and green customized attention. The end result is that employees are inclined to exhibit green behavior (Kura, 2016). To sum up, when employees perceive that leaders exhibit GTL behaviors, they exhibit more PEBs. Hence, it can be proposed that:

H1. Green transformational leadership positively influences employees' pro-environmental behavior

2.5. GTL and GHRM

Green transformational leadership (GTL) is a leadership style that provides a consistent vision, inspiration, and motivation to workers and subordinates to accomplish their developmental needs and goals to achieve the overall organization's environmental objectives (Chang and Chen, 2013). Whereas the GHRM is the strategic side of human resource management that focuses on achieving organizational sustainability by developing, motivating, and sustaining employees' green behavior (Dumont et al., 2017). GTL embodies the notion that top management has a prodigious impact on the company's GHRM practices and business operations (Renwick et al., 2013). GTL in organizations is critical for creating supportive GHRM practices and policies that assist companies in achieving their objectives and visions for green success (Jia et al., 2018). To put it another way, GTL underscores individual employees' needs to establish and enforce GHRM practices that will inspire and motivate the followers. Therefore, we anticipate that GTL can play a more significant role in promoting positive human resource management activities such as recruiting and selection, training and development, performance assessment and management, and compensation and reward programs as a means of inspiring, stimulating, and motivating subordinates to accomplish organizational goals (Zhu et al., 2005). We argued that GTL uses GHRM as a tool to influence and enhance followers' capabilities and motivation. In this way, they provide their followers with an opportunity to participate in green activities (Berrone and Gomez-Mejia, 2009). Therefore, we predict that:

H2. Green transformational leadership positively influences green human resource management systems in organizations.

2.6. GHRM and PEBs

The past literature suggests that HRM is critical in shaping

employees' job attitudes and behaviors (Pham et al., 2019). GHRM practices encourage workers to adopt environmentally friendly behaviors (Cherian and Jacob, 2012) through their participation in greener initiatives. Additionally, GHRM activities assist businesses in reducing costs, increasing performance, improving the employee relationship with the firm, and conducting environmentally sustainable activities. Establishing green responsibilities and goals, coordinating corporate environmental management events, and promoting green behaviors among employees come under the umbrella of GHRM practices. Moreover, GHRM improves environmental efficiency by providing opportunities for employees to engage in and contribute to corporate green initiatives. Environmentally conscious jobs and task designs encourage workers to acquire ecological awareness. Also, it offers training in environmental management systems to enhance employees' participation in PEBs' (Tseng et al., 2013). Once employees are rewarded for exhibiting green behavior, they become more motivated to engage in extra-role behavior, i.e., pro-environmental behavior. As a result, it has been proposed that GHRM activities can have a beneficial effect on employee PEBs in the workplace (Dumont et al., 2017). Therefore, we predict that:

H3. Green human resource management positively influences employees' pro-environmental behaviors.

Leaders play a vital role in managing the dynamics of people and how they impact each other towards the organizational goals, whereas GHRM is focused on all the practices and activities geared towards fulfilling the organization's environmental management policies. We believe that leadership and GHRM jointly create an organizational environment that might promote green activities in organizations. However, a scarcity of literature integrates and develops leadership and HRM mechanisms to facilitate green activities in organizations. Only a few studies tested the intervening role of GHRM. For example, Singh et al. (2020) found the crucial mediating role of GHRM in GTL and green innovation, while Jian et al. (2020) suggested the indirect influence of GTL on PEBs through GHRM.

Similarly, studies in recent times (e.g., Ahmad et al., 2021) also established the mediation of GHRM between ethical leadership and PEBs. Moreover, leadership literature authenticates that leadership indirectly affects the employees' attitude and behavior through mediators (Jiang et al., 2012). Hence, based on the above empirical findings, we attempt to take GHRM as a mediator between GTL and employees' PEBs.

Furthermore, higher management encouragement, especially managerial support, inspires employees to take environmental actions such as designing eco-friendly products with fewer resources and reducing pollution. GTL thoroughly embodies top management's attitudes, convictions, principles, and habits and has a significant effect on corporate GHRM activities (Renwick et al., 2013). Consequently, current research suggests that GTL is indispensable in developing GHRM policies and practices because GTL gives certain advantages to GHRM practices for several HR functions such as performance management, talent management, and employee productivity (Bass and Riggio, 2006), which enables employees to exhibit PEBs. Therefore, it can be proposed that:

H4. The relationship between green transformational leadership and employees' pro-environmental behaviors is mediated by green human resource management.

2.7. Environmental knowledge (EK) as moderator

Environmental knowledge refers to understanding the fragility of the environment and the importance of its protection. Being aware of the environment means how human behavior impacts the environment and taking corrective actions. Knowledge is considered one of the essential

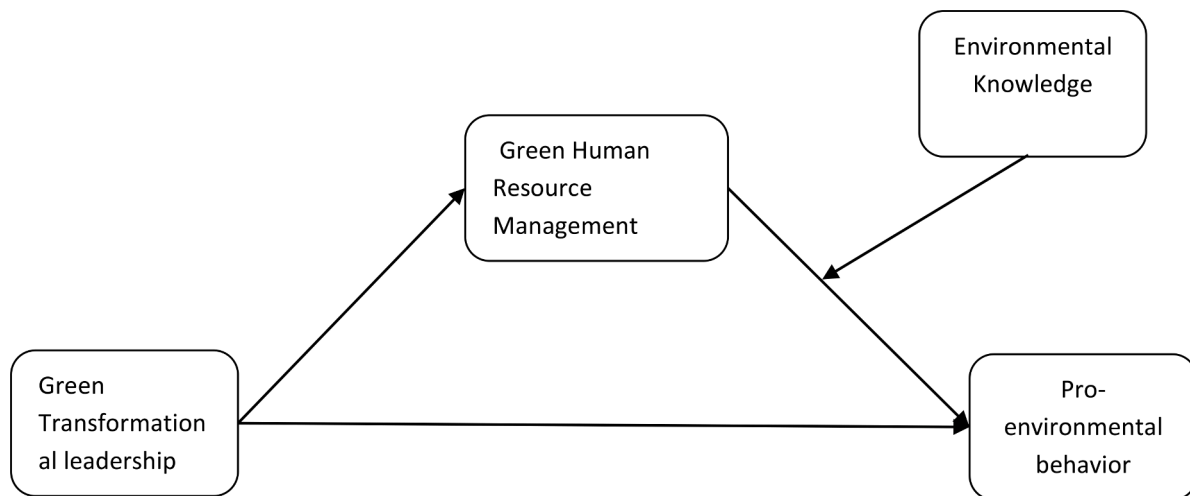


Fig. 1. Hypothesized Model of the study.

aspects for successfully implementing the action. We believe that employees with greater awareness of the environment will be more inclined to green activities. Employees that work for a green company, for example, are more likely to participate in eco-initiatives since they are recruited and selected with a good environmental attitude and expertise (Anwar et al., 2020). Individuals vary in their awareness and knowledge of environmental challenges; thus, it is imperative to investigate the boundary condition placed by the level of knowledge between the GHRM-PEBs link. The rationale of such boundary condition relies on the person-environment fit theory (Edwards, 1996), which argues that GHRM can influence employees' PEBs by moderating individual characteristics like knowledge (Gilal et al., 2019). Drawing on the demands-ability fit (D-A fit) notion of Edwards's theory, we explore the possible intervening role of EK.

The D-A fit refers to the match between a person's abilities and environmental demands. Knowledge, skills, energy, and time are examples of abilities that a person can use to fulfill environmental needs (Edwards, 1996). Employees' EK may be seen as the ability side of the idea, while HRM practices can be thought of as the demands side (Ahmad et al., 2021; Edwards and Shipp, 2007). Individuals are well-known for applying their expertise and talents to meet organizational needs. Despite this, only a few studies have used the D-A fit theoretical approach to investigate the moderating of EK in the GHRM-PEB connection. Thus, this study proposes that employees with a greater level of EK are expected to put that knowledge into practice by showing PEB than those with lower levels of EK. As a result, it is suggested that:

H5: Environmental knowledge moderates the GHRM-PEB link, such that the link will be more substantial for employees with higher knowledge than those with a lower knowledge.

3. Research method

3.1. Sampling and procedure

The current research collected data from the manufacturing industries located in the large industrial estates of Pakistan to test the hypothesized model (Fig. 1). Collecting data from manufacturing concerns can be justified based on the following reasons. First, manufacturing firms' carbon footprint and disposal activities have led to worries and concerns regarding hazards to public health and environmental pollution (Perkins et al., 2014). Second, Pakistan's increasing urbanization and rapid industrialization have raised the need for sustainable production and consumption. Third, the engagement of

manufacturing companies and the disclosure of environmental and social information in the Pakistani environment is greater than other sectors since these companies have large resources and urge stakeholders to build a favorable image of society (Nameghi and Ariffin, 2013). Hence, the environmental agencies and government have urged manufacturing firms to be eco-friendly and design green products. Thus, it is essential to investigate how manufacturing firms can reduce their environmental footprint in Pakistan by employing GTL and GHRM practices. Data were collected from supervisor-subordinate dyads. Subordinates were asked to rate their perceptions of GHRM, EK, and GTL, while supervisors were asked to rate their subordinates' PEB. A total of 305 responses were collected; however, after removing incomplete responses, we were left with 280 valid responses for our analysis. The majority of the respondent was male. (54.5%). While 63.4% of respondents had work experience between 5-10 years.

3.2. Measures

The current research collected data on variables, namely GTL, GHRM, and PEBs, and these variables are measured through 7 points Likert scale. This study employed a scale developed by (Dumont et al., 2017) comprising six items to measure GHRM. Sample items include: "My organization relates employees' eco-friendly behavior to compensation and rewards." Past studies (Fawehinmi et al., 2020) used this scale to assess the GHRM." PEB was measured by employing six items scale developed by (Robertson and Barling, 2013b). Sample items include "I turn lights off when not in use." This research employed a 6-items scale to measure GTL developed by Chen and Chang (2013). Responses regarding environmental knowledge were gathered using a three-item scale developed by (Fawehinmi et al., 2020).

4. Data analysis

The present study examined the hypothesized model using partial least squares structural equation modeling (PLS-SEM). This technique is extensively used in management research (AlNuaimi et al., 2021; del-Castillo-Feito et al., 2022; Kusi-Sarpong et al., 2021; Mokha and Kumar, 2021).

PLS-SEM is considered a soft modeling approach that is not appropriate for testing well-established theoretical models (Wilden et al., 2013). However, this technique is suitable for testing theories and models that are not well developed, as is the case of the current study model. Although several studies have investigated the antecedents of pro-environmental behavior, very few studies have investigated the interaction among GTL, GHRM, EK, and PEBs. Thus, the theoretical

Table 1
Measurement model Validity and Reliability.

	Items	Loadings	Composite Reliability	AVE
Green HRM	GHRM1	0.697	0.931	0.693
	GHRM2	0.780		
	GHRM3	0.896		
	GHRM4	0.881		
	GHRM5	0.894		
	GHRM6	0.829		
Green Transformational Leadership	GTL1	0.888	0.954	0.777
	GTL2	0.868		
	GTL3	0.888		
	GTL4	0.883		
	GTL5	0.882		
	GTL6	0.879		
Pro-environmental Behaviors	PEB1	0.848	0.944	0.737
	PEB2	0.852		
	PEB3	0.829		
	PEB4	0.895		
	PEB5	0.870		
	PEB6	0.856		
Environmental Knowledge	EK1	0.735	0.788	0.554
	EK2	0.704		
	EK3	0.792		

Table 2
Exogenous variables' discriminant validity (HTMT Ratio).

Construct	GTL	Green HRM	PEB
GTL			
Green HRM	0.806		
PEB	0.791	0.846	

model of our research is not well established; therefore, PLS-SEM is an appropriate technique for testing it.

4.1. Measurement model

Data analysis through PLS-SEM is a two-step process. First, the outer (measurement) model should be tested for establishing validity and

reliability. For this purpose, we investigated the discriminant validity, average variance extracted, and composite reliability. The results in Table 1 show that CR values suggested a good internal consistency as all of the values exceeded the recommended criterion of 0.7 (Hair et al., 2017).

Hair et al. (2017) suggested that factor loadings above 0.60 are considered to be acceptable. All factor loadings in this study were above the recommended value of 0.60. The study findings also suggested the adequacy of AVE as all the values exceeded the cut-off value of 0.5 (Hair et al., 2017). The current research also employed the Heterotrait-Monotrait ratio of correlations (HTMT) to examine discriminant validity (DV) (Table 2). The result suggested the adequacy of DV as all the HTMT values were less than the recommended 0.90 (Henseler et al., 2015).

In the second step, we assessed the structural model. For this, the coefficient of determination (R^2) and predictive relevance (Q^2) were calculated before the hypothesized associations were examined. Using cross-validated redundancy, the blindfolding technique revealed that each Q^2 value exceeded 0. Green HRM (0.380); and PEB (0.484) are the Q^2 values for this study. The R square (Fig. 2) values showed that green transformational leadership causes 55.5% changes in green HRM and 66.6% change in pro-environmental behavior; these values indicate the substantial effect of green leadership. To validate statistical significance, a bootstrapping procedure with 5,000 resamples was used to generate standard errors and t-values (Hair et al., 2017). Fig. 3

The statistical significance ($p < 0.05$) of the path coefficients of relationships can be seen in Table 3. The findings ($B = 0.364$, $t = 5.595$, $p < 0.00$) show that GTL has a significant relationship with PEBs, implying that H1 is supported. Similarly, results show that GTL has a significant impact on green HRM ($B = 0.745$, $t = 21.348$, $p < 0.00$), and green HRM significantly influences PEB ($B = 0.508$, $t = 7.905$, $p < 0.00$), hence supporting our hypothesized relationships

The hypothesis on mediation effect was tested using the SmartPLS bootstrapping function, as recommended by Hair et al. (2017). Bootstrapping makes no assumptions about the form of the variable distribution or the sampling distribution of the statistics. The results show (Table 4) that GTL had a significant indirect effect on PEBs through GHRM (Beta = 0.378, t value =). The results also indicated the presence of complementary mediation, as Hair et al. (2017) suggested that if both

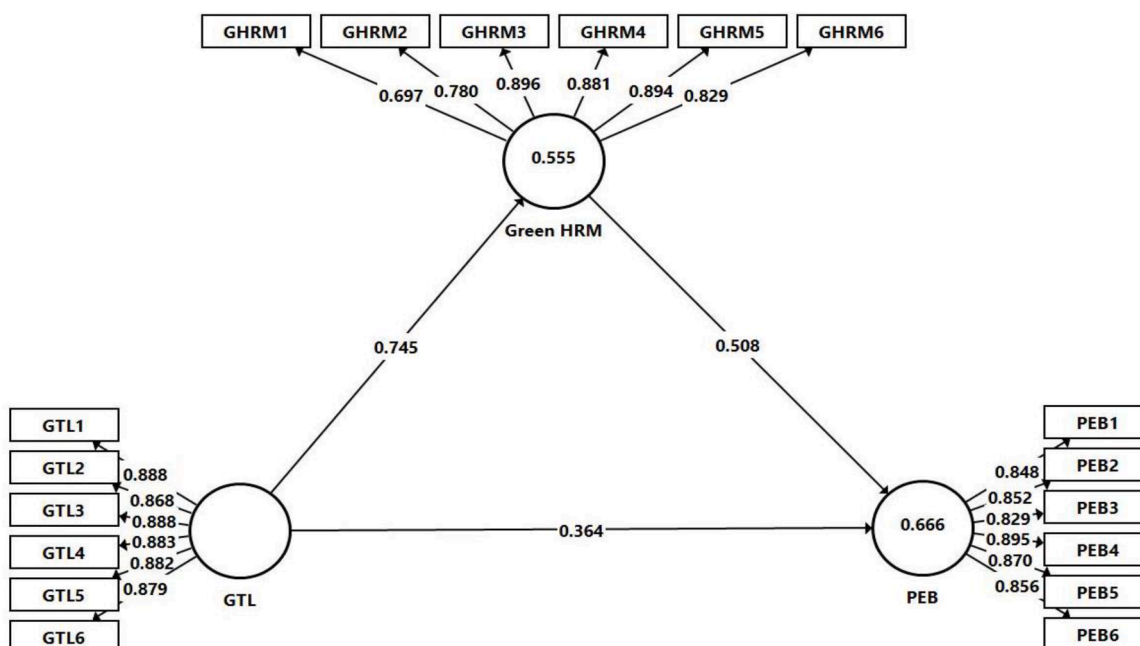


Fig. 2. Measurement model.

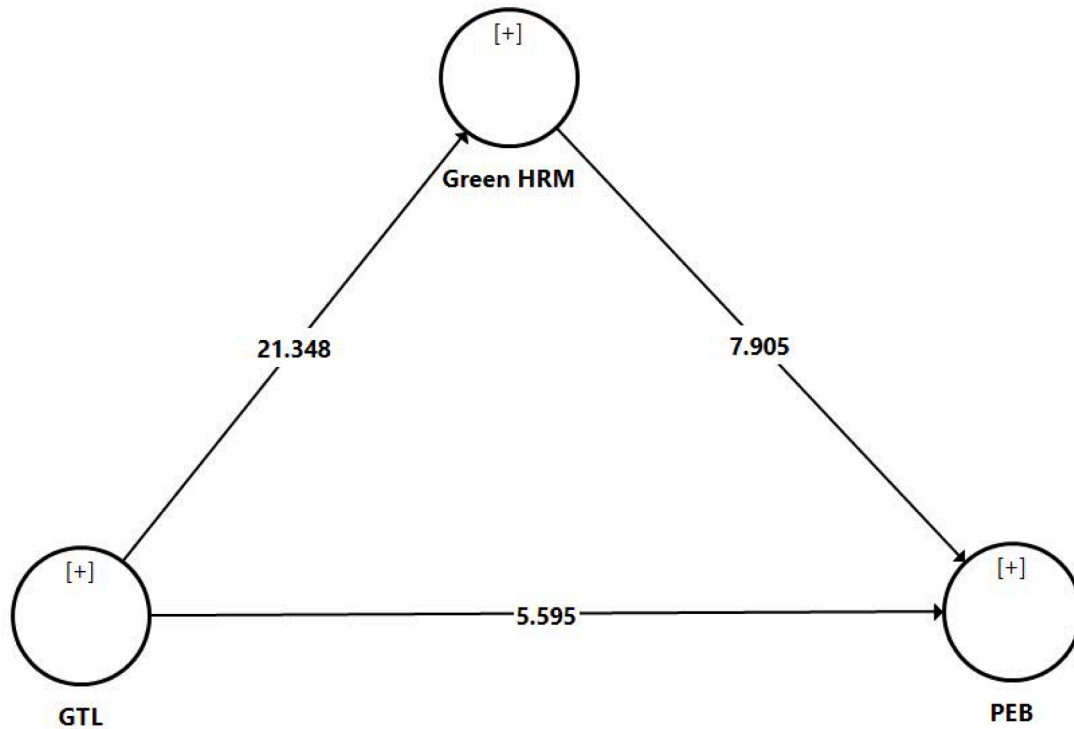


Fig. 3. Structural Model.

Table 3
results of bootstrapping.

Paths	Path coefficient	T Statistics	P Values
GTL -> GHRM	0.745	21.348	0.000
GTL -> PEB	0.364	5.595	0.000
GHRM -> PEB	0.508	7.905	0.000

Table 4
Mediation of GHRM between GTL and PEB.

Path	Path coefficient	T Statistics	P Values	95% CI	Decision
GTL -> GHRM -> PEB	0.378	7.474	0	[0.284-0.474]	Supported

Table 5
Moderation Analysis.

Path	Path coefficient	T Statistics	P Values	95% CI
Moderating Effect (EK) -> PEB	0.081	2.366	0.018	[0.018-0.150]

direct and indirect effects are significant and pointed in the same direction, complementary mediation exists.

4.2. Moderation analysis

As suggested by Hair et al. (2017), we employed the product indicator method to demonstrate the moderating influence of environmental knowledge on the GHRM-PEB relationship. We expected that high environmental knowledge would increase PEB and vice versa. Table 5 shows that environmental knowledge has a strong moderating influence

on GHRM and PEB.

In addition to the significance of moderating impact, the interpretation of moderation analysis is frequently regarded as a challenge; the graphical representation may therefore contribute to the comprehension of data and form a conclusion. Higher environmental knowledge has a steeper slope than low environmental knowledge, as seen in Fig. 4. That is, a higher level of EK strengthens the link between GHRM and PEB.

5. Discussion and implications

Although organizations significantly deteriorate the environment, they can also play a pivotal role in protecting and preserving the environment. One such strategy that organizations are implementing to enhance environmental conservation is fostering employees' pro-environmental behavior. To stimulate employees' pro-environmental behavior, it is vital to comprehend the factors impacting these actions and behaviors. One such factor is leadership. Leaders in organizations not only influence traditional organizational outcomes but also impact some emerging outcomes such as environmental management. However, less is known about this, especially in the Pakistani context. Thus, to fill this gap, we developed and tested a pro-environmental behavior model in which we investigated the role of GTL, GHRM, and environmental knowledge. In doing, so the study contributed to literature in several ways.

First, most of the existing literature on transformational leadership focuses on employees' non-green outcomes. Our study investigates the role of environmental-specific transformational leadership in fostering the employees' pro-environmental behaviors, which is a unique contribution to leadership literature (Ahmad et al., 2021).

Second, drawing on the study results, we argue that GTL is a crucial resource that organizations should use to implement GHRM systems, which will ultimately help foster employees' pro-environmental behaviors. This stance aligns with the notion that employees' PEBs are more likely to be supported in the workplace when leaders take a proactive stance on environmental concerns (Afsar et al., 2016; Robertson and Barling, 2013a).

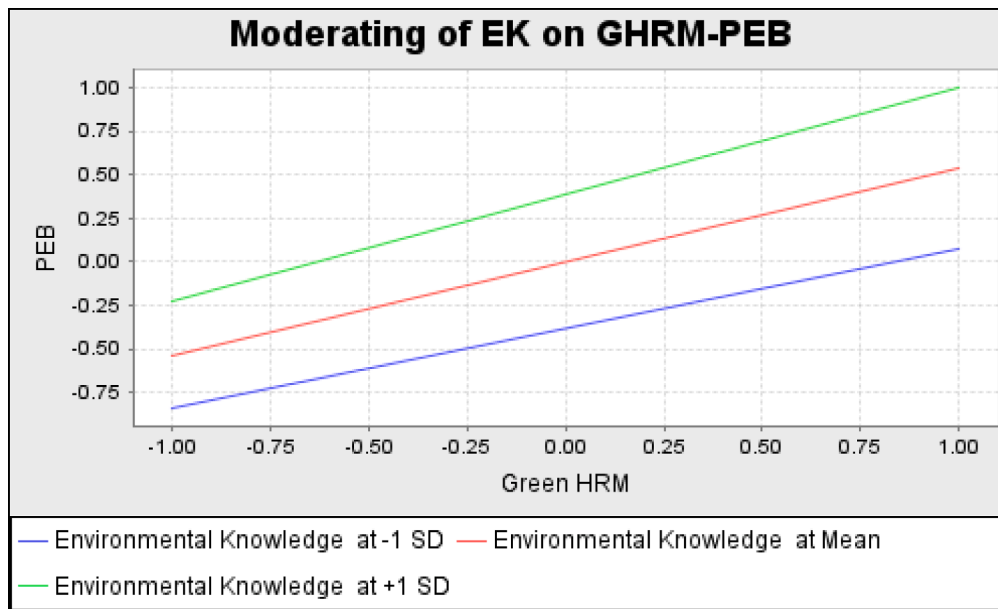


Fig. 4. Slope Plot for Moderation analysis.

Third, this study presents a thorough and synergistic comprehension of the process through which PEB can be promoted. For this purpose, the study attests role of GHRM in mediating the relationship between green leadership and PEB and offers a deeper understanding of the interconnected mechanisms that promote PEBs, and eventually provide guidance for organizational practice.

Finally, the results indicated that employees' environmental knowledge moderated the GHRM-PEB link; we may deduce from these findings that individuals aware of environmental concerns are more likely to exhibit ecological behavior. Individuals' understanding of environmental problems, processes, and remedies raises their consideration and awareness of the need to take a role in environmental protection. Individual environmental awareness is most crucial for environmental management.

5.1. Practical implications

The current research offers valuable insights for organizational development and leadership. For the organization's long-term survival and viability, leadership should guarantee that GHRM practices are included in strategic initiatives. The transformative leadership traits of managers have been proven to substantially impact subordinates' participation in PEBs. These findings show that leaders should not only guarantee that environmentally-friendly procedures have been discussed with employees and that GHRM practices are applied but also set an example by modeling the expected behavior. Green transformational leaders that model pro-environmental conduct and promote followers' participation in such behavior are needed to successfully adopt GHRM techniques in organizations. Organizations should define environmental performance goals and promote an open communication culture in which employees are mentored and their bosses are trained on how to meet those goals. Managers should inquire about their previous environmental performance while hiring new employees or elevating existing employees to senior positions. An evaluation of the candidate's environmental expertise should be included in the selection and promotion panels. Furthermore, the results of this study have societal implications. It focuses public attention on individuals and organizations who behave in a socially responsible and ecologically conscious manner.

It establishes the importance of organizational leadership's involvement in generating behaviors aimed at energy conservation, water preservation, and waste reduction in society. Following the

moderating function of environmental knowledge in PEB, policymakers should arrange training and seminars to increase the environmental knowledge of employees. This is based on the premise that employees with environmental awareness demonstrate higher environmental care and protection than those with less understanding. Employees with increased environmental awareness might feel accountable to the firm and society and want to pursue their social tasks. In order to promote strong environmental practices at all levels of the business, several environmental education efforts are necessary. Moreover, disciplinary measures should be dissuasive enough to avoid environmental damage.

5.2. Limitations and future research directions

Despite current research methodological strengths and significant implications, it is not without limitations. First, this study collected data from the manufacturing industry in Pakistan, which limits the generalizability of this study. Thus, future research should focus on other industries. Second, the current research examines the influence of GTL in the Pakistani context only; therefore, we suggest future studies should conduct cross-country analysis. Third, although the present research examined the mediation of GHRM in linking GTL with employees' PEB, there can still be other potential mediators.

CRediT authorship contribution statement

Muhammad Farrukh: Conceptualization, Methodology, Formal analysis, Writing – original draft, Writing – review & editing. **Nabeel Ansari:** Conceptualization, Data curation, Writing – original draft. **Ali Raza:** Methodology, Writing – review & editing. **Yihua Wu:** Data curation, Writing – review & editing, Validation. **Hong Wang:** Data curation, Writing – review & editing, Validation.

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Greening the workforce in higher educational institutions: The pursuance of environmental performance

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Abstract

The research aims to examine the role of green human resource management (GHRM) in the university's environmental performance. Furthermore, this research also focuses on the mediating effect of green commitment and pro-environmental behavior. It also aims to check how green self-efficacy moderates the relationship between green commitment and pro-environmental behavior. The paper opted for a quantitative design using the convenience sampling technique/approach by collecting the data through a structured questionnaire on 208 academic staff currently employed in the university. The data were collected from August until December 2021 on two campuses (Gujranwala, Jhelum) of the University of Punjab in Pakistan. The current study results give empirical insights that show how green human resource management practices lead to environmental performance at a greater level in a university setting. Study results proposed that change in behavior of employees through human resource management practices can ultimately affect the organization's environmental performance. Further results also demonstrate that green self-efficacy moderates the relationship between green commitment and pro-environmental behavior. This study highlights the role of the university staff's level of commitment and self-efficacy, which are beneficial for enhancing the university's environmental performance. The originality of this study fills the gap in how green commitment mediates the relationship of green human resource management and environmental performance further; it fulfills the gap of green self-efficacy that moderates the relationship of pro-environmental behavior and green commitment. The study sheds light on green human resource management practices in the higher education sector. It emphasizes the vital role of academic staff's environmentally conscious behavior in enhancing a university's environmental performance. The further study highlighted the increasing concept of green human resource management as a set of building the ability, enhancing motivation, and providing opportunities to influence workers' pro-environmental behaviors. The conclusion of the current research was capable of validating the positive concerns of green GHRM, behaviors, and commitments for environmental performance.

Keywords Green human resource management · Environmental performance · Green commitment · Pro-environmental behavior · Green self-efficacy

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Introduction

The green-oriented organizations related to environmental sustainability are the most discussed topics nowadays (Renwick et al., 2013; Masri & Jaaron, 2017; Pham et al., 2019a). The idea of GHRM has been organized worldwide due to its benefits like increasing environmental performance, building new ideas, inspiring the employees to commit to the green task, and increasing the commitment level of employees in connection with the environment in firms (Siyambalapatiya et al. 2018; Jia et al. 2018; Kim et al. 2019; Luu 2018; Murshed et al. 2021).

As a developing country, Pakistan has serious environmental problems. Little investigation has found the methods for the environment by using GHRM practices in organizations, especially in a university setting. University practices toxic substances and generates hazardous waste due to conducting daily tasks such as working in science labs and the use of chemicals during experiments, and visitors vehicle CO₂ emissions. Also, maintaining the campus facilities generates pollution waste (Usman et al. 2022; Abbass et al. 2019; Yusliza et al. 2019). Recent literature highlighted the present condition of sustainability endeavors in a university setting. Workers' pro-environmental behavior is important in overcoming environmental issues and ensuring EP (Mohamed, Noor, & Sing, 2020).

Moreover, there is a need for a sustainable environment in the higher education sector because these sectors get more attention due to their operations and tasks, which directly and indirectly influence the environment with regards to consumption of material, generation of waste, excessive usage of electric equipment's (Alshuwaikhat & Abubakar, 2008). Furthermore, due to expansion in educational activities and excessive use of IT equipment, educational institutes are considered the main consumer of energy and material (Usman et al. 2022a; Altan 2010).

The university is responsible for the environment, including environmental management (EM) features and environmental activities in their strategies, research and development plans, operational tasks, IT, and educational syllabus (Mikulik and Babina 2009; Huang et al. 2022). However, the progress of universities in connection with sustainability in the environment is still extremely low (Lozano et al. 2016; Usman and Makhdum 2021). The researcher concludes that green institutions need GHRM practices in a university setting (Tairu, 2018).

Workers' commitment to environmental tasks has been studied by a few researchers, which are helpful to understand the connection between environmental commitment and HRM (Pinzone et al., 2016; Luu 2018). Whereas major studies focused on the impact of green HRM on corporate EP and workers' pro-environmental behavior, contrarily, the

influence of green HRM practices on green commitment is still not found in previous studies. Furthermore, the ability motivational opportunity (AMO) theory (Blumberg and Pringle, 1982) proposed a framework to discover the impact of green HRM practices like recruitment, green training, and green appraisal, but the researcher found limited studies in the literature which show the effect of green HRM on green commitment and pro-environmental behavior.

Employee-related behavior to the environment is termed OCBE, which are employees' voluntary measures lead to effective EP in firms (Boiral and Paillé, 2012). The friendly atmosphere of workers at the workplace is the most necessary for all types of firms, especially in educational institutes (Rayner and Morgan, 2018). Presently, the main focus of green HRM studies is on corporate sectors compared to academic sectors (Tairu, 2018), as the researcher found the studies related to green HRM in multinational organizations (Gholami et al., 2016) as follows: the manufacturing sector (Yusliza et al. 2019, 2017; Ahmad et al. 2022; Nejati et al. 2017; Usman et al. 2022b; Yang et al. 2021; Yong et al. 2019), sports-related organizations (Gholami et al. 2016), and health sectors (Yang and Usman 2021; Pinzone et al. 2016). A research gap in GHRM literature found in the university context is an emerging study area (Dyer and Dyer, 2017). Apart from this, little consideration has been given to environmental management (EM) in Asian countries, considered the most polluted continent in the world, so here is a research gap that is investigated in this research paper.

The existing evidence revealed that the university's academic staff is least aware of the environmental performance measures and incompetent to add the environmental values into the syllabus and research programs. The literature revealed that enhancing environmental performance through green HRM practices has mainly focused on academic staff in the university context (Brinkhurst et al., 2011; Anwar et al., 2020). However, universities comprise a large population with complex tasks that ultimately impact an EP. Multidisciplinary involvement of operational staff, teaching staff, students, and senior management is necessary to enhance the overall EP of the university. Therefore, due to differences in the perception of university staff, the current study focuses on checking the effect of green HRM practices on environmental performance through green commitment, pro-environmental behavior, and green self-efficacy on the University of the Academic Staff Punjab, Pakistan.

Literature review

Theoretical foundation

Green HRM and environmental performance can be understood while considering the Ability-Motivation-Opportunity theory (AMO). In previous studies, it is the most effective

theory to know the influence of GHRM practices on the performance of an organization. (Appelbaum, Bailey, Berg, Kalleberg, & Bailey, 2000; Boselie, Dietz, & Boon, 2005). Theory clarifies that high-performance exercises are associated with HRM practices that are gathered based on three conditions, i.e., ability, opportunities, and motivations (Appelbaum et al., 2000). Ability includes hiring training and involvement, which confirm the skills and knowledge needed by resources to execute certain tasks. In contrast, opportunity includes knowledge sharing, which encourages the workers to participate in different activities. Finally, motivation includes performance management and compensation, which enhances the performance of resources to achieve performance-related targets (Marin-Garcia & Tomas, 2016).

Ability-Motivation-Opportunity theory describes that HR practices increase the workers' skills, affect workers' behavior at the workplace, and increase workers' performance. (Appelbaum et al., 2000), and these things affect the overall performance of an organization. (Appelbaum et al., 2000; Marin-Garcia & Tomas, 2016).

Scholar's examined green HRM practices while implementing the Ability-Motivation-Opportunity (AMO) theory in different sectors such as (Cheema & Javed, 2017; Pham et al., 2019a, b, c; Pinzone et al., 2016; Ragas, Tantay, Chua, & Sunio, 2017; Singh, Del Giudice, Chierici, & Graziano, 2020; Yu, Chavez, Feng, Wong, & Fynes, 2020). For example, the researcher examined the impact of green HRM, Green Behavior, and environmental knowledge of education in public sector universities. (Pham et al., 2019a, b, c). A researcher studied the role of sustainable environment GHRM and social responsibility in the textile industry (Cheema & Javed, 2017). Furthermore, the researcher examined the impact of GHRM environmental cooperation and supply chain management in the automobile sector (Yu et al., 2020).

Hypothesis development

Green HRM and environmental performance

Previous studies state that consumption of energy and globalization worsens the quality of the environment in countries of Gulf Cooperation Councils. Now, organizations are aware of their environmental concerns, and they are focusing on implementing green HRM policies to gain a competitive edge while overcoming environmental issues (Giménez Leal et al., 2003). It is described as procedures of certifying that management structure practices in firms are environmentally friendly and environmentally stable. Literature shows that GHRM practices positively impact corporate environmental performance in the manufacturing industry (Masri and Jaaron, 2017).

Furthermore, it offers a positive relationship between green HRM and environmental performance in the service and manufacturing industry. (Longoni et al., 2018). Green appraisal (GA) and green training (GT) impact positively corporate EP in multi industries (Guerci et al., 2016). Organizations can promote their environmental performance and green image through advertisement. It can be helpful to encourage the candidate to apply for capable positions. As such, the job's responsibilities must show the environmental-related task and require those skills from the candidate who is essential to accomplish environmental tasks (Chaudhary 2018; Usman et al. 2021).

Green training is a fundamental need of any firm, as it adds to its sustainable development (Pinzone et al., 2019). Environmental training is important to enhance the employee's ability and skills related to EM (Teixeira et al., 2012). It helps to increase resource consideration regarding the importance of environmental protection and increase employees' skills to adapt to change and waste reduction at the firm (Jabbour et al., 2019). Adopting a green standard in firms is important for enhancing environmental performance (Tang et al., 2018). Firms use strategies like a green reward system to involve them in environmental activities and achieve environmental goals. (Merriman and Sen, 2012). Environmental responsibilities provide a clear understanding of what they are supposed to do in EM. Moreover, the compensation system has advantages in effecting resource interest with the firm's objectives (Ahmad, 2015). In contrast, financial incentives are mostly used to encourage resources for green practices (Ooi et al., 2017).

H1: Green HRM has a positive relationship with environmental performance.

Green HRM and green commitment

Green HRM practices include recruitment, green training, and green appraisal to enhance workers' environmental commitment level and improve expertise sharing (Ren et al., 2018; Harvey et al., 2013). For example, environmental training gives the workers an environmental understanding and helps adopt green skills that produce a consistent commitment level of workers for the environment (Perron et al., 2006). The researcher pointed out the impact of green training on green commitment (Pinzone et al., 2016), whereas the researcher viewed the green reward and compensation system as an element that boosts the green outcomes of the firm, like commitment related to the environment (Ren et al., 2018); further studies show that rewarding system for workers environmental behavior relates to the workers' environmental responsibility (Luu, 2019).

Literature shows that green HRM significantly affects organizational commitment and EP of the higher education sector (Kim et al., 2019). GHRM has a positive impact on

effective environmental commitment (Pinzone et al., 2016). Furthermore, green commitment does not mediate the relationship between green HRM and environmental performance (Pham et al., 2020).

H2: Green HRM has a positive relationship with green commitment.

Green HRM and pro-environmental behavior

People are working to protect the environment from previous decades (Easterling et al., 1996). Individuals are environmentally conscious to accept the importance of eco-friendly issues. This recognition enhances the positive behavior of individuals in a friendly environment in daily routine lives (Kalafatis et al., 1999; Laroche et al., 2001). Due to the following reasons, green HRM influences the pro-environmental behavior of employees at the workplace, which includes the following (1) spreading instructions related to firms' green matters developing and strengthening the employees' green values through training are expected to enhance workers' green perception (Renwick et al., 2013). (2) Design job description linked up with green training and environmental obligations to enhance the worker's skills and abilities, due to this worker motivated to perform green tasks (Pless et al., 2012). (3) Reward systems, performance systems, and promotion encourage the workers to participate in green activities (Renwick et al., 2013). Therefore, it facilitates workers to fulfill the extra-role task at offices.

Previous literature shows that GHRM has a direct and indirect impact on in and extra-role workers' pro-environmental behavior through the psychological green climate in the food industry (Dumont et al., 2017). GHRM, like employee involvement, performance management, and competence building, has a positive impact on OCBE in the healthcare industry (Pinzone et al., 2016). Furthermore, literature shows that green training and green organizational culture directly affect green voluntary behavior (Pham et al., 2019b). The researcher revealed that green HRM practices significantly impact workers' environmental behavior. (Pinzone et al., 2019).

H3: Green HRM has a positive relationship with pro-environmental behavior.

Green commitment and environmental performance

In the context of the environment, commitment indicates how workers are attached and responsible for the environmental problems and shows the inner motivation level of workers (Luu 2018). Regular participation of workers in environmental-related green activities strengthens their concerns regarding corporate environmental strategies; as a result, commitment level of workers is high, which is helpful to overcome the environmental problems of firms (Usman and Hammar 2021; Jabbour and Santos 2008). Scholars

said that concentrating on producing the EM structure can enhance the green attitude of those workers who are environmentally committed (Perez et al., 2009). Due to this, their philosophy standards positively changed to adapt to firms' green values and objectives, and they prefer to work in green-oriented firms (Pinzone et al., 2016). Management commitment significantly impacts environmental performance (Amir et al., 2020).

Further research revealed that employee commitment positively impacts environmental performance (Pham et al., 2019c). Managers' environmental responsibility enhances environmental performance in the hospitality industry (Tariq et al., 2020). Environmental commitment significantly impacts firm performance (Somjai et al., 2020).

H4: Green commitment has a significant positive relationship with environmental performance.

Pro-environmental behavior and environmental performance

Existing literature proved the connection between workers' PEB and EP (Paillé et al., 2014), and few studies have confirmed the workers' environmental activities (waste reduction) that should enable the firms to achieve their environmental goals and increase environmental performance (Daily et al., 2009). The research revealed that the workers' environmental behaviors, like reducing waste, help the firm achieve its environmental objectives (Daily et al., 2009). Further studies show that the eco-friendly behavior of workers can enhance the EP through environmental management systems (Usman and Hammar 2021; Roy et al. 2013). Researcher shows that employees' eco-friendly behavior improves the hotel industry's environmental performance (Usman and Balsalobre-Lorente 2022; Kim et al. 2019). The researcher revealed that OCBE has a significant positive impact on environmental performance in the ecotourism industry (Huang and Hsu 2020). Limited research shows the relationship between green behavior and environmental performance in the education sector in previous literature. Therefore, it is a dire need to study the impact of these relationships.

H5: Pro-environmental behavior has a significant positive relationship with environmental performance.

H6: Green commitment has a significant positive relationship with pro-environmental behavior.

Moderating role of green self-efficacy

Self-efficacy (SE) is predicted by performance and several positive job-related outcomes. Based on self-efficacy, green environmental factors comprise green self-efficacy (GSE) (Chen et al., 2015). The researcher revealed a significant and positive influence of GSE on management behavior (Jansson et al., 2010). The researcher said that employees whose SE

is most likely to significantly affect sustainable organizational practice (Guo et al., 2019). Moreover, the researcher proposed that the correlation between green self-efficacy and environmental attitude and credence of management is significant (Steg & De Groot, 2010; Ervin et al., 2013). Whereas GSE is a key item of environmental attitude and beliefs, the GSE would support the accountability of workers and enhance the creativity to acquire pro-environmental tasks like reducing waste (Gholami et al., 2013). Workers' green self-efficacy increases. When they believe in themselves, they generate new intentions, which is helpful to meet organizational green goals (Hmieleski and Baron, 2008). The researcher said that intelligent green individuals might conduct creative pro-environmental behaviors (Hsiao et al., 2011). The researcher noted that peoples whose GSE is on a significant level demonstrate confidence to proceed and believe in attaining green organizational objectives (Chen et al., 2014) (Fig. 1).

H7: Green commitment has a significant and positive relationship with green self-efficacy.

H8: Green self-efficacy has a significant and positive relationship with pro-environmental behavior.

H9: Green self-efficacy moderates the relationship between green commitment and pro-environmental behaviors.

Methodology

Questionnaire and pre-test

The measurement items of all variables were adapted from existing literature. A 5-point Likert scale was used from (1) strongly disagree to (5) strongly agree. The motive of current research is to find the connection between green HRM practices, green commitment, pro-environmental behaviors, green self-efficacy, and environmental performance based on academic staff's perception. Current research has studied three dimensions of green HRM practices: recruitment, green training, and green appraisal. The scale of 17 items was adopted from the literature of Anwar et al. (2020) to

measure the green HRM practices. For measuring green commitment, the scale of 07 items was adapted from the literature of (Afsar & Umrani, 2020). On this scale, replaced the word organization with a university like "I care about the environmental concern of my university." A scale of 09 items was adopted from the literature of Anwar et al. (2020) to measure pro-environmental behavior. The scale of 06 items was adapted from the literature of Chen et al. (2001) to measure green self-efficacy. The university replaced the word organization on this scale, like "I feel I can succeed in accomplishing environmental ideas in my university."

Moreover, the scale of 14 items was adopted from the literature of Anwar et al. (2020) to measure the environmental performance in HEIs. To check the content validity questionnaire, send them to Professors and HR managers who deal with Pakistan's HEIs. The questionnaire was finalized for the data collection process based on their suggestions.

Sample design and data collection

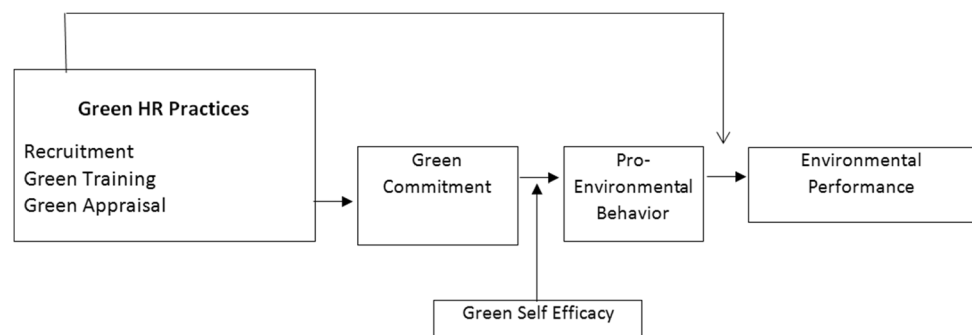
A quantitative survey method was used to collect the data from August until December 2021 on two campuses (Gujranwala, Jhelum) of the University of Punjab in Pakistan. A convenience sampling technique was utilized (Anwar et al., 2020). The unit of analysis for this study is university. The respondents were academic staff; these staffs were responsible for implementing those strategies to enhance environmental performance. About 320 structured questionnaires were distributed among academic staff, asking detailed information about the need for the current study, from which returned 226, out of which 18 were imperfect, so discarded them. Only 208 were found to be useful. The response rate of the current study was 70.62%.

Empirical findings

Data analysis

Statistical data analysis has been done using the Smart PLS software as it is considered the most advanced

Fig. 1 Structural model assessment (structure equation modeling). Source: author's constructed



technique for data analysis. Furthermore, PLS-SEM is most considered because of lesser needed data and data normality (Hair Jr, Hult, Ringle, & Sarstedt, 2016). This study used Smart PLS-3 to analyze data and evaluate the hypothesis. The two-step procedures employed in this study highlighted the results recommended by (Henseler, Ringle, & Sinkovics, 2009) as well-considered most suitable in the field of social science research (Hair Jr et al., 2016).

Assessment of reflective measurement model

Partial Least Square (PLS) is statistical software used to assess the structural and measurement models. In PLS, each construct's reliability is evaluated by checking the construct loadings on their latent construct, respectively (Nisar et al., 2020). For assessing the measurement model in the current study, scholars confirmed both the validity and reliability of the data set. Composite reliability is used to determine data reliability, whereas convergent and discriminant validity measure data validity (Anwar et al., 2020). These results show the validity of measurements. Average variance extract (AVE) was used to assess convergent validity. The threshold for AVE is 0.500, as shown in Table 1. A two-stage approach is used for green HRM practices, CR and AVE for 2nd order construct is calculated manually. The AVE value of all items was greater than the threshold value in the range of 0.503 to 0.740. Furthermore, it also shows that all the measures of 07 constructs were valid, including recruitment, green training, green appraisal, green commitment, pro-environmental behaviors, green self-efficacy, and environmental performance. Therefore, the model has sufficient convergent validity.

Discriminant validity

HTMT ratio is a new criterion introduced to check the discriminant validity for variance-based SEM. (Henseler et al. (2015) said that in many research situations, a lack of discriminant validity had not been detected by formal-lacker, and cross-loading approaches due to this alternate approach are introduced (Abbass et al. 2022a; Henseler et al. 2015), i.e., hetrotrait ratio and monotrait ratio. The threshold value for HTMT ratios is less than 0.90, and if the value is greater than the threshold value, then the problem of discernment validity occurs. Table 2 shows the HTMT ratios of the 1st order construct, which shows each value is less than the threshold value, whereas Table 3 shows the ratios for the 2nd order construct. It also shows the values are less than 0.90, which means discriminant validity for constructs is established (Fig. 2).

Assessment of structural model (SEM)

Hypothesis testing has been done using bootstrapping and PLS-SEM, which shows the variables' significant, positive, and negative relationships. The direct effect was used to test the hypothesis of green HRM practices and EP. The indirect effect is used for mediation and moderation analysis. Table 4 shows the bootstrapping results. Result of PLS-SEM and bootstrapping shows the significant and positive relationship between green HRM practices and environmental performance ($SD=0.053$, $t=13.733$, $p=0.00$). It means the 1st hypothesis is supported. Furthermore, significant and positive connection has been found between green HRM and green commitment which shows $\beta=0.091$, $t=3.881$, $p=0.00$). Therefore, the 2nd hypothesis is also supported. Besides this, the p value of 0.067 was greater than the cut-off value of 0.05, which shows the insignificant relationships between green HRM and pro-environmental behaviors ($\beta=-0.067$, $t=1.837$, $p=0.067$); hypothesis 3 is not supported and rejected. Moreover, as the t value 0.298 was the lowest than the threshold value i.e. 1.645, insignificant relationship was found between Green Commitment and environmental performance ($\beta=-0.085$, $t=0.298$, $p=0.765$). Based on the result hypothesis, four is rejected. As the t value 0.747 and p value =0.455 were lower than the threshold values, this study found an insignificant relationship between Pro-environmental behavior and environmental performance ($\beta=-0.080$, $t=0.747$, $p=0.455$). Based on the result hypothesis, five is also rejected. A positive and significant relationship was found between green commitment and pro-environmental behavior. The t value is greater than the threshold value, and the p value is less than 0.05 ($\beta=0.055$, $t=8.794$, $p=0.00$); t means hypothesis 6 is supported. However, results show a significant and positive relationship between green commitment and green self-efficacy ($\beta=0.065$, $t=7.876$, $p=0.00$), which means hypothesis 7 is supported. Moreover, the T value is greater than the threshold value, which is greater than 1.645, same as the p value is less than 0.05, which shows the significant and positive relationship between green self-efficacy and pro-environmental behavior ($\beta=0.071$, $t=4.674$, $p=0.00$); therefore, the hypothesis 8 is supported. This hypothesis shows a significant relationship, which means green self-efficacy moderates the relationship between green commitment and green self-efficacy ($\beta=0.045$, $t=3.728$, $p=0.00$), which means hypothesis 9 is also supported (Fig. 3).

Discussion

Investigating green initiatives in HRM is a new area of research, and the current study gives a clear understanding of green HRM practices. Many existing works of literature worked on the execution of green HRM in different sectors

Table 1 Convergent validity

1 st order	2 nd order	Items	Loadings	CR	AVE
Recruitment	Green HRM	R1	0.724	0.849	0.654
		R2	0.862		
		R3	0.834		
Green training		GT4	0.754	0.912	0.566
		GT5	0.816		
		GT6	0.784		
		GT7	0.858		
		GT8	0.698		
		GT9	0.683		
		GT10	0.667		
		GT11	0.739		
Green appraisal		GA12	0.746	0.845	0.532
		GA14	0.469		
		GA15	0.668		
		GA16	0.845		
		GA17	0.849		
Green commitment		R	0.764	0.895	0.740
		GT	0.942		
		GA	0.866		
		GC1	0.609		
		GC3	0.767		
		GC4	0.751		
		GC5	0.749		
Pro-environmental behavior		GC6	0.688	0.858	0.503
		GC7	0.678		
		PEB2	0.633		
		PEB3	0.675		
		PEB4	0.787		
		PEB5	0.737		
		PEB6	0.681		
		PEB7	0.809		
		PEB8	0.659		
Green self-efficacy		PEB9	0.721	0.893	0.512
		GSE1	0.743		
		GSE3	0.646		
		GSE4	0.851		
		GSE5	0.674		
Environmental performance		EP1	0.782	0.821	0.537
		EP2	0.797		
		EP4	0.646		
		EP5	0.773		
		EP6	0.683		
		EP7	0.65		
		EP8	0.72		
		EP10	0.67		
		EP13	0.701		

Source: author's design by using Smart PLS-3.

Table 2 HTMT ratio (1st order)

HTMT							
1 st order	EP	PEB	GC	R	GA	GSE	GT
EP							
PEB	0.407						
GC	0.384	0.813					
R	0.63	0.225	0.321				
GA	0.801	0.452	0.443	0.728			
GSE	0.407	0.736	0.659	0.158	0.388		
GT	0.776	0.434	0.38	0.72	0.847	0.343	

Source: author's design by using Smart PLS-3.

Table 3 HTMT ratio (2nd order)

HTMT					
2nd order	EP	PEB	GC	GERM	GSE
EP					
PEB	0.407				
GC	0.384	0.813			
GHRM	0.846	0.431	0.418		
GSE	0.407	0.736	0.659	0.346	

Source: author's design by using Smart PLS-3.

like the manufacturing sector (Yusliza et al., 2019, 2017; Nejati et al., 2017; Yong et al., 2019), sports-related organizations (Gholami et al., 2016), and health sectors (Abbass et al. 2022b; Pinzone et al. 2016). In the literature of green HRM, the research gap is found in the university context, specifically in Pakistan. The current study adds value to the literature on HRM by contributing to the sustainable university concept because this area is not explored fully. The recent study's findings are beneficial for universities' academic staff.

The current study adds value to previous studies by increasing understanding of green management which has emerged as a global concern. Many researchers have supported the implementation of policies related to green HRM for the accomplishment of the environmental objectives of the firm. Still, little has been found to connect green practices and environmental performance. Furthermore, the current study conceptualizes the green HRM practices in the light of the Ability-Motivation-Opportunity theory. It answers a said question about how green HRM influences environmental performance with the mediating effect of green commitment and pro-environmental behavior. Environmental management influences employees' organizational commitment.

Moreover, current research reported that green HRM practices are a component of EM; meanwhile, HRM is a significant resource that empowers the achievement of goals by confirming the involvement of resources (Domínguez-Falcón et al., 2016). Therefore, the current

research adds to the previous studies of the EM by assessing the impact of green HRM on employee commitment, employees' behavior, and the environmental performance of HEIs.

The first objective was to conduct the study is to check the influence of green HRM practices on environmental performance. In this regard, literature shows the strong connection between green HRM and environmental performance in the manufacturing industry, hotel industry, and multi-industry (Guerci et al., 2016; Masri and Jaaron, 2017; Longoni et al., 2018). Same as, the current study results show that green HRM positively impacts environmental performance in HiRer educational institutes. It means employees who have environmental awareness are expected to behave voluntarily in environmental activities at the workplace. Furthermore, it also highlighted that the recruitment procedure strongly demonstrates an organizational preference for those applicants who have potential and those who are committed to the environment positively. Therefore, hiring candidates that possess these concerns is expected to overcome the environmental threats of the organizations. Same as when staff is sufficiently trained/skilled for executing the environmental initiatives. Their motivation level is high to voluntarily contribute to a firm environmental effort beyond their given assignments. Green training initiatives train workers with the required expertise and skills for environment management also enhance willingness to contribute to the environmental-related initiative. These findings are parallel with previous studies.

Furthermore, the second objective in the context of the current study was to check the impact of green HRM on green commitment. Previous studies show that green HRM has a significant and positive impact on green commitment in the hotel industry. (Pinzone et al., 2016; Kim et al., 2019; Pham et al., 2020). The results of current studies are in line with the literature, which shows the effects of green HRM on green commitment are positive in HEIs. It means that green HRM practices enhance the commitment level of employees like environmental training gives the environmental understanding to the workers and helps to adopt green skills that

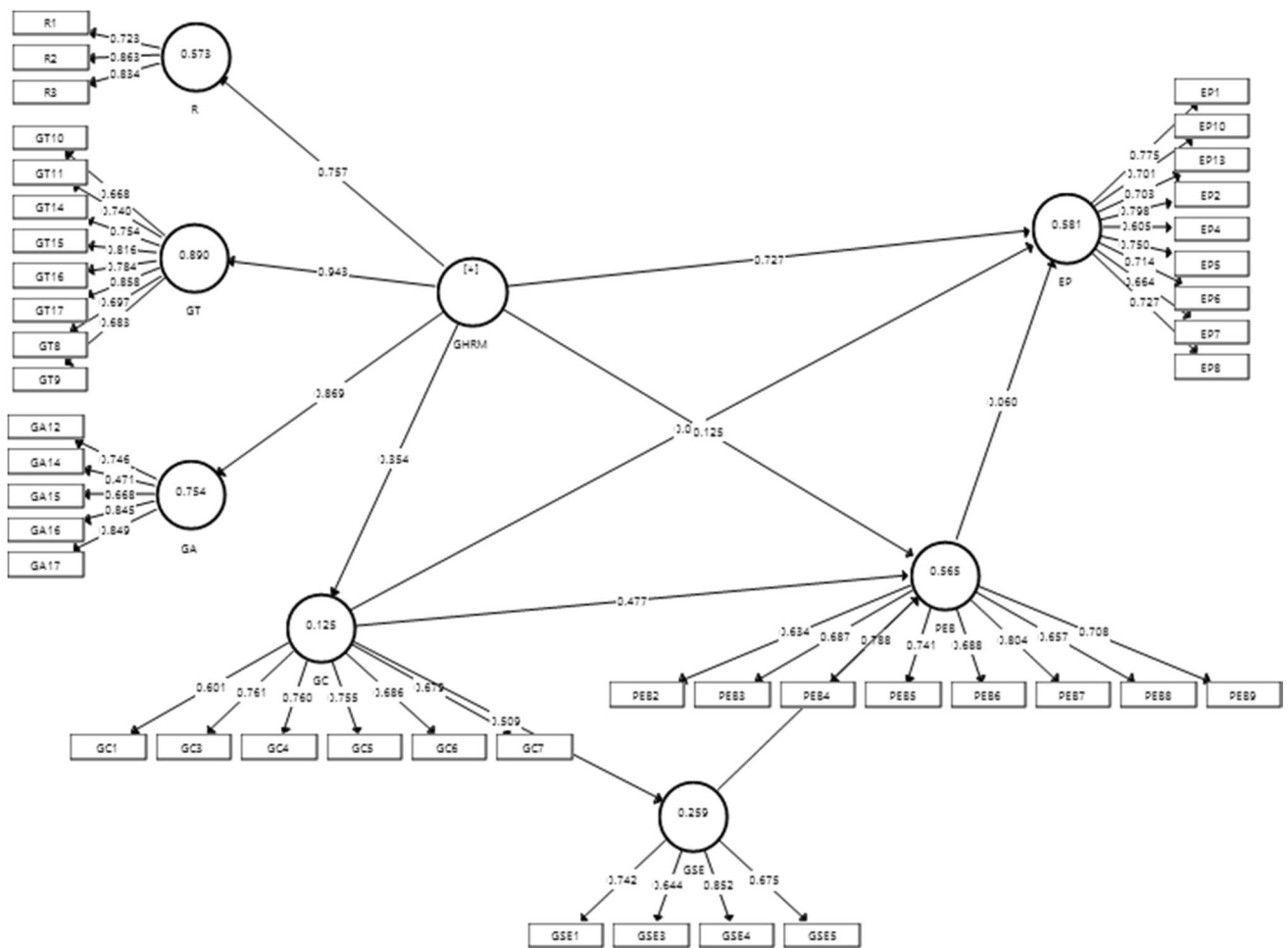


Fig. 2 Theoretical framework. Source: author’s constructed

Table 4 Results of hypothesis (direct, indirect, mediation, and moderation)

		<i>SD</i>	<i>t</i>	<i>P</i>	LLCI	ULCI	Decision
H1	GHRM→ EP	0.053	13.733	0.00	0.611	0.815	Supported
H2	GHRM→ GC	0.091	3.881	0.00	0.18	0.529	Supported
H3	GHRM→ PEB	0.067	1.837	0.067	0.003	0.24	Not supported
H4	GC→ EP	0.085	0.298	0.765	-0.149	0.177	Not supported
H5	PEB→ EP	0.08	0.747	0.455	-0.094	0.232	Not supported
H6	GC→ PEB	0.055	8.794	0.00	0.361	0.598	Supported
H7	GC→ GSE	0.065	7.876	0.00	0.006	0.358	Supported
H8	GSE→ PEB	0.071	4.674	0.00	0.187	0.47	Supported
H9	GC→ GSE→ PEB	0.045	3.728	0.00	0.088	0.258	Supported
H10	GHRM→ GC→ PEB→ EP	0.050	13.701	0.00	0.519	0.857	Supported

GHRM, green human resource management; EP, environmental performance; GC, green commitment; PEB, pro-environmental behavior; GSE, green self-efficacy; EP, environmental performance.

produce a consistent commitment level of workers for the environment.

The third objective of the current study is to check the connection between green HRM and pro-environmental

behavior. Previous literature shows the positive association between them in the hospitality industry and the health care industry (Pinzone et al., 2016, 2019; Pham et al., 2020), whereas the current study hypothesis does not support this

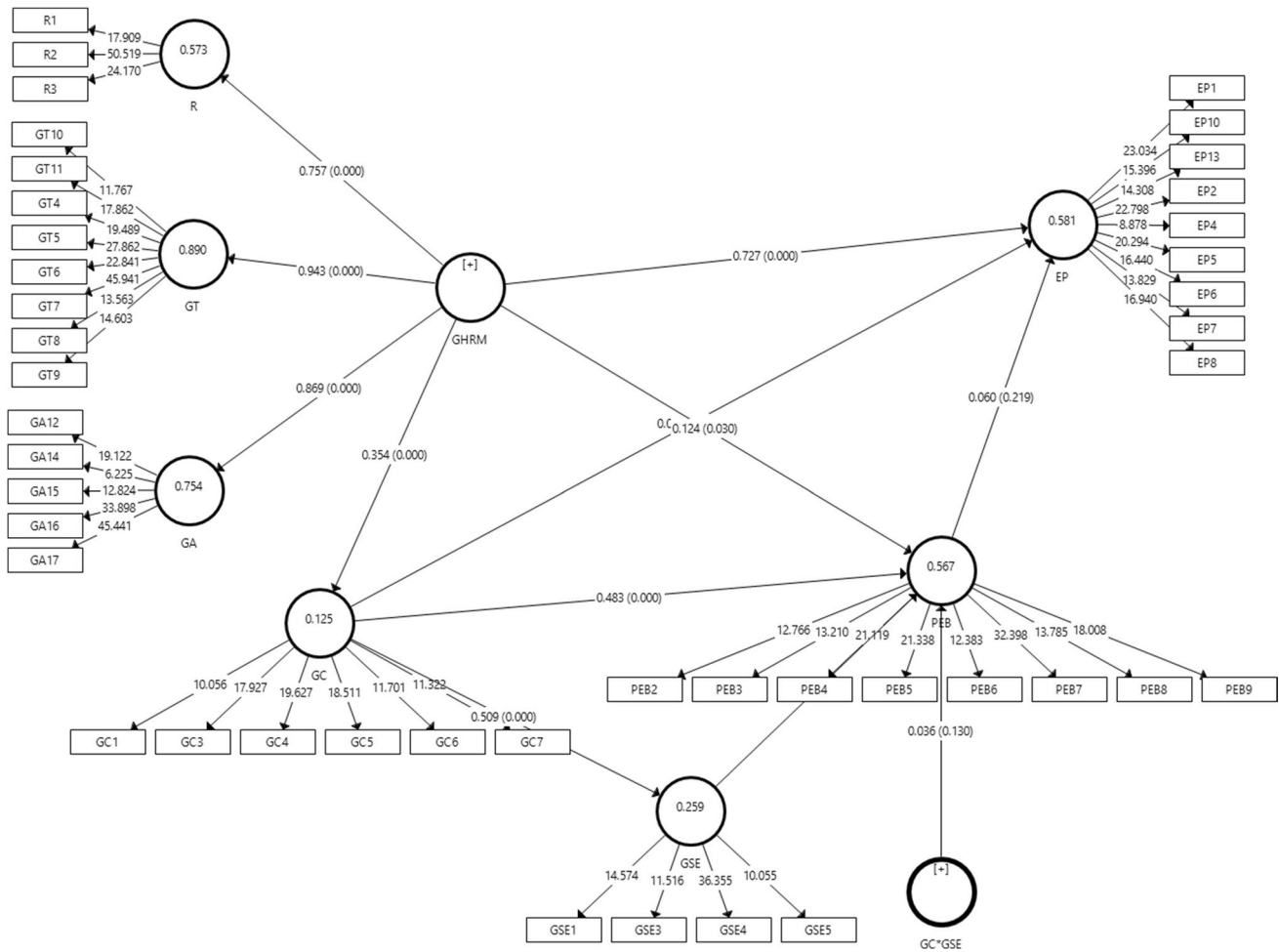


Fig. 3 Measurement model assessment (confirmatory factor analysis). Source: author’s constructed

variable’s relationship in the university settings, which means that in education sectors, the employee’s green values are not properly strengthened, and no mechanism has been made that encourages the employee to be involved in green activities.

The fourth objective in the context of the current study was the green commitment, and pro-environmental behavior mediates the relationship between green HRM and environmental performance. In this regard, the previous research shows that green commitment does not mediate the relationship between green HRM and environmental performance (Pham et al., 2020; Ren et al., 2018), and pro-environmental behavior mediates the relationship of green HRM and pro-environmental behavior (Kim et al., 2019; Huang and Hsu, 2020), but the results of the current study hypothesis of mediation analysis have not supported the literature. It means a dire need to implement a green strategy in the education sector, because the university staff is responsible for environmental issues and responsible for the implementation of environmental strategies.

The final objective of the current study was to check the moderating role of green self-efficacy between green commitment and pro-environmental behaviors. Previous studies show that green self-efficacy significantly and positively moderates the relationship of green responsibility and pro-environmental behaviors in the hotel industry, healthcare sector, tourism sector (Khalid et al. 2021; Gholami et al. 2013; Chen et al. 2014; Hong and Guo 2019). The current study shows similar results with previous studies. The hypothesis of moderation analysis is supported, and green self-efficacy moderates the relationship between green commitment and pro-environmental behavior.

Conclusion

Due to increasing environmental responsibilities, universities have understood the fact, which ultimately leads to ineffective environmental performance that is not considered the green initiatives in human and behavior

factors. In this regard, few literature elements were found that guideline the implementation of effective green measures in university with the help of commitment self-efficacy and behaviors. The current study tried to contribute to the literature of green HRM while focusing on academic staff. Universities are considered knowledge creation leaders; they are judged based on environmental awareness creation and a commitment to promoting pro-environmental behavior and green self-efficacy. The current study highlighted the increasing concept of green HRM as a set of building the ability, enhancing motivation, and providing opportunities to influence workers' pro-environmental behaviors. The conclusion of the current research was capable of validating the positive concerns of green HRM, behaviors, and commitments for environmental performance.

Theoretical implications

The results make a significant contribution to the current study of the literature. Firstly, based on the Ability-Motivation-Opportunity (AMO) theory, the findings reveal the connection between green HRM and green commitment. Staff may perceive green HRM practices as a positively firm gesture reflecting environmental concerns. If green HRM practices favor university staff, they are likely to show a higher commitment level to the universities. The results align with previous studies (Paillé and Boiral, 2013), endorsing that scholars can employ the values of Ability-Motivation-Opportunity theory to clarify the psychological relation of nature among a university and its staff in the context of EM. This research invokes and provides evidence for ability motivation theory on the connection between green HRM and green commitment in educational institutes. Secondly, contribution in the results is based on the effects of green HRM and EP for the university. These results are important because little assistance has been found to the effectiveness of green HRM and EP in the education sectors.

Meanwhile, previous studies focused on managing sustainability and protecting the environment in different sectors. Moreover, numerous researches focus on identifying the EM standards to achieve the certification on the green or eco-friendly environments, whereas little consideration is given to involving the university's staff to protect the environment. The current study results show that green commitment and pro-environmental behaviors mediate the impact of green HRM on EP in the education sector. These results highlight the significance of green HRM, which increases the commitment level and affects the behavior that is helpful to engage the staff in green activities, which ultimately positively affects the environmental performance. Furthermore, university initiates to manage sustainability and protect the environment contribute to educational research, leading to

the growth of upcoming studies of green HRM of educational institutes.

Practical implications

Current research gives university shareholders evidence-based suggestions regarding relative contributions and importance of several HR practices toward the environment and behaviors. Findings and GHRM practices support the academic policymakers for shaping environmental behavior while focusing on staff commitment level and behavior. Hiring procedures can emphasize the environmental stance of the University for the Attraction of applicants with environmental attitudes. Moreover, results proposed increasing the motivation of the university staff by dividing the environmental tasks and compensating them for the fulfillment of these tasks. It motivates them to put more effort into taking the initiative to implement environmental strategies. The training program is necessary for enhancing environmental knowledge and awareness in employees because the individual with environmental skills is more expected to commit to environmental behavior to complete environmental tasks.

Furthermore, staff involvement benefits policymakers because they can suggest better solutions for environmental problems while using their expertise and skills. As the literature suggests, sustainable activities like recycling the waste, a day without a car, and cleaning the university help enhance the university's environmental performance.

Future directions and limitations

Chances of further research always exist because of theoretical and methodological limitations. Current research is based on a convenience sampling technique for the data collection process, and data is gathered at one time. Involvements of green HRM may take time to exploit the effect on the change of behavior. Future studies may use a longitudinal technique for implementing green HRM practices by investigating the changes to employee behaviors, commitments, and environmental performance for better understanding.

Moreover, this model can be replicated in different developing countries while considering the cross-cultural setting. The current research uses the Ability-Motivation-Opportunity (AMO) theory to test moderation and mediation between green HRM and environmental performance. Future studies may relate other theories with their models, which is helpful for the enhancement of green practices. Other mediating variables should consider in future studies like green culture, employees' green attitude, and the green support of management. Same as three green HRM practices used in current research like recruitment, green training and involvement, and green appraisal, future studies of green HRM should consider other techniques like green

work-life balance. In the current study, respondents are academic staff. Future studies may consider the students in their studies because they are stakeholders of universities, and they contribute toward a better future globally.

Author contribution The idea of the original draft belongs to Dr. Qazi Muhammad Ali and Kashif Abbass. Dr. Qasim Ali Nisar writes the introduction, literature review, and empirical outcomes sections. Dr. Kashif Abbass, Dr. Zain ul Abidin, and Dr. Rabia Qamar helped in data collection and compiling, visualizing data of observed variables. Kashif Abbass and Dr. Qazi Muhammad Ali constructed the methodology section in the study. All the authors read and approved the final manuscript.

Declarations

Ethics approval and consent to participate Ethical approval and informed consent are not applicable for this study.

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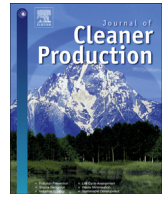
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Nexus between green intellectual capital and green human resource management



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ABSTRACT

This research was a pioneering study that examined the relationship between green intellectual capital and green human resource management. A quantitative research approach using a mail survey was employed to get insights from 112 large manufacturing firms in Malaysia. Partial Least Squares Regression Analysis was employed to examine the proposed relationship. The results indicated that green human capital and green relational capital influenced green human resource management. Surprisingly, green structural capital was not significantly related to green human resource management. As revealed by searches of ISI Web of Knowledge and Scopus, no similar work has tested a similar framework based on evidence from all over the world.

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1. Introduction

The notion of being green has gained attention from both scholars and industry practitioners over the past few decades. In academic circles, research has grown steadily from a general deliberation on green business into “greening” the functional areas within an organization that include green purchasing (Zhang et al., 2018), green supply chain management (Kazancoglu et al., 2018; Zaid et al., 2018), green innovation (Li et al., 2018), green finance (Ng, 2018), green management (Mustapha et al., 2018), green information technologies (Przychodzen et al., 2018), and green human resource management (HRM) (Renwick et al., 2013; Zaid et al., 2018).

Businesses operate in a highly competitive global economy in which they must not only be efficient and deliver value, but also must be responsible, and this includes responsibility towards the environment. The intensification of environmental concerns around the globe has led companies to adopt environmental practices at an increasing rate; and such adoptions can benefit

companies becoming “green and competitive” (Carmona-Moreno et al., 2012; El-Kassar and Singh, 2018; Jabbour et al., 2015). In the pursuit of this green agenda, scholars (e.g., Renwick et al., 2013) have argued that human resource management (HRM) plays an important role. Hence, embedding green practices within HRM functions could enhance the likelihood of a firm's sustainability.

In an emerging economy such as Malaysia, the need for a highly efficient workforce with a focus on environmental sustainability is paramount. Emerging economies have become the most important economies in recent years because of the high demand for resources, including human resources, which are being used to boost their gross domestic products (GDP). Researchers have reached a consensus that emerging markets are a main destination for organizations from varying industries around the world (Gaur et al., 2014; Popli et al., 2016, 2017; Singh et al., 2017; Singh, 2018a). This is because of the large pool of talents and resources available in these regions. Thus, it is necessary to know more about green HRM in Malaysia because, according to Renwick et al. (2013), the green HRM literature is largely Western. However, given the importance of the development of Asian economies, this is an important gap for future studies to reduce.

Based on the available knowledge, the current literature has examined green HRM in relationship to several factors. Previous empirical studies have examined green HRM in relationship to

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environmental aspects (O'Donohue and Torugsa, 2016; Rangarajan and Rahm, 2011; Zibarras and Coan, 2015), green supply chain management (SCM) (Longoni et al., 2016; Nejati et al., 2017; Teixeira et al., 2016), corporate social responsibility (Jabbour, 2011; Wagner, 2011), stakeholder pressure (Guerci et al., 2016a), resistance to change (Nejati et al., 2017), strategic HR competencies (Yong and Mohd-Yusoff, 2016), HR factors (Yusliza et al., 2017), performance (Guerci et al., 2016a; Longoni et al., 2016; Masri and Jaaron, 2017; O'Donohue and Torugsa, 2016; Siyambalapatiya et al., 2018; Yusoff et al., 2018), and competitive advantage (Carmona-Moreno et al., 2012).

Kong and Thomson (2009) have highlighted that previous research has investigated the relationships between intellectual capital (IC) and HRM. However, previous works have not directly discussed the link between green IC and green HRM. Kong and Thomson (2009) argued that knowledge could be acquired at various levels of an organization; therefore, IC can be seen as a driving force in forming and implementing HRM practices in an organization. Chen (2008) also mentioned that no research had explored IC with respect to green innovation or environmental management. In her study, Chen (2008) discovered that companies investing many resources and efforts in green IC could not only meet strict international environmental regulations and popular environmental consciousness of consumers, but also eventually obtain a corporate competitive advantage. This is an important fit for organizations in the emerging economies to attract the appropriate talents, achieve competitive advantages and still maintain environmental sustainability. As a consequence, this is a useful avenue for future research.

1.1. Research objective

In the light of the aforementioned information, in this paper, three dimensions of green IC (green human capital, green structural capital, and green relational capital) were identified to investigate the effects of these dimensions on green HRM. To achieve this goal, a survey was conducted among 112 large manufacturing firms operating in Malaysia.

1.2. Research question

Research work is required to examine the connections of green IC measures with green HRM. For instance, Boxall and Purcell (2000) and Stovel and Bontis (2002) suggest that the strategic development and management of IC helps senior executives to make the most of their organizational intellectual resources. Kong and Thomson (2009) further added that this implies that IC may provide senior executives with a greater pool of knowledge to make more informed strategic HRM decisions for future organizational challenges. One of the new challenges that organizations are facing in the twenty-first century is how HRM functions of the organization can become green. Keeping in mind these suggestions and the extant literature, it is vital to trace the linkages between green IC and green HRM. Specifically, the research question to be answered is:

RQ1. Does green IC (green human capital, green structural capital, and green relational capital) predict green HRM?

2. Literature review

2.1. Green HRM

The twenty-first century has become known as the century of culturally diverse emerging markets countries that are

geographically spread over across the globe (Singh, 2018a). Green HRM has become a requirement today for many reasons. First, many adverse environmental incidents have been reported. Second, industries use natural resources to produce goods or products often resulting in industrial wastage and pollution of the surrounding environment. Third, pollution, ecological imbalances and global warming are seen as by-products of the excess consumption of natural resources that serve raw materials.

The green issue has become prominent in emerging economies such as that of Malaysia. One reason is that emerging economies have begun to use more energy and natural resources in recent years and, as a result, have contributed to environmental degradation. For example, Malaysia had average annual growth rates of CO₂ emissions that were a bit greater than 6%, which was close behind that of the People's Republic of China (2nd largest economy in the world), which was 7.42% (Sadorsky, 2014).

Previous researchers have argued that the manner in which HRM can be greened is often studied in terms of a continuum comprising all HRM practices – analysis and description of job positions, recruitment and selection, training and development, performance and appraisal, and rewards (Renwick et al., 2013). According to Renwick et al. (2015), the most recent studies emerging examine green HR systems and individual staff behaviours, along with multi-level dynamics and new theoretical directions. Their article also contributed to enhancing Green HRM scholarship in several ways, including examining Green HR practices, wider contextual issues, and effect of Green HRM on performance.

Researchers have suggested that HRM can play a fundamental role in facilitating change to green HRM by selecting employees based on the correct criteria, the introduction of training and development of employee skills in environmental management and developing appropriate performance assessment and rewards systems. Renwick et al. (2013) concluded that green HRM practices begin at the point of an employee's entry and continue until the point of the employee's exit. The sustainable management of people, process and product in emerging markets is not an easy task, and organizations always must develop a sustainable architecture to leverage the best out of "mind-share" and "market-share" philosophy (Singh, 2018b). Generic HRM practices have been incorporated with green aspects; therefore, the term "green" has been added in each HRM practice (Renwick et al., 2013) to avoid confusion.

The argument has been made green HRM has a core role and helps to support other functions in maintaining the competitive advantage of organizations in many ways (Carmona-Moreno et al., 2012; Jabbour and Jabbour, 2016; Masri and Jaaron, 2017; Yong and Mohd-Yusoff, 2016). For instance, El-Kassar and Singh (2018) found that the direct effect of environmental performance on competitive advantage was stronger for companies with lower HR practices. In addition, their results also indicate that companies with established HR practices attain a more balanced competitive advantage through a combination of better environmental and organizational performance. Jabbour and Jabbour (2016) proposed a synergistic integrative framework in advancing the roles of green supply chain management (SCM) and green HRM in building more sustainable organizations. Teixeira et al. (2016) found that green training tends to help firms improve their green SCM in the context of more sustainable HRM as well as sustainable management practices, which enables an organization to eventually reduce costs and also to improve organizational reputation. Further, Guerci et al. (2016b) opined that green recruitment attracts talented and green employees.

Some researchers have offered the idea that green HRM practices can help organizations to achieve sustainability. Milliman

(2013) suggested that green HR practices are intended to support organizations in promoting the environmental aspects of their sustainable development efforts. Guerci and Carollo (2016) explored HRM-related paradoxes in developing environmental sustainability. Gholami et al. (2016) highlighted the importance of green HRM system in making the transition to the notion of a “sustainable centre” in sports centres throughout Malaysia and other parts of the world. These studies indicated that Green HRM practices led to sustainability, especially from the environmental perspective. Nevertheless, few studies have tested the relationship between green IC and green HRM; thus, evidence of these relationship appears to be inconclusive.

2.2. Green intellectual capital

Studies of intellectual capital (IC) have drawn the wide attention of researchers, and the importance of intellectual capital has been highlighted in management literature. However, IC incorporating environmental concepts – green IC – was only introduced by Chen in 2008 and has not emerged as an important field of study until recently.

Definitions of green IC and environmental IC are scarce in the management literature. Among them, Chen (2008) defined green IC as “the total stocks of all kinds of intangible assets, knowledge, capabilities, and relationships, etc. about environmental protection or green innovation in the individual level and the organization level within a company” (p. 277). Liu (2010) defined green IC as “the integration of green and environment knowledge sources and knowing capability of companies for improving competitive advantage” (p. 2). López-Gamero et al. (2011) proposed green IC as “the sum of all knowledge that an organization is able to leverage in the process of conducting environmental management to gain competitive advantage” (p. 21).

Intangible assets can be said to be rare and not easily imitated. The opinion is that intangible resources and competencies contribute more a firm's attaining and sustaining superior performance than do tangible resources (Bogner and Bansal, 2007; Chang and Chen, 2012; Wang et al., 2014) and are crucial for an organization's survival in dynamic environments (Subramaniam and Youndt, 2005; Teece et al., 1997).

Green IC enables organizations to comply with strict international environmental regulations, to fulfil growing environmental awareness developing among consumers, and to create value for the organization (Huang and Kung, 2011). Generally, the literature has identified three dimensions that encompass the classification of green IC, namely, 1) green human capital; 2) green structural/organizational capital; and 3) green relational capital. *Green human capital* is “the summation of employees' knowledge, skills, capabilities, experience, attitude, wisdom, creativities, and commitments, etc. about environmental protection or green innovation, and was embedded in employees not in organizations” (Chen, 2008, p. 277). Further, human capital is opined to be the basic element of the intellectual capital process that performs the role of a driving force for green structural capital and green relational capital (Li and Chang, 2010; Chahal and Bakshi, 2014). These attributes are not owned by organizations and cannot be imitated. The attributes of employees that could comprise tacit or explicit knowledge are an invaluable asset in achieving a successful green HRM (Mazzi et al., 2016). Due to this uniqueness, these attributes are a form of competitive advantage for an organization. Green human capital is opined to be the core strategic resource for sustainable competitive advantage in today's dynamic organizational environment (Bontis et al., 2007; Campbell et al., 2012; Mengistae, 2006). Human capital is the utmost significant aspect of IC (Wang et al., 2014). The belief is that organizations that appreciate the

importance of human capital invest in their employees to enjoy better performance (Seleim et al., 2007; Wang et al., 2011). Human capital works alongside other organizational resources and capabilities (Carpenter et al., 2001), such as green HRM.

Green structural capital has been defined as “the stocks of organizational capabilities, organizational commitments, knowledge management systems, reward systems, information technology systems, databases, managerial mechanisms, operation processes, managerial philosophies, organizational culture, company images, patents, copy rights, and trademarks, etc. about environmental protection or green innovation within a company” (Chen, 2008, p. 277). Furthermore, green structural capital is defined as the “institutionalized knowledge about the form of organizational processes, structures, technologies, policies and culture” (Wang et al., 2014). These resources are valuable intangible assets owned by an organization (Edvinsson and Malone, 1997; Wang et al., 2014) and can be used to support the green HRM in the organization (Kong and Thomson, 2009). An organization's environmental culture can be referred to as the set of assumptions, values, symbols, and organizational artefacts in an organization (Harris and Crane, 2002), and, according to Fernández et al. (2003), a significant relationship exists between organizational culture and green HRM. Furthermore, E-HRM which is a part of information technology system of green structural capital, has been found to have relationship with green HRM practices (Yusliza et al., 2017; Yusoff et al., 2015).

Green relational capital has been defined as “the stocks of a company's interactive relationships with customers, suppliers, network members, and partners about corporate environmental management and green innovation, which enables it to create fortunes and obtain competitive advantages” (Chen, 2008, p. 278). Tumwine et al. (2012) and Welbourne (2008) depict relational capital as an intangible asset that focuses on evolving, nurturing and preserving superior relationships with any organization, individuals or groups that may impact the position of a business in the market. For this reason, it is paramount for organizations to align their interests with those of their stakeholders to survive and to remain competitive. Going “green” is a recent concern for major stakeholders, including customers, suppliers and the government. Hence, there is pressure on an organization to practice green HRM. For instance, Guerci et al. (2016a) showed that customer pressure has a strong relationship with green HRM.

2.3. Hypotheses development

Today, when environmental concerns cannot be ignored by organizations, it is time to explore the relevance of green IC in the environmental management context. In Delgado-Verde et al. (2014) study, the results indicated that green organizational capital had an indirect impact on environmental product innovation through green social capital. These findings highlighted that green organizational capital (i.e., environmental communication structures, procedures, responsibilities, and policy) had no direct and positive relationship with environmental product innovation. Rather, the success of the environmental product innovation depended heavily on the cooperative relationships among employees (i.e., green social capital).

Chen and Chang (2013) verified the direct effect of green human capital on green innovation performance, and the mediation effect of green human capital on the positive relationships between corporate environmental ethics and the two consequents: green relationship learning and green innovation performance in the Taiwanese manufacturing companies. As a result of their study, they said that companies should improve their green human capital to increase the levels of the positive effects between corporate

environmental ethics and the two consequents.

In the field of HRM, previous studies have mainly underlined the influence of HR practices in developing various aspects of IC (Teo et al., 2014; Yang and Lin, 2009; Youndt and Snell, 2004). However, Kong and Thomson (2009) provided a contradictory view; they argued that IC, strategic HRM and HRM concepts are closely connected and that IC should be the driving force in these relationships. Later, they recommended that future research was required to gain a better understanding of how individual IC components influenced HRM practices. Based on the significant relationship observed between green IC and green innovation, as well as to fill the gap that Kong and Thomson (2009) highlighted and gain a better insight from the environment perspective, this study posits the following:

- H1.** Green human capital is positively related to green HRM.
- H2.** Green structural capital is positively related to green HRM.
- H3.** Green relational capital is positively related to green HRM.

2.4. Theoretical background

The theoretical background of this study is based on the Intellectual Capital-based View Theory (ICV). A handful of influential practitioners, including Sveiby (1997) and Edvinson and Malone (1997) coined the ICV. This theory evolved with use by other researchers such as Reed et al. (2006). ICV complements Leonard-Barton's (1992) well-known knowledge-based view (KBV). Although both theories aim to elucidate the hidden knowledge-based dynamics that underlie a firm's value and both are derived from RBV theory, they seem to have a different focus. KBV is mainly concerned about assessing the effectiveness of an organization's use of knowledge-management tools as knowledge-generating mechanisms such as its information technology systems and information management systems (Leonard-Barton, 1992; Nonaka et al., 2001). While ICV's emphasis is on the concentration and dynamics of knowledge capital rooted in a firm and is postulated to have direct relationship with its organizational performance/competitive advantage (Youndt and Snell, 2004). ICV is meant to narrow down the focus on intangible resources.

According to resource-based theory, a firm's intangible resources are more likely to contribute to the attainment and sustainment of a firm's superior performance when they are combined or integrated (Barney, 1991). However, major criticisms of the RBV are that the notion that RBV is too general and lacks a clear explanation of competitive advantage (Foss and Knudsen, 2003; Priem and Butler, 2001).

Hence, this current study will be using the ICV theory to explain the relationship between green human capital, structural capital and relational capital with the green human resource management of the organization. Green HRM has been declared to be a form of competitive advantage. Organizations gain a competitive advantage when they employ the use of green HRM practices such as green training (Murthy, 2008; Yusoff et al., 2018) from the green intellectual capital of an organization.

2.5. Conceptual model

The originality of this study is the testing the relationship between Green IC, namely green human capital, green structural capital, and green relational capital on Green HRM. The proposed conceptual model is shown in Fig. 1.

3. Methodology

3.1. Survey and data collection

This study employed correlational design to examine the influence of green intellectual capital on green HRM. To examine the conceptual model and test these relationships, a survey instrument was designed, and measurement scales were developed. The draft questionnaire was constructed and the content validity of the scale was checked and improved with the help of four academics and four experts from the industry. A revised version questionnaire was finalized and then used to test the proposed hypotheses. The measurement scales in the used questionnaire comprised items representing green intellectual capital such as green human capital, green structural capital and green relational capital, and green HRM. All items measuring these variables and the scales are discussed below.

The unit of analysis of the study is the individual firm. The population of this study comprised all large manufacturing firms in Malaysia. In Malaysia, a large firm is an organization having more than 200 employees. Large manufacturing companies were chosen because of their sensitivity to environmental issues, because they are subjected to government rules, and because they have formalized HR practices. These criteria are supported by the studies of Guerci et al. (2016a), Amran et al. (2012), and Tzafirir (2005).

For this current study, the sampling frame was all large manufacturing firms in Malaysia. The sampling frame was obtained from the Federation of Malaysian Manufacturers (FMM) Directory 2015 (FMM, 2015). Using the FMM Directory 2015, a total of 661 large manufacturing firms were identified based on the number of employees stated in the directory. Given the small sampling frame of the study and the likelihood of a low response from mail survey (Sekaran and Bougie, 2016); all the large manufacturing firms were included in the study. Thus, the sampling technique employed in this study was a census. As such, the all 661 large manufacturing firms in Malaysia were mailed a survey.

This study combines issues related to the environment (green issues) with business aspects (HRM, intellectual capital). Therefore, the appropriate person to provide the required data from should ideally have knowledge about the two aspects. Hence, the questionnaires were addressed to the HR director or HR manager who was actively participating in HRM. As a result, 661 questionnaires were distributed with a cover letter that ensured the anonymity of answers and that included a brief explanation of the research.

3.2. Measurements

Green HRM were measured by using a 15-item scale that adapted from Jabbour (2011) and Yong and Mohd-Yusoff (2016). A 7-point Likert-type scale ranging from (1) not at all to (7) to a very great extent was applied to answer each item.

Three dimensions were used to measure green IC, namely, green human capital (5 items), green structural capital (9 items), and green relational capital (5 items). These green IC items were adapted from Chen (2008). The measurement scales were scored on a 5-point Likert-type scale with responses to statements ranging from (1) strongly disagree to (5) strongly agree. Table 1 shows the references for all the selected items in the research questionnaire. As highlighted above, all the selected items were validated by the literature.

4. Results

The total population of the study was 661 large manufacturing firms listed in the Federation of Malaysian Manufacturers (FMM)

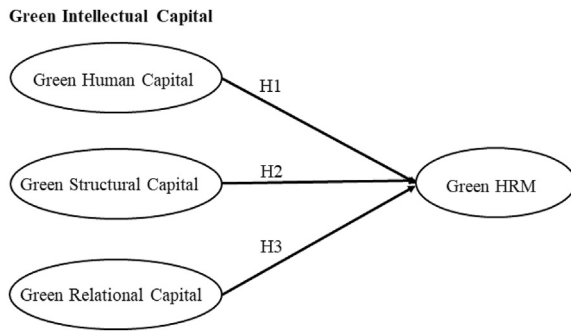


Fig. 1. Conceptual model.

Directory 2015. However, after excluding eight firms used for the interviews and four companies used for the pretesting of the questionnaire, the population of the study was 649. Accordingly, a total of 649 questionnaires were mailed to the respondents. After a reminder via telephone calls, 112 completed questionnaires were received, giving a response rate of 17.3%. This response rate is considered acceptable given the minimum sample size was targeted at 89, the commonly reported low response rate from a mail survey (Sekaran and Bougie, 2016) and the generally low response rate for this type of correlational study in Malaysia.

In terms of sample size determination, the G-power sampling size determinant was used in this survey. Based on the number of predictors, which are three (3), the minimum sample size recommended was 89. Hence the 112 respondents in this study is considered sufficient as the minimum needed power in social science management research is 0.80 and this sample size of 112 gives us a power of higher than 0.8.

In addition, the response rate for this study is comparable to other studies on manufacturing companies in Malaysia and hence is considered acceptable. For instance, studies conducted by Behyan et al. (2015) reported 19.48% with 120 samples, Lazim and Ramayah (2010) reported 10.07% with 106 samples, and Loke et al. (2013) reported 10.60% with 228 samples.

4.1. Demographic profile of responding companies

The majority of the companies were from the electrical and electronics industry (25.0%). Most large manufacturing firms in this current study had 201 to 500 employees (42.0%), and the number of employees in HR department was in the range of 5–10 employees (35.7%). The large manufacturing firms in this current study had mostly been established for more than 20 years (61.6%). The sample also indicates that the large manufacturing firms participating in this current research are mostly MNCs (52.7%). Notably, most of large manufacturing firms complied with ISO 9000 certification (88.4%) and ISO 14000 certification (71.4%). Regarding geographical location, most companies were located in Penang (47.3%), followed by Selangor (15.2%) and Johor (10.7%).

4.2. Data analysis

To analyse the research model developed for this study, the Partial Least Squares (PLS) analysis was utilized using SmartPLS 3.2.7 software (Ringle et al., 2015). The overall sample size of 112 was too small to use CB-Sem. Therefore, partial least squares structural equation modeling (PLS-SEM) was used that allowed for a small-sized sample in the structural model analysis. One advantage of PLS-SEM is the ability to analyse a small sample size (Hair et al., 2012). First, the measurement model was tested followed

by an examination of the structural model following the guidelines in the literature (see Anderson and Gerbing, 1988; Hair et al., 2017).

4.2.1. Measurement model

The model developed included a second order factor for green HRM. Thus, the first order factors were tested followed by the second order factor validity and reliability. As Hair et al. (2017) suggested, factor loadings, average variance extracted (AVE) and composite reliability (CR) were used to test the convergent validity followed by the discriminant validity.

As shown in Table 2, all the first order factors showed loadings of more than 0.7, AVE > 0.5 and CR > 0.7, thus allowing the conclusion that the measures were both valid and reliable. The second order factors also passed the three criteria's, thus both the first order and second order factors were valid and reliable.

Discriminant validity was tested following Fornell and Larcker (1981) who suggested that discriminant validity is achieved if the square root of the AVE is greater than all the correlations in the same row and column of the particular construct. As shown in Table 3, discriminant validity of the constructs was achieved. Table 3, which shows the HTMT criterion (Henseler et al., 2015), also passed the 0.85 (Kline, 2011) threshold indicating that discriminant validity was established.

4.2.2. Structural model

To assess the structural model Hair et al. (2017) suggested looking at the R^2 , beta and the corresponding t-values via a bootstrapping procedure with a resample of 5000 (see Mahmud et al., 2017). There was no problem of multicollinearity as all the VIF values were less than 5 (Hair et al., 2017). Then, the study examined the effects of the independent variable on the dependent and the mediator on the dependent variable (see Table 4); the R^2 was 0.343, indicating that all the modelled constructs explained 34.3% of the variance in green HRM. Falk and Miller (1992) recommended that R^2 values should be equal to or greater than 0.10 for the variance explained of a particular endogenous construct to be deemed adequate. Hair et al. (2014) addressed the difficulty of providing rules of thumb for acceptable R^2 as it is reliant upon on the model complexity and the research discipline.

While R^2 values of 0.20 are deemed as high in disciplines such as consumer behavior, R^2 values of 0.75 would be deemed as high in success driver studies (e.g., in studies that aim at explaining customer satisfaction or loyalty). In this area of study with three predictors, R^2 values of 34.3% was acceptable. The study also calculated power using danielsoper.com and with the number of predictors set at 3, a sample size of 112 and R^2 of 0.343, which achieved a power of 0.99, which is very high.

Result shows that green human capital ($\beta = 0.263, p < 0.05$) and green relational capital ($\beta = 0.274, p < 0.05$) were positively related to green HRM while green structural capital ($\beta = 0.095, p > 0.05$) was not significant. Thus, H1 and H3 were supported while H2 was not supported. Green relational capital had a stronger effect on green HRM as compared to green human capital.

Finally, the blindfolding procedure with a distance of 7 was run to assess the predictive relevance of the model. The model possesses predictive relevance for specific endogenous constructs if the Q^2 value amounts to greater than 0 (Fornell and Cha, 1994; Hair et al., 2017). The Q^2 was 0.202, which was greater than 0, indicating that predictive relevance was acceptable.

5. Discussion

The originality of this research is examining the relationship between green IC and green HRM. Based on the knowledge of the authors, this is the first work testing this theoretical framework in

Table 1
Constructs/Items used in the research's questionnaire.

Construct	Definition	Item	Adapted from
Green HRM	The systematic, planned alignment of typical human resource management practices with the organization's environmental goals	GAJ1: Enable involvement in managing environmental activities GAJ2: Enable acquiring knowledge about environmental management GAJ3: Demand knowledge about environmental management GR1: The environmental performance of my company attracts new employees. GR2: The company prefers to hire employees who have environmental knowledge. GS1: Employee selection takes environmental motivation into account. GS2: All selection steps consider environmental questions. GT1: Environmental training is continuous. GT2: Environmental training is a priority. GT3: Environmental training is an important investment. GP1: Every employee has specific environmental goals to achieve. GP2: Contributions to environmental management are assessed. GP3: Individual performance assessment results are recorded. GRW1: Cash rewards are provided to recognize environmental performance. GRW2: Environmental performance is recognized publicly.	Jabbour (2011); Yong & Yusliza (2016)
Green Human Capital	The summation of employees' knowledge, skills, capabilities, experience, attitude, wisdom, creativities, and commitments, etc. about environmental protection or green innovation, and was embedded in employees not in organizations	GHC1: The contribution of environmental protection of employees in our firm is better than our major competitors. GHC2: Employee competence with respect to environmental protection in our firm is better than that of our major competitors. GHC3: The product and/or service qualities of environmental protection provided by the employees of this firm are better than our major competitors. GHC4: The amount of cooperative teamwork with respect to environmental protection in our firm is more than that our major competitors. GHC5: Our managers fully support our employees in achieving their goals with respect to environmental protection.	Chen (2008)
Green Structural Capital	The stocks of organizational capabilities, organizational commitments, knowledge management systems, reward systems, information technology systems, databases, managerial mechanisms, operation processes, managerial philosophies, organizational culture, company images, patents, copy rights, and trademarks, etc. about environmental protection or green innovation within a company	GSC1: The management system for environmental protection in our firm is superior to that of our major competitors. GSC2: Our firm is more innovative with respect to environmental protection than are our major competitors. GSC3: The profit earned from environmental protection activities of our firm is greater than that of our major competitors. GSC4: The ratio of investments in R&D expenditures to sales for environmental protection in our firm is more than that of our major competitors. GSC5: The ratio of employees to the total employees in our firm who are engaged in environmental management is more than that of our major competitors. GSC6: Investments in environmental protection facilities in our firm are more than those of our major competitors. GSC7: Competence in developing green products in our firm is better than that of our major competitors. GSC8: The overall operational processes for environmental protection in our firm work smoothly. GSC9: The knowledge management system for environmental management in our firm is favourable for the accumulation of the knowledge of environmental management.	Chen (2008)
Green Relational Capital	The stocks of a company's interactive relationships with customers, suppliers, network members, and partners about corporate environmental management and green innovation, which enables it to create fortunes and obtain competitive advantages	GRC1: Our firm designs products and/or services in compliance with the environmentalism desires of our customers. GRC2: Customer satisfaction with respect to environmental protection of our firm is better than that of our major competitors. GRC3: The cooperative relationships concerning environmental protection of our firm with our upstream suppliers are stable. GRC4: The cooperation relationships about environmental protection of our firm with our downstream clients or channels are stable. GRC5: Our firm has well cooperative relationships concerning environmental protection with our strategic partners.	Chen (2008)

light of empirical evidence from Malaysia, contributing to a better understanding of sustainability in manufacturing companies.

5.1. Theoretical contributions

In Malaysia, the manufacturing industry is one of the main contributors to the country's economy, but it is also the highest

contributor to the environmental issues. Hence, aggressively pursuing the adoption of environmentally friendly activities, such as green HRM practices, is becoming crucial to mitigate environmental problems. The benefits of adopting green HRM such as cost reduction, talent attraction and retention have been examined in the literature (Sawang and Kivits, 2014). Kong and Thomson (2009) asserted that intellectual capital is a driving force in forming and

implementing HRM practices in an organization; however, the relationship between green IC and green HRM remains to be studied. In view of this gap, this current study investigated the influence of three dimensions of green IC (green human capital, green structural capital, and green relational capital) on green HRM. Using data collected from a sample of 112 large manufacturing firms operating in Malaysia, the proposed relationships were tested.

In terms of green human capital, the results showed a significant and positive relationship with green HRM Practices. This result is in line with the arguments provided by [Huang and Kung \(2011\)](#), in which they stated green human capital possesses environmental competence and commitment to related activities. On the other hand, [Chen and Chang \(2013\)](#) also found the positive influence of green human capital on green innovation performance. In this case, environmental knowledge and experience gained from employment in a previous company might be embedded in the employees, which enables them to facilitate environmental knowledge development, application and dissemination in the company for which they presently work. Imbued with the appropriate knowledge and skills, green human capital they can share their thoughts and provide suggestions on the environmental practices; thus, they are more likely to influence the green HRM practices.

Contrary to expectations, this study did not find green structural capital to have a relationship with green HRM practices. This finding is partially supported by [Delgado-Verde et al. \(2014\)](#), in which they discovered that green organizational capital was not directly associated with environmental product innovation, but through the use of green social capital. A possible explanation for this relationship is because environmental perspectives had been incorporated into their existing management systems due to compliance with ISO 14000 standards. ISO 14000 is a global series of environmental management systems (EMS) standards ensuring that the companies manage their environmental responsibilities properly. Hence, the influence of green structural capital on green HRM practices was not observable. In addition, most large manufacturing firms in this research had been in operation for more than 20 years. Long-established companies often have solid management systems that are not easy to change. Thus, although green structural capital seems to be employed in these companies, this practice is insufficient to influence all the green HRM practices.

The result of this study supports the expectation that green relational capital positively contributes to green HRM practices. Green relational IC is about the relationship of an organizations' stakeholders to environmental management and to the market in which it operates to retain the corporate environmental image and reputation and social relationships ([López-Gamero et al., 2011](#)). [Chen's \(2008\)](#) argued that the strong collaboration with other parties can enhance the competitive advantage of a firm. Seemingly, the relationship between manufacturers and their network members is built based on cooperation and knowledge sharing. Therefore, manufacturers may be inclined to adopt green HRM practices if the green relational capital shares the idea of green HRM practices and the benefits associated with the adoption of such practices.

Furthermore, this research reveals important theoretical contributions in the academic and research arenas with respect to the intellectual capital-based view theory (ICV). This theory highlighted the concentration and dynamics of knowledge capital rooted in a firm and is claimed to have direct relationship with its organizational performance/competitive advantage ([Youndt and Snell, 2004](#)). ICV is meant to narrow down the focus on intangible resources while green HRM has been declared to be a form of competitive advantage. Based on this theory, green IC can be considered to be a great intangible resource for a firm to attain

competitive advantage.

In addition, studies exploring the issue of human resource management from the environmental point of view in the context of a developing country, such as Malaysia, are rather scant. This study enriches the literature on green HRM and extends the scope of HRM research by studying the link between green IC and green HRM. The finding implies that manufacturing firms in Malaysia with high levels of green human capital and green relational capital can foster their adoption of green HRM practices. However, the influence of green structural capital on green HRM requires further exploration.

This research has examined several green IC measures that attempt to bridge the gap as [Kong and Thomson \(2009\)](#) proposed in relationship to the effects of IC on HRM practices. In particular, the identification of these links among green intellectual capital and with green HRM specifies theoretical prioritization, and validation of green HRM practices in a manufacturing context, hence expanding the understanding of how manufacturing firms should enhance the use of green intellectual capital to support their green HRM initiatives.

5.2. Managerial implications

From a practical perspective, this study has several implications, especially for business professionals and policy makers. The conceptual model presented in this study is intended to give a guide for manufacturing firms about the influence of green intellectual capital on the implementation of Green HRM. Given the fact that Green HRM is gaining heightened attention in recent years, using this model of Green HRM in manufacturing industries in developing countries can improve an organization's cleaner production capabilities and the use of Green HRM as a strategy to sustain manufacturing competitiveness.

Furthermore, the results of this study revealed that green IC has a significant influence on green HRM practices – green human capital and green relational capital. This implies that prompt attention should be given to these two aspects of green IC. The results indicated the significance of green human capital towards green HRM practices. Human capital is rooted in employees and can disappear when employees leave ([Chang and Chen, 2012](#)). Because environmental knowledge and skills embedded in employees are important for companies to develop green management, it is prudent for companies to attract the best human capital and to develop and cultivate their existing employees so that they can contribute to the development of a green organization.

In contrast to green human capital, green structural capital is rooted in companies and will not be taken when employees leave ([Chang and Chen, 2012](#)). This study did not find evidence to support the significance of green structural capital towards green HRM practices. However, this finding does not mean that the importance of green structural capital should be ignored given the prevalence of this variable identified in other studies. Managers must try to invest and establish strong information systems to retain their IC. At the same time, managers must build an organizational culture about environmental protection. With a strong environmental culture embedded in a company, employees are committed to accomplishing environmental goals.

This study supports the significance of green relational capital towards green HRM practices. Hence, managers should build interactive “green relationships” with their upstream suppliers, downstream customers, and strategic partners, which enable a company to facilitate information-sharing on environmentalism and enhance the development of relevant knowledge. By having environmental knowledge and information, companies are more likely to adopt green HRM practices.

Table 2
Convergent validity.

First Order	Second Order	Item	Loadings	CR	AVE
Green Analysis and Description of Job Position		GAJ1	0.895	0.946	0.855
		GAJ2	0.960		
		GAJ3	0.918		
Green Human Capital		GHC1	0.719	0.908	0.666
		GHC2	0.863		
		GHC3	0.888		
		GHC4	0.889		
		GHC5	0.699		
Green Performance Assessment		GP1	0.961	0.965	0.901
		GP2	0.957		
		GP3	0.929		
Green Recruitment		GR1	0.927	0.931	0.871
		GR2	0.939		
Green Relational Capital		GRC1	0.826	0.949	0.787
		GRC2	0.877		
		GRC3	0.900		
		GRC4	0.906		
		GRC5	0.924		
Green Rewards		GRW1	0.943	0.948	0.901
		GRW2	0.956		
Green Selection		GS1	0.969	0.968	0.938
		GS2	0.968		
Green Structural Capital		GSC1	0.853	0.948	0.671
		GSC2	0.852		
		GSC3	0.809		
		GSC4	0.818		
		GSC5	0.810		
		GSC6	0.835		
		GSC7	0.812		
		GSC8	0.747		
		GSC9	0.829		
Green Training		GT1	0.946	0.963	0.897
		GT2	0.969		
		GT3	0.925		
	Green HRM	Green Analysis	0.764	0.934	0.703
		Green Performance	0.908		
		Green Recruitment	0.827		
		Green Rewards	0.827		
		Green Selection	0.890		
		Green Training	0.805		

Table 3
Discriminant validity.

Construct	1	2	3	4	5	6	7	8	9
Green Analysis and Description of Job Position									
Green Human Capital	0.347								
Green Performance Assessment	0.602	0.522							
Green Recruitment	0.724	0.588	0.759						
Green Relational Capital	0.355	0.779	0.533	0.548					
Green Rewards	0.524	0.461	0.823	0.669	0.473				
Green Selection	0.633	0.555	0.837	0.822	0.506	0.777			
Green Structural Capital	0.384	0.813	0.543	0.548	0.913	0.447	0.519		
Green Training	0.611	0.537	0.687	0.603	0.518	0.649	0.650	0.489	

Table 4
Hypothesis testing.

Hypothesis	Relationship	Std Beta	Std Error	t-value	p-value	LL	UL	f ²	VIF
H1	GHC → GHRM	0.263	0.122	2.155	0.016	0.067	0.482	0.033	3.244
H2	GSC → GHRM	0.095	0.121	0.789	0.215	0.001	0.236	0.002	4.877
H3	GRC → GHRM	0.274	0.138	1.986	0.024	0.061	0.517	0.031	3.757

The findings highlighted that green IC is important for large manufacturers in adopting green HRM practices. Thus, policy makers should devise environmental protection training programs for organizational members to enhance the efficiencies and

competencies of green human capital in establishing green HRM. Government can build environmental protection facilities in industrial areas that aim to reduce the production of waste in operation processes. Additionally, the government should organize

environmental-related conferences or workshops, should encourage firms to cooperate with partners to use the resources more efficiently and help develop cleaner industries.

5.3. Limitations of the study

As in any research, this study is not without its limitations. First, a potential limitation of this study is in terms of the generalizability of the findings. This research was conducted in a specific national context (Malaysian large manufacturing firms); hence, the findings may not be applicable to other industries or other cultural contexts. Therefore, the results should be interpreted with caution when generalizing them. Because of this, future research is suggested to test the model among large firms in other countries with the aim of validating it.

A second limitation stems from the fact that this study was based on a self-reported survey by the representatives of large manufacturing firms. Because the questionnaire was structured in such a way that only one person from each company was chosen to represent their company, the issue of common method variance was unavoidable. Common method variance is a problem in research whereby the variability of response overlaps due to data being collected from single sources. However, the issue of common method variance was rectified by employing a test to assess for its occurrence. This approach is applied widely by social sciences researchers.

Lastly, the present study found partial relationships between green IC and green HRM practices; however, the study only considered the current state of the large manufacturing firms, and this focus does not allow this research to examine either the short or long-term effects of green IC on green HRM. Future research would benefit from a longitudinal approach that traces the development of green HRM practices and investigates how the relationship between variables changes over time.

5.4. Suggestions for future research

Although this study has certain limitations, the study offers prospects and directions for future research. First, the conceptual model did not consider the six dimensions of green HRM. We suggest examining each dimension of green IC with the six dimensions of green HRM. In addition, we suggest testing the model in different institutional and governance settings (e.g., developed and developing countries) or conducting a comparative study across different countries and cultural contexts would be interesting. Such diversity would provide a broader view to researchers, enrich HRM literature, and determine the significance of the measurements. Finally, the proposed model can be extended to incorporate sustainability, performance, as well as competitive advantage in future research.

5.5. Conclusion

Increased concern about environmental issues in recent years has made the “go green” concept a focal point of companies. In a highly competitive era, business success is no longer achieved simply by having a healthy financial status or creating innovative products but rather success is achieved through human resources. Hence, going green in HRM is essential to increase its efficiency and the competitiveness of a company.

Despite the importance of green HRM, research in this topic is relatively limited (Renwick et al., 2013) and the adoption of green HRM practices scarcely exists in many companies (Wagner, 2011). To generate better insight, this study set out with the main objective of understanding the relationship between green IC and the

adoption of green HRM practices in the context of Malaysian large manufacturing firms.

In conclusion, the enormous attention given to environmental issues has encouraged companies to adopt green practices in their business, and green HRM is a necessary change, particularly in manufacturing industry, to build a green organizational identity. It is important for manufacturers to understand the driving force of the adoption of green HRM, to be aware of the benefits associated with green HRM, and to recognize the role of green HRM in supporting and perhaps even achieving business sustainability.

This study serves as a first step in developing a rich and meaningful model of green HRM that is so necessary for any deeper understanding in the near future. Although limitations exist, the hope is that researchers can use the findings of this study as a future reference for the green HRM context.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jclepro.2018.12.306>.

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Pathways towards sustainability in manufacturing organizations: Empirical evidence on the role of green human resource management

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Abstract

Green human resource management (HRM) practices can help organizations align their business strategies with the environment. Anchored in the resource-based view of the firm, this study examines the influence of green HRM practices on sustainability using cross-sectional data obtained from 112 large manufacturing firms in Malaysia. The results show that green recruitment and green training have positive effects on sustainability. However, green analysis and job description, green selection, green performance assessment, and green reward were not found to have any significant influence on sustainability. The model presented in this paper offers useful insights into the positive role of green HRM in the sustainability of manufacturing firms, and as previous studies exploring the link between green HRM and sustainability using empirical data from Malaysian manufacturing firms are scarce, this research is of significant importance for scholars and practitioners. The scope of this study focuses on emerging economies with a limited number of variables that are contextual and specific to the Malaysian economy. Future research could explore the relationship between green HRM and other variables that may contribute to the present framework in other contexts. Future studies may also consider each dimension of green HRM, or indeed other elements of green HRM, in relation to the different aspects of sustainability.

KEYWORDS

green human resource management, Malaysia, manufacturing firms, sustainability, sustainable human resource

1 | INTRODUCTION

There are several motivators that may encourage companies to adopt sustainable practices (Raut, Narkhede, & Gardas, 2017). In particular, a company may work to mitigate its environmental and social impacts (Menezes, Filho, & Drigo, 2017), in line with the international treaties and regulatory frameworks that various countries (Kanstrup, Swift, Stroud, & Lewis, 2018; Quesada, Klenke, & Mejía-

Ortiz, 2018), groups, continents, the United Nations, and other entities encourage and propagate globally (Gençay, Birben, & Durkaya, 2018).

According to the resource-based view (RBV; Wright, Dunford, & Snell, 2001), human resources are considered unique resources of a firm; they cannot be easily copied by competitors, and they are capable of generating unique competitive advantage for firms. In this context, it is believed that the alignment of human resources and

environmental issues in firms can have synergistic effects. In order to stand out among their competitors, firms often invest in practices (Dey, Malesios, De, Chowdhury, & Abdelaziz, 2019), including unique differentiation practices (Schedlitzki, 2019), and the internalization of values and attributes relevant to managers (Geiger, Grossman, & Schrader, 2019). This manifests as a set of actions ranging from the hiring of employees with environmental awareness to investing in selective processes that evaluate a candidate's commitment and coherence with respect to people and the environment (Saeed et al., 2018), offering training that clarifies the company's environmental and social commitments and desired postures, and performance evaluations and rewards that give value to the company's sustainable goals (Gholami, Rezaei, Saman, Sharif, & Zakuan, 2016; Yong, Yusliza, Ramayah, & Fawehinmi, 2019).

Presently, companies whose business models are aligned with the premises of sustainability (Sehnm, Campos, Julcovski, & Cazella, 2019) act as determinants of circularity in terms of resources. Thus, their organizational structures require a workforce focused on sustainability issues (Singh, 2018). New product launches and their associated processes or the management of a sustainable production chain require employees with appropriate beliefs, attitudes, behaviors, and decision-making skills. Furthermore, this workforce must exhibit a "green culture" outlook (Masri & Jaaron, 2017) and have the capacity to offer products and services to society that place value and importance on permanence of the planet. In short, green human resource management (HRM) is in vogue (Zaid, Jaaron, & Bon, 2018).

Literature on green HRM and sustainability is limited and shows mixed results. For instance, Masri and Jaaron (2017) explore the link between green HRM and manufacturing firms' sustainability in the context of developing nations, establishing six green management practices that have positive links with sustainability. On the other hand, Yong et al.'s (2019) study in the Malaysian context proves that green structural capital is not linked to green HRM. Others acknowledge the importance of future studies in examining this relationship for organizational sustainability and society as a whole.

Green HRM practices constitute a necessary change in the manufacturing industry (Yong et al., 2019). Time is of the essence in terms of green HRM initiatives that foster environmental management practices, reducing environmental degradation and encouraging protection and renewal (Jackson, Renwick, Jabbour, & Muller-Camen, 2011). Green HRM is still in the early stages of development, with some companies following green practices (Jain & D'lima, 2018) and others using green HRM as a human resources strategy that supports pro-environmental corporate management (Bombiak & Marciniuk-Kluska, 2018). Further, Jackson and Seo (2010) state that firms that are proactive in terms of "greening" may be more productive, resulting in competitive advantage. Conversely, firms without a comprehensive program of green HRM have potential limitations, resulting in ineffective environmental management (Renwick, Jabbour, Muller-Camen, Redman, & Wilkinson, 2015). Environmental human resource (HR) practices help enhance processes by improving efficiency, eliminating environmental waste, and fostering green behavior, resulting in greater efficiency and cost reduction. It is still

unclear as to whether a company's desire to become sustainable is supported and/or influenced by green HRM practices, such as green analysis and job description, green recruitment, green selection, green training, green performance assessment, and green rewards.

However, there is little evidence in the academic literature that confirms this relationship, especially in this nascent, emerging field of research (Haddock-Millar, Sanyal, & Müller-Camen, 2016; Pinzone, Guerci, Lettieri, & Redman, 2016; Saeed et al., 2018). Further, recent calls by researchers for more empirical studies into different organizational contexts, comparing emerging countries and developed countries, consolidates the importance of green HRM practices in the development of sustainable strategy and environment. However, although the literature demonstrates a link between green HRM and the Asian service industry (Kim, Kim, Choi, & Phetvaroon, 2019; Pham, Tučková, & Jabbour, 2019), there is more to explore in terms of green HRM in large manufacturing companies in Asia. This study will examine the relationship between green HRM and sustainability through the lens of RBV in large manufacturing firms from Malaysia.

Malaysia's manufacturing industry is well suited to a study of sustainability because Malaysia has an average 6.7% annual growth rate of CO₂ emissions (Sadorsky, 2014), and the manufacturing industry is the highest contributor to environmental degradation; many manufacturing companies create waste and pollution, threatening the existence of life on earth (Zailani, Jeyaraman, Vengadasan, & Premkumar, 2012).

This paper will address the following important research question: What is the relationship between green HRM practices (encompassing green analysis and job description, green recruitment, green selection, green training, green performance assessment, and green rewards) and sustainability? Thus, this paper's contribution is twofold: First, it will explore the relationship between green HRM and sustainability in an Asian context, the results of which will contribute to the ongoing development of theories within the field of sustainability and business strategy. Second, the results may provide actionable insights for practitioners, who can use these results to their strategic advantage.

The remainder of this paper is organized as follows: Section 2 will discuss the theoretical background and the literature on green HRM and sustainability and outline the hypotheses. The details of the research methodology will be explained in Section 3, followed by a presentation of the results and analysis in Section 4. Section 5 will elaborate on the theoretical and practical implications, conclusions, limitations, and possibilities for future research.

2 | LITERATURE REVIEW

2.1 | Theoretical background

According to the RBV theory, a firm's resources are the tangible and intangible assets that are tied, semipermanently, to the firm. Examples include brand names, in-house knowledge, skilled manpower, efficient procedures, and machinery and trade contracts. These resources are

valuable, rare, and cannot be easily imitated by others. Possessing such resources provides strategic competitive advantage over competitors in the market place (Wernerfelt, 1984). Over time, scholars have highlighted the growing importance of internal resources as sources of competitive advantage and, of people in particular, as internal resources that are strategically important to a firm's success and sustainability (Wright et al., 2001). Further, in the literature on strategic management, the applications and implications of RBV have led to an increased convergence of strategic HRM and strategic management in general (Wright et al., 2001). Huselid (1995) argues that general HR practices, and particularly those aligned with a company's competitive strategy, can help create competitive advantage. In a similar vein, Koch and McGrath (1996) investigate the relationship between HR planning, recruitment, staffing practices, and labor productivity. They argue that "a highly productive workforce is likely to have attributes that make it a particularly valuable asset to the organization" (Koch & McGrath, 1996).

Scholars' increased emphasis on sustainable strategy has reinforced the importance of HR practices and sustainability. Jabbour and Santos (2008) identify the link between HR practices and organizational sustainability through the RBV lens. Similarly, Jackson and Seo (2010) assert that those companies that pay attention to greening their human resources may be more productive, resulting in competitive advantage. The central role of HRM is in the search for sustainable organizations. Institutional and societal pressures, evolutionary processes, regeneration, organizational competitiveness (Bombiak & Marciniuk-Kluska, 2018), and the desire to optimize natural resources whenever possible (Sehnm, Vazquez-Brust, Pereira, & Campos, 2019) focus managers on human attributes that contribute to firms' sustainability (Macke & Genari, 2019). HR departments are set up with strict guidelines in terms of natural resources (Renwick et al., 2015). The benefits resulting from the implementation of green HRM practices include an increase in staff ecological awareness, which in turn furthers the organization's sustainability practices (Bombiak & Marciniuk-Kluska, 2018).

People can be seen as organizational resources that can leverage management strategies and plans for sustainability (Yong et al., 2019). Business models that extend the product value chain (Sehnm, 2019; Sehnm, Campos, et al., 2019), environmentally focused principles, and ecologically sound premises (Sehnm, Vazquez-Brust, et al., 2019) are all important factors in the search for sustainability. Furthermore, the use of big data systems and balancing the constant desire to generate profits with environmental awareness, as well as valuing human potential and respecting the social needs of specific ethnic groups, communities, and regions (Singh, 2018), are all integral factors in environmental sustainability.

In order to pinpoint the relationship between green HRM practices and organizational sustainability, this research paper employs an RBV perspective, which will determine how HRM greening efforts help to achieve sustainability and strategic advantage. This research will employ an approach similar to that of Gholami et al. (2016), Gloet (2006), Jabbour and Santos (2008), Jabbour (2011), Jabbour and Jabbour (2016), Jackson et al. (2011), Renwick et al. (2015), Singh

(2018), Yong et al. (2019), and Zibarras and Coan (2015), *inter alia*, in order to build an empirical model using data from large Malaysian manufacturing firms.

2.2 | Green HRM

Green HRM refers to "the systematic, planned alignment of typical human resource management practices with the organization's environmental goals" (Jabbour, 2013, pp. 147–148). The area of green HRM is of significance within organizations as it contributes to other departments such as green management, green operations, green marketing, and green supply chain management. Green HRM is considered to have a holistic view, which aligns employees with the company's environmental strategy. Activities with a green focus are difficult to initiate as they require systemic change, and any change has to be initiated, implemented, and accepted by employees, as this is one of green HRM's primary aims (Mishra, Sarkar, & Kiranmai, 2014). Previous researchers argue that the manner in which HRM is greened is often studied in terms of a continuum comprising all HRM practices—analysis and job descriptions, recruitment and selection, training and development, performance and appraisal, and rewards (Renwick, Redman, & Maguire, 2013).

2.2.1 | Green analysis and job description

Job analysis has grown in importance due to changes in the workforce and in jobs themselves. A clear delineation of the roles and responsibilities of a certain position, through job analysis, ensures that every level of the organizational structure understands its contribution and adds value to the product/service development. Job analysis also ensures that incumbents deliver on their values with minimum overlap and wastage of resources. Many companies have indicated that job analysis improves administrative efficiency, enhances the organization's work environment, reduces costs, and improves productivity (Roscoe, Subramanian, Jabbour, & Chong, 2019; Siddique, 2004). Hence, job analysis and job descriptions are essential elements in recruiting the correct candidates.

From the green perspective, green analysis and job description, which include "environmental issues in all the job descriptions transforms the commitment to the environment into an employees' obligation beside the usual activities of their jobs" (Jabbour, Santos, & Nagano, 2010, p. 1057). In an organization that is working towards the sustained improvement of environmental performance, green analysis and job descriptions should focus on positions that demand environmental knowledge, particularly employees who are directly involved in the improvement of environmental performance; encouraging employees to broaden their environmental knowledge; and empowering employees to engage in environmental management issues (Jabbour, 2011). Furthermore, a job description can be used to specify environmental aspects of the position, such as environmental reporting or health and safety duties (Mishra, Sarkar, & Singh, 2012).

2.2.2 | Green recruitment

Attracting high-quality employees is a key challenge for HR in the “talent war.” Job seekers prefer organizations that reflect their personal values. Due to increasing environmental awareness, the environmental reputation and image of a recruiting organization play an increasingly prominent role in recruitment drives (Renwick et al., 2013). Firms are beginning to recognize that gaining a reputation as a green employer is an effective way to attract potential talent (Phillips, 2007).

The environmental performance of a company can be used in the recruitment process to attract talent (Jabbour, 2011). In the race to attract the most talented and innovative employees, companies such as General Electric present a picture of themselves as having rich environmental awareness in order to boost their recruiting leverage (Huff, 2007). Web-based recruitment allows recruiters to provide more information on their environmental management activities compared with more traditional media such as newspaper advertising or brochures (Renwick et al., 2013).

Interestingly, Tang, Chen, Jiang, Paillé, and Jia (2017) categorize green recruitment and selection into three aspects: (a) candidates' green awareness, (b) green employer branding, and (c) green criteria used to attract candidates. They stress that candidates' green awareness (i.e., green consciousness, conscientiousness, and how candidates' green values align with the organization's values) can help firms to achieve their environmental goals; green employer branding is used to attract potential employees, and evaluation and selection of employees are based on green criteria.

2.2.3 | Green selection

Recruitment and selection are often used interchangeably, but Bratton and Gold (2012) provide clarification: Recruitment is the process of generating a pool of capable people to apply for employment, whereas selection is the process by which managers use specific instruments to choose a candidate from a pool of applicants, in line with management goals and legal requirements. Selecting the correct candidate is essential for business success. Mathis and Jackson (2011) argue that an organization is less likely to succeed without qualified employees.

In terms of the green perspective, green selection is the “selection of people committed and sensitive to the environmental issue, with a potential contribution to the environmental management of a company” (Jabbour et al., 2010, p. 1057). Thus, an organization that is focused on environmental management should select people who are committed and sensitive to environmental issues. Nevertheless, there is limited literature on the selection of environmentally committed employees or personnel with the requisite technical knowledge of environmental management (Jabbour, 2011).

2.2.4 | Green training

Training activities are often among the first areas to be targeted by HRM when organizational change is necessary (Jackson et al., 2011). The training of the workforce has long been recognized as an

important ingredient in promoting and implementing environmental management practices in an organization (Madsen & Ulhoi, 2001). Green training, also known as environmental training, “provides employees with the needed knowledge about the environmental policy of a company, its practices, and necessary attitudes” (Jabbour et al., 2010, p. 1057).

Green training tends to be the most effective HR practice for supporting environmental management (del Brío, Junquera, & Ordiz, 2008) and is a key factor in both the development of environmental awareness in employees and the initial process of implementing environmental strategies (Unnikrishnan & Hegde, 2007). Green training may increase employees' environmental performance and might include environmental legal issues, instructions for the use of new devices, and corporate codes of conduct. (Muster & Schrader, 2011).

Sammalisto and Brorson (2008) argue that green training serves two purposes: (a) teaching employees the company's environmental policy and daily procedures and (b) changing employees' attitudes and increasing their environmental awareness. Green training is now widespread in some countries. For instance, in the United Kingdom, a CIPD/KPMG survey reported that 42% of organizations educate and train employees in environmentally friendly business practices (Phillips, 2007).

2.2.5 | Green performance assessment

Performance assessments are generally used for administering salaries, identifying an employee's strengths and weaknesses, and providing performance feedback, in order to increase operational competence and improve corporate growth while also heightening transformational processes and performance. Without a formal performance assessment process, discipline is weakened in an organization, and employees' ability to improve may be hampered. However, assessment programs must be developed carefully in order to fully capitalize on employees' talents and efforts (Mathis & Jackson, 2011).

From a green perspective, green performance assessment refers to “the appraisal and registration of employees' environmental performance throughout their careers in a company and provides them with feedback about their performance to prevent undesirable attitudes or reinforce exemplary behaviour” (Jabbour et al., 2010, p. 1057). Some companies have set environmental goals for their employees and evaluate their contributions to environmental management as one criterion in the performance assessment program. This is more often the case in companies with an ISO 14001 certification (Jabbour, 2011).

Effective performance assessment provides useful feedback for employees and can support continuous improvement in a firm's environmental achievements (Jackson et al., 2011). Jabbour et al. (2010) show that performance assessment impacts on environmental management when companies have annual goals for pollution prevention and the development of environmental innovations.

2.2.6 | Green rewards

Rewards work to attract, retain, and motivate the best employees while also cultivating the development of new knowledge, actions, and abilities in order to achieve organizational goals (Jerez-Gómez, Céspedes-Lorente, & Valle-Cabrera, 2007). Rewards are powerful tools that can link organizational interests with employees' interests; they can direct employees' attention to the most important aspects of their work and motivate them to exert maximum effort (Jackson et al., 2011).

Green rewards are defined as “the implementation of a system of financial and nonfinancial rewards for employees with a distinct potential to contribute to environmental management” (Jabbour et al., 2010, p. 1058). Several organizations have developed reward systems to incentivize environmental performance. Jackson et al. (2011) argue that monetary and nonmonetary rewards are powerful tools in supporting environmental management activities. A CIPD/KPMG survey estimated that 8% of firms in the United Kingdom were rewarding green behaviors with financial incentives or recognition (Phillips, 2007).

2.3 | Sustainability

Sustainability has become a primary focus for many organizations due to climate change and regulatory and social pressures towards greater environmental and social responsibility. Sustainability has garnered increasing attention from corporate executives and gained a prominent place in the strategic goals of many organizations (Chouinard, Ellison, & Ridgeway, 2011).

The triple bottom line principle has been introduced to describe the three pillars of sustainability, that is, economic, environmental, and social (Elkington, 1997). Economic sustainability is vital to corporate financial success; an organization must be able to produce goods and services on a continual basis while also making a profit in order to survive. Environmental sustainability considers the impact of business on the environment. The conservation of natural resources is essential for sustainable economic production and intergenerational equity. Social sustainability embodies the humanitarian context of business, which emphasizes fairness in distribution and opportunity and relates to issues of health and education, income inequality, and poverty (Aggerholm, Andersen, & Thomsen, 2011; Harris, 2003).

Sustainability means that business success is determined not solely in financial terms, such as profits and return on investment, but also accounts for environmental and social dimensions (Gardberg & Fombrun, 2006). Sustainability means addressing the needs of today without compromising future needs, emphasizing intergenerational equity. This translates directly to preserving the availability of resources for future generations (Brundtland & Khalid, 1987). Organizational practices, especially those that are people-oriented with a green focus, are critical for overall sustainability. Jabbour and Santos (2008) show that organizations now require a standard of development that favors the economic, environmental, and social

dimensions equally. Sustainability can be used as a reference point in developing solutions to face environmental and societal challenges (Kuckertz & Wagner, 2010).

As sustainability moves up the business agenda, HRM has been identified as a key player in developing the competencies, collaborative strategies, and organizational capabilities that are required to support an organization's journeys to sustainability (Wirttenberg, Harmon, Russell, & Fairfield, 2007). HRM has the highest potential for incorporating sustainability into the organizational scope of seeking prosperity, environmental integrity, and social equity (de Souza Freitas, Jabbour, Mangili, Filho, & de Oliveira, 2012).

HRM practices, such as hiring the right people, supported by performance evaluation and reward systems, can direct employee mindset and actions towards achieving sustainability goals for the organization (Siti Nabiha, 2015). Sustainability principles can be embodied in HRM systems that generate and sustain the long-term economic, physical, and social well-being of an organization's workforce (Taylor, Osland, & Egri, 2012). Employees are the people who execute eco-policies and create green corporate culture; thus, successful greening is challenging if personnel are not correctly trained.

Jabbour and Santos (2008) suggest that HRM plays a crucial role in the development of sustainable organizations through HR practices that promote environmental performance, innovation, and effective diversity management. On the other hand, Yusliza, Ramayah, and Othman (2015) claim that green HRM actually supports the paradigmatic understanding of the concept of the “triple bottom line,” which means that green HRM involves HR practices aligned with the three sustainability pillars of economic, environment, and social balance. Despite widespread attention, the role of HRM systems in achieving sustainability goals has not been widely studied (Aguinis & Glavas, 2012).

2.4 | Development of hypotheses

Organizations are increasingly concerned with sustainability, and the HR function is positioned to assist in developing and implementing sustainability strategies (Cohen, Taylor, & Muller-Carmen, 2010). De Souza Freitas et al. (2012) carried out a case study in a leading Brazilian company, and the results show that organizations seeking to achieve sustainability need the assistance of HR in designing a communication system that bridges the gap between practices and sustainable values. Jackson and Seo (2010) also suggest that HRM is the solution for achieving environmental sustainability in an organization. Given this position, green HRM practices (green analysis and job description, green recruitment, green selection, green training, green performance assessment, and green rewards) are proposed as tools for attaining business sustainability.

To the best of our knowledge, the area of green analysis and job description has received little attention in terms of green HRM practices. Jabbour (2011) provides us with the empirical evidence that job description has a significant influence on employee involvement in environmental management activities, and the existing structure

of job positions enables the acquisition of environmental knowledge adopted in those companies. These findings indicate that the incorporation of environmental aspects in job analysis and description is rare, despite the fact that job description influences employees' participation in environmental activities.

Pfeffer (2010) highlights that the direct and indirect effects of HRM systems, from job design to stress due work hours, on employees' health and lives can be enormous. Hence, organizations are concerned about the social impacts of their HRM systems and consider these impacts as part of their sustainability strategy as well as pay and economic stability. However, whether green analysis and job description can lead to sustainability has yet to be explored empirically. Hence, this study hypothesizes the following:

H1. *Green analysis and job description is positively related to sustainability.*

With regards to green recruitment and green selection, previous researchers have either grouped these two practices together as one variable (i.e., green recruitment and selection) or refer to these practices as green hiring. Green reputation has become one of the most important criteria in attracting candidates. For instance, Guerci, Montanari, Scapolan, and Epifanio (2016) discovered that prospective job applicants in the Italian labor market still value green-related issues in their career choices, even though the Italian economy has been in a major recession for many years. Recruiting candidates with a green mindset can make it easier for companies to attract professionals who understand sustainable processes and provides the employer with an opportunity to stand out among competitors (Ahmad, 2015).

On the basis of the economic dimension of sustainability, Longoni, Luzzini, and Guerci (2016) and Zaid et al. (2018) show that green hiring is positively related to the economic performance of an organization. Green HRM influences the economic performance of a company by creating and structuring a motivated and committed workforce that generates economic value (Longoni et al., 2016). From the environmental perspective of sustainability, contradictory findings have been highlighted by previous researchers. For instance, green recruitment and selection (Masri & Jaaron, 2017; Yusoff, Nejati, Kee, & Amran, 2018) and green hiring (Longoni et al., 2016; Zaid et al., 2018) were found to be related positively to environmental performance; however, Guerci, Longoni, and Luzzini (2016) found no relationship between green hiring and environmental performance. Green HRM practices may cultivate employees' motivation and abilities in terms of environmental management and provide them with the opportunity to contribute to environmental development (Longoni et al., 2016). In addition, Zaid et al. (2018) indicate that green hiring within the green HRM bundle positively influences the social performance of the organization. Therefore, the following hypotheses are postulated:

H2. *Green recruitment is positively related to sustainability.*

H3. *Green selection is positively related to sustainability.*

According to Jabbour (2011), green training or environmental training is an important investment, and companies should provide continuous training. Ji, Huang, Liu, Zhu, and Cai (2012) and Liu, Li, Zhu, Cai, and Wang (2014) indicate that, in the Chinese context, green training is a major factor in motivating the workforce to pursue environmental sustainability goals. Companies with more intense levels of training are also those that have a more proactive environmental attitude and hence equally high sustainability performance.

Empirically, green training and development was found to relate positively to all three dimensions of sustainability: economic performance (Longoni et al., 2016; Zaid et al., 2018), environmental performance (Guerci, Longoni, & Luzzini, 2016; Longoni et al., 2016; Masri & Jaaron, 2017; Yusoff et al., 2018; Zaid et al., 2018), and social performance (Zaid et al., 2018). On the basis of these arguments and the aforementioned literature, the current study argues that organizations that practice green training are more likely to attain sustainability. Accordingly, the following hypothesis is posited:

H4. *Green training is positively related to sustainability.*

Green performance assessment focuses on environmental incidents, deployment of environmental responsibilities, and the communication of environmental concerns and policy. However, organizations face challenges in measuring environmental performance standards across different departments and gaining usable data on employees' environmental performance (Renwick et al., 2013). Despite the challenges, performance assessment is still being used as an indicator to determine rewards and variable remuneration for employees (Jabbour, 2011). The use of environmental rewards and recognition can be seen to have a significant impact on employee willingness to generate eco-initiatives (Renwick et al., 2013). Some companies in the United States have recognized employees who have contributed to the accomplishment of environmental goals by providing preferred parking, time off, gift certificates, and paid vacations (Govindarajulu & Daily, 2004).

Most researchers discuss green performance assessment and green rewards under one category and term it "green performance management and compensation". On the basis of the empirical research, green performance management and compensation were related positively to all three dimensions of sustainability: economic performance (Longoni et al., 2016; Zaid et al., 2018), environmental performance (Guerci, Longoni, & Luzzini, 2016; Longoni et al., 2016; Masri & Jaaron, 2017; Yusoff et al., 2018; Zaid et al., 2018), and social performance (Zaid et al., 2018). To gain empirical evidence of the hypothesized outcome, the following hypotheses were framed:

H5. *Green performance assessment is positively related to sustainability.*

H6. *Green rewards are positively related to sustainability.*

2.5 | Conceptual model

The aim of this study is to examine the impact of green HRM practices on sustainability. The proposed conceptual model is shown in Figure 1.

3 | METHODOLOGY

3.1 | Survey and data collection

The present study aims to determine the impact of green HRM on sustainability through a correlational design. The research scope is confined to the organizational level utilizing cross-sectional empirical examination. To test the conceptual model, a survey instrument and measurement scales were designed. A pretest was performed to check the content validity of the scale, which was then improved with the help of four academics and four experts from the industry. A revised version of the questionnaire was finalized and then used to test the proposed hypotheses. The measurement scales used in the questionnaire comprised items representing green HRM practices (i.e., green analysis and job descriptions, green recruitment, green selection, green training, green performance assessment, and green rewards) and sustainability.

The study population was made up of large manufacturing firms in Malaysia. In Malaysia, a large firm is an organization with more than 200 employees. Large manufacturing firms were selected because of their sensitivity to environmental issues (Guerci, Longoni, & Luzzini, 2016), because they have formalized HR practices (Tzafrir, 2005), and because they are subject to government rules (Amran, Ooi, Nejati, Zulkafli, & Lim, 2012).

In the present study, the sampling frame was all large manufacturing firms in Malaysia, which were obtained from the Federation of Malaysian Manufacturers (FMM) Directory 2015 (FMM, 2015). Using the FMM Directory 2015, a total of 661 large manufacturing firms were identified on the basis of the number of employees in the directory. Considering the small sampling frame of the study and the likelihood of a low response from a mail survey (Sekaran & Bougie, 2016), all large manufacturing firms were included in the study. Hence, the census method was employed in this study.

As the current study focuses on environmental issues and aspects of business (HRM and sustainability), our target respondents were

those employees who possessed knowledge of these two categories. Therefore, 661 structured close-ended questionnaires were distributed to the HR director or HR manager who was actively participating in HRM in large manufacturing firms in Malaysia.

The questionnaires, together with return envelopes, were mailed to 661 companies that were listed in the FMM and met the inclusionary criteria. Each return envelope was coded with a number for the purpose of monitoring which large manufacturing firms responded. The questionnaires, together with a cover letter, were distributed to HR directors or HR managers via postal mail to large manufacturing firms in Malaysia. The cover letter explained the nature and objectives of the study and highlighted the strict confidentiality of respondent information. Data were collected between September 2016 and January 2017.

3.2 | Measurements

Sustainability was measured using a 15-item scale adapted from Zhu, Sarkis, and Lai (2008), Laosirihongthong, Adebajo, and Tan (2013), and Paulraj (2011). A 7-point Likert-type scale ranging from 1 (*not at all*) to 7 (*to a very great extent*) was applied in answer to each item.

Six dimensions were used to measure *green HRM practices*, namely, green analysis and job description (three items), green recruitment (two items), green selection (two items), green training (three items), green performance assessment (three items), and green rewards (two items). These measurement items were adapted from Jabbour (2011) and Yong and Mohd-Yusoff (2016). A 7-point Likert-type scale ranging from 1 (*not at all*) to 7 (*to a very great extent*) was applied in answer to each item.

Previous studies confirm that data become significantly less accurate if measured by scale points numbering either less than five or more than seven (Johns, 2010). Although the 5-point Likert-scale is commonly used in research, the present study employed a 7-point Likert-type scale. This is because a short scale may be cognitively easier, but it may not differentiate respondents' opinions (Weisberg, Krosnick, & Bowen, 1996). On the other hand, Cox (1980) and Preston and Colman (2000) argue that human information processing capability can be maximized by using a 7-point response scale. Table 1 shows the references for all the selected items in the research questionnaire. As highlighted above, all the selected items were validated by the literature.

4 | RESULTS

The total population of this study comprised 661 large manufacturing firms listed in the FMM Directory 2015. However, after excluding the eight firms used for the interviews and four companies used for the pretesting of the questionnaire, the population of the study was 649. Hence, a total of 649 questionnaires were mailed to respondents. After a reminder via telephone call, 112 completed questionnaires were received, giving a response rate of 17.3%. This response rate can be considered acceptable, given that the minimum sample size

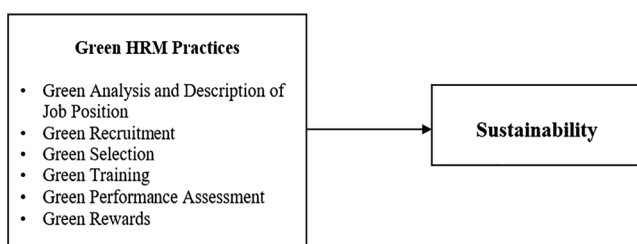


FIGURE 1 Conceptual model

TABLE 1 Constructs/items used in the research questionnaire

Construct	Definition	Item	Adapted from
Sustainability	Integration of economic, environmental, and social performance, which not only positively affects the natural environment and society, but also results in long-term economic benefits and competitive advantage for the firm.	ECP1: Decrease in costs for materials purchasing. ECP2: Decrease in costs for energy consumption. ECP3: Decrease in fees for waste treatment. ECP4: Decrease in fees for waste discharge. ECP5: Decrease in fines for environmental accidents. ENP1: Improved compliance with environmental standards. ENP2: Reduction in airborne emissions. ENP3: Reduction in energy consumption. ENP4: Reduction in material usage. ENP5: Reduction in consumption of hazardous materials. SCP1: Improved overall stakeholder welfare. SCP2: Improvement in community health and safety. SCP3: Reduction in environmental impacts and risks to the general public. SCP4: Improved occupational health and safety of employees. SCP5: Improved awareness and protection of the claims and rights of people in the community being served.	Zhu et al. (2008); Laosirihongthong et al. (2013); Paulraj (2011)
Green analysis and job description	Including environmental issues in all job descriptions translates commitment to the environment into employees' obligations, on top of their usual activities.	GAJ1: Enable involvement in managing environmental activities. GAJ2: Enable acquisition of knowledge on environmental management. GAJ3: Demanding knowledge on environmental management.	Jabbour (2011); Yong and Mohd-Yusoff (2016)
Green recruitment	The activities of either internal or external recruitment shows a company's preference for candidates committed to the environment.	GR1: The environmental performance of a company attracts new employees. GR2: The company prefers to hire employees who have environmental knowledge.	Jabbour (2011); Yong and Mohd-Yusoff (2016)
Green selection	Selection of people who are committed and sensitive to environmental issues, with potential to contribute to the environmental management of a company.	GS1: Employee selection takes environmental motivation into account. GS2: All selection steps consider environmental questions.	Jabbour (2011); Yong and Mohd-Yusoff (2016)
Green training	Provides employees with the required knowledge on the environmental policy of a company, its practices, and necessary attitudes.	GT1: Environmental training is continuous. GT2: Environmental training is a priority. GT3: Environmental training is an important investment.	Jabbour (2011); Yong and Mohd-Yusoff (2016)
Green performance assessment	Appraisal and register of employees' environmental performance throughout their career in a company and providing them with feedback about their performance in order to prevent undesirable attitudes or to reinforce exemplary behavior.	GP1: Every employee has specific environmental goals to achieve. GP2: Contributions to environmental management are assessed. GP3: Individual performance assessment results are recorded.	Jabbour (2011); Yong and Mohd-Yusoff (2016)
Green rewards	Implementation of a system of financial and nonfinancial rewards for employees with a distinct potential to contribute to environmental management.	GRW1: Cash rewards are provided to recognize environmental performance. GRW2: Environmental performance is recognized publicly.	Jabbour (2011); Yong and Mohd-Yusoff (2016)

was targeted at 98, the commonly reported low response rate from mail surveys (Sekaran & Bougie, 2016) and the generally low response rate for this type of correlational study in Malaysia.

As suggested by Hair, Hult, Ringle, and Sarstedt (2017), this study employed the G-Power software to calculate the sample size. On the

basis of the threshold of effect size = medium, alpha = .05, power = .8, and predictors = 6, the minimum sample size needed to achieve an acceptable power of .8 was 98. A total of 112 completed questionnaires that were usable for further analysis were collected, representing a response rate of 17.3%. This response rate can be

considered acceptable, and previous research has commonly reported low response rates in social science studies (Sekaran & Bougie, 2013). This level of usable response rate is comparable with similar survey-based studies, which range between 10% and 21% in manufacturing firms in Malaysia (Behyan, Mohamad, & Omar, 2015; Fernando & Hor, 2017; Fernando & Wah, 2017; Fernando, Jabbour, & Wah, 2019; Lazim & Ramayah, 2010; Sundram, Ibrahim, & Govindaraju, 2011). Data collection involving manufacturing firms in Malaysia presents various challenges. Low response rates are common for this type of correlational study in Malaysia.

Therefore, the 112 respondents in this study can be considered adequate considering the minimum power needed in social science management research is .80, and this sample size of 112 has a power higher than .8.

4.1 | Demographic profile of responding firms

Most of the firms were from the electrical and electronics industry (25.0%). The biggest category of manufacturing firms in this study had 201 to 500 employees (42.0%), and the number of employees in HR departments ranged from 5 to 10 employees (35.7%). Most of the large manufacturing firms studied had been established for more than 20 years (61.6%). The sample also indicates that the large manufacturing firms participating in the current research are mostly multinational corporations (52.7%). Notably, most large manufacturing firms complied with ISO 9000 certification (88.4%) and ISO 14000 certification (71.4%). Regarding geographical location, most firms were located in Penang (47.3%), followed by Selangor (15.2%) and Johor (10.7%).

4.2 | Data analysis

4.2.1 | Measurement model

In order to analyze the research model developed for this study, partial least squares (PLS) analysis using SmartPLS 3.2.8 software (Ringle, Wende, & Becker, 2015) was used. SmartPLS is a second-generation statistical software that can analyze smaller data sets which are nonnormal. Survey research data is generally nonnormal, and as such this technique is the most suitable for our analysis. We tested the measurement model, followed by an examination of the structural model, following the guidelines in the literature (see Anderson & Gerbing, 1988; Hair et al., 2017).

The model we developed included a second-order factor for sustainability. Thus, we first tested the first-order factors, followed by the second-order factor validity and reliability. As suggested by Hair et al. (2017) and Mahmud, Ramayah, and Kurnia (2017), we used factor loadings, average variance extracted (AVE), and composite reliability (CR) to test the convergent validity, followed by the discriminant validity.

As shown in Table 2, all the first-order factors showed loadings of more than .7, AVE > .5, and CR > .7, showing that the measures are both valid and reliable. The second-order factors also passed the three criteria, and so both the first- and second-order factors are valid and

TABLE 2 Measurement model

Construct	First-order item	Second-order item	Loading	CR	AVE
Green analysis and job description	GAJ1		.887	.946	.854
	GAJ2		.956		
	GAJ3		.927		
Green performance assessment	GP1		.961	.965	.901
	GP2		.958		
	GP3		.928		
Green recruitment	GR1		.925	.931	.87
	GR2		.941		
Green rewards	GRW1		.940	.948	.901
	GRW2		.958		
Green selection	GS1		.972	.968	.938
	GS2		.965		
Green training	GT1		.949	.963	.897
	GT2		.969		
	GT3		.921		
Economic performance	ECP1		.880	.943	.768
	ECP2		.877		
	ECP3		.921		
	ECP4		.929		
	ECP5		.764		
Environmental performance	ENP1		.765	.916	.685
	ENP2		.862		
	ENP3		.840		
	ENP4		.877		
	ENP5		.790		
Social performance	SCP1		.847	.947	.781
	SCP2		.931		
	SCP3		.910		
	SCP4		.837		
	SCP5		.890		
Sustainability	EP	Economic performance	.884	.931	.818
	ENV	Environmental performance	.939		
	SOC	Social performance	.891		

Abbreviations: AVE, average variance extracted; CR, composite reliability.

reliable. Discriminant validity was tested (see Table 3) using the HTMT criterion (Henseler, Ringle, & Sarstedt, 2015), which passed the .85 threshold (Kline, 2011), indicating that discriminant validity was established.

4.2.2 | Structural model

To test the hypotheses, we ran a bootstrapping procedure with a resampling rate of 5,000 (Hair et al., 2017) to obtain the t values, p values, and bootstrapped confidence intervals. The results are shown in Table 4.

We tested the six hypotheses, and, as shown in Table 4, only two were found to be significant. Specifically, green recruitment ($\beta = .244$, $t = 1.672$, $p < .01$) with f^2 of .025 and green training ($\beta = .264$, $t = 2.056$, $p < .01$) with f^2 of .045 were significant, whereas

TABLE 3 Discriminant validity (HTMT criterion)

Construct	1	2	3	4	5	6	7
1. Green analysis and job description							
2. Green recruitment	.724						
3. Green reward	.524	.669					
4. Green performance assessment	.602	.759	.883				
5. Green selection	.633	.822	.777	.837			
6. Green training	.611	.603	.649	.687	.650		
7. Sustainability	.256	.409	.358	.364	.368	.410	

green analysis and job description, green selection, green performance assessment, and green reward were not significant. Thus, only H2 and H4 were supported. The R^2 was .186, which indicates that 18.6% of the variance in sustainability can be explained by the constructs proposed in this model. Sustainability performance is influenced by many other factors, but as we have focused on green HRM practices, R^2 should be high. An R^2 value of 18.6% is deemed acceptable as we conducted a power analysis using Daniel Soper's online calculator (available at: <https://www.danielsoper.com/statcalc/calculator.aspx?id=9>) to calculate the post-hoc power analysis, and the results indicated a power of .97. Furthermore, R^2 is dependent on the area of research (Hair et al., 2017). We also tested predictive relevance using the blindfolding procedure with an omission distance of 9; the Q^2 value was .12, and because the value is greater than 0 (Fornell & Cha, 1994), we can confirm the predictive relevance of the model.

5 | DISCUSSION

The originality of this research lies in the examination of the relationship between green HRM practices and sustainability. As far as we know, this is the first work testing this theoretical framework in light of empirical evidence from Malaysia, contributing to a better overall understanding of sustainability in large manufacturing firms.

TABLE 4 Hypothesis testing

Hypothesis		Std beta	Std error	t value	p value	BCI LL	BCI UL	f ²	VIF
H1	Analysis Sustainability	-.105	0.115	0.915	.180	-0.297	0.068	.003	2.002
H2	Recruitment Sustainability	.244	0.146	1.672	.048	0.023	0.494	.025	3.831
H3	Selection Sustainability	-.015	0.208	0.071	.472	-0.311	0.375	0	4.423
H4	Training Sustainability	.264	0.128	2.056	.020	0.061	0.466	.045	1.946
H5	Assessment Sustainability	.009	0.213	0.040	.484	-0.321	0.37	0	4.311
H6	Reward Sustainability	.074	0.163	0.454	.325	-0.163	0.346	.003	3.004

5.1 | Theoretical contributions

On the basis of the RBV theory, this study hypothesized that green HRM practices (i.e., green analysis and job description, green recruitment, green selection, green training, green performance assessment, and green rewards) would have a positive relationship with sustainability. The findings indicated that in fact, only two green HRM practices showed a statistically significant and positive relationship with sustainability: green recruitment and green training.

HRM practices have been proposed as a way of transforming employees into valuable, rare, and inimitable resources that can promote firms' goals (Barney, 1991; Barney, Ketchen, & Wright, 2011; De Saá-Pérez & García-Falcón, 2002). These findings imply that green HRM may provide environmentally committed employees and diffuse environmental values throughout the firm, which, in turn, can help to attain business sustainability. However, this work adds to the body of literature on green HRM and confirms that there are two main practices capable of enhancing the alignment of business strategy and the environment: green recruitment and green training.

The present study reveals that green analysis and job description have no significant influence on sustainability. This might be because the incorporation of environmental aspects in job analysis and description is rare (Jabbour, 2011), especially in the Malaysian context. Besides, even if companies have included environmental issues in their job descriptions and made environmental commitment employees' responsibility, only those employees in the environment, health, and safety department seem to be affected. Furthermore, most of the firms comply with ISO 14000 standards. ISO 14000 is a global series of environmental management systems standards, ensuring that the companies manage their environmental responsibilities properly. Empirically, previous researchers such as Comoglio and Botta (2012) and Iraldo, Testa, and Frey (2009) have indicated that environmental management systems implementation influenced environmental performance positively. Hence, the influence of green analysis and job description on sustainability may simply not be apparent in the context of Malaysian large manufacturing firms.

In terms of the relationship between green recruitment and sustainability, the results demonstrated a positive relationship between these two variables. Seemingly, large manufacturing firms have adopted green recruitment, showing firms' preference for candidates who are committed to the environment. With this level of commitment, a firm is likely to attain sustainability, especially in terms of

environmental performance. This reflects the findings of Masri and Jaaron (2017), whereby, in manufacturing organizations in a Palestinian context, they found that green recruitment and selection had a positive influence on environmental performance. This result implies that, in order to combat environmental issues in the manufacturing industry, HR managers considered the environmental commitment of a candidate as a priority in the recruitment process. Recruiting people who are committed to environmental protection may increase the company's environmental performance. Companies can use green recruitment to attract high-quality candidates who can add value to the organization, strongly considering potential candidates' concern for the environment. Consequently, employees who exhibit this concern are more likely to reduce the environmental impacts and risks to the general public. These findings are in line with the ideas set out by Ahmad (2015), who suggests that recruiting candidates with a green mindset provides the employer with a competitive advantage and leads to sustainable performance.

No significant relationship was found to exist between green selection and sustainability. From an economic perspective, this result contradicts the results of Longoni et al. (2016), which show that, in multiple industries in Italy, green hiring has a positive and significant influence on financial performance. A reasonable explanation for these contradictory findings is that large manufacturing firms in this research might be in the early stage of adopting green selection. Therefore, the effect of green selection on economic performance may not be apparent. However, from an environmental perspective, this result is consistent with the research of Guerci, Longoni, and Luzzini (2016), who found no relationship between green hiring and environmental performance, but contrasts with the findings of Longoni et al. (2016), Masri and Jaaron (2017), Yusoff et al. (2018), and Zaid et al. (2018). This nonsignificant relationship could also be due to the fact that candidates are selected on the basis of their skills and expertise in the relevant department, and their environmental knowledge is only a value-added element. As Craig (2015) states, it is crucial to hire a candidate who possesses the required skillset; otherwise, the firm can lose out, with a high turnover of staff and less effective overall performance. This argument is illustrated in the Malaysian context, where the Prime Minister unveiled a four-pronged strategy to improve Malaysia's manufacturing sector through higher productivity, contribution, innovation, and more high-skilled workers (Saieed, 2018). Thus, green selection does not necessarily lead to sustainability, because this manufacturing industry is still focused on the skills and expertise of an employee.

In terms of green training, the results show that there is a positive relationship between green training and sustainability. This finding is similar that of Zaid et al. (2018), in which green training had a positive influence on sustainable performance. Seemingly, green training can develop the environmental knowledge of employees, build their environmental awareness, motivate their creativity for green innovation, and encourage their environmental commitment, all of which contribute to the improvement of environmental performance. Through green training, employees are encouraged to find ways to decrease paper and energy consumption and reduce the use of environmentally

damaging materials in their products, particularly applicable to employees in the manufacturing industry. Hence, with continuous green training, companies should be able to improve their economic and environmental performance. Furthermore, the manufacturing industry is perceived as having a significant impact on the environment, and there has been a long-term emphasis on environmental compliance (Guerci, Longoni, & Luzzini, 2016). Furthermore, this relationship suggests that green training can help companies acquire and develop employees who can better protect the environment as well as society. In addition, green training that provides employees with environmental knowledge increases the environmental awareness of employees and puts an emphasis on their well-being; this in turn tends to reduce risks to the general public and thus contributes to the long-term social benefit of both internal employees and external communities (Paulraj, 2011).

The results show a nonsignificant relationship between green performance assessment and sustainability. This is in line with the argument given by Renwick et al. (2013) in which they state that firms are facing challenges in measuring employees' environmental performance. The results obtained are somewhat contradictory with those of Zaid et al. (2018), who found a significant relationship between green performance management and compensation and sustainable performance. Most of the large manufacturing firms in this study have been established for more than 20 years. Thus, it is not surprising that these companies routinely try to lower their costs to stay competitive in the marketplace. As Lawton (2012) indicates, long-established companies need to control their costs, and such controls may lead ultimately to a more efficient and adaptable company. Thus, although companies might adopt green performance assessment, their economic performance might not be directly linked to green performance assessment. Besides, in the large Malaysian manufacturing firms studied in this research, employees' green goals and responsibilities and individual green assessment may apply only to employees in the environment, health, and safety department. This limited adoption seems to have been insufficient to promote overall sustainability.

In examining the relationship between green rewards and sustainability, this study found no significant relationship between these two variables. Green reward is designed to motivate employees to promote environmental management; hence, this practice is more likely to directly affect employee performance than to affect the sustainability of the companies. Renwick et al. (2013) point out that environmental rewards and recognition may increase the willingness of employees to produce environmental initiatives. This could be the reason behind the nonsignificant finding in the context of Malaysian large manufacturing firms. From an environmental perspective, the nonsignificance of this relationship might be because green rewards are not extensively used within large Malaysian manufacturing firms to encourage the environmental contributions of employees. The limited use of this practice, therefore, may not lead to significant environmental improvement. Additionally, Govindarajulu and Daily (2004) suggest that relying on rewards does not lead to significant improvement in environmental performance, but such improvement can be attained if it is combined with clear communication, feedback, and

empowerment. This finding contradicts Pfeffer (2010), who highlights the profound effect of an organizational reward system on human health. A further possible explanation for this result is that this practice places a particular emphasis on the environmental perspective, whereas concern for community is not emphasized. Therefore, in the context of this study, this practice is possibly unable to accomplish sustainability for companies as a whole.

According to de Souza Freitas et al. (2012) and Rimanoczy and Pearson (2010), HRM can guide firms' sustainability through reviewing values and assumptions in order to rearrange the organizational culture and cultivate an understanding of sustainability, which will then be reflected in employees' daily actions. Hence, although the outcome of green HRM on sustainability is inconclusive, the significant influence of green recruitment and green training on sustainability clearly suggests that large manufacturing firms should strongly consider elevating the adoption of green HRM practices to achieve long-term sustainability.

Additionally, past HRM research conceptualizes the contribution of HRM practices in terms of a company's sustainability (de Souza Freitas et al., 2012; Jabbour & Santos, 2008). However, the relationship has not been tested empirically, and the measures of sustainability have yet to be fully investigated. By conceptualizing sustainability and examining how it operates on a company level, this research has identified and examined a construct that can be empirically tested. Thus, this study extends existing research by substantiating the measurement of sustainability and empirically demonstrating the contributions of green HRM practices to business sustainability. This contribution will also enable future research to examine the relationship between sustainability and other constructs that are considered important to these studies.

In conclusion, insignificant results require further investigation in order to add to the discussion and provide new insights in the field of green HRM. Thus, future research in the field of green HRM could further investigate the links between green analysis and job description, green selection, green performance assessment, green rewards, and sustainability in different contexts to establish and confirm synergies and contradictions.

5.2 | Managerial implications

Aside from the theoretical implications, there are several implications for practitioners and policy makers. This section discusses the key points for large manufacturing firms and policy makers based on the findings of this study.

From a practical perspective, this study has several implications, especially for business professionals and policy makers. The conceptual model presented in this study is intended to give a guide for manufacturing firms, illustrating the outcome of the implementation of green HRM on business sustainability. Due to the scarcity of natural resources and the environmental issues raised in the recent years, the industry plays a very crucial role in mitigating environmental issues. Hence, by using this model of green HRM in manufacturing industries,

practitioners can build and improve green-oriented human resources and adopt green HRM as a strategy to attain business sustainability. The findings imply that manufacturing firms in Malaysia that adopted green HRM (i.e., green recruitment and green training) had improved business sustainability. Green HRM practices provide additional benefits to a company in terms of environmental performance and social performance as well as typical financial performance. Once management has opted for sustainability as an area of focus, the company should look at reshaping organizational culture by applying green HRM practices to employees. Through this, employees gain awareness of the importance of going green and commit themselves to the organization's environmental and social mission and personally strive towards sustainability goals.

Last, but not the least, the manufacturing industry in Malaysia is reported to have poor environmental performance, and yet it is the one of the biggest contributors to Malaysia's economy. This study points out that green HRM practices may help in achieving business sustainability. The government of Malaysia must make available clear and effective environmental policies that provide strategic direction in order to encourage manufacturing firms to go green. In conjunction with this initiative, the government might provide more incentives and environmental training to encourage manufacturers to apply green HRM practices.

5.3 | Limitations of the study

Although this study's findings are both robust and important, there are some limitations that must be acknowledged. The limitations of this study stem from the framework and its application. First, although the variables selected for the framework can be considered adequate for studies on green HRM practices in organizations, it is believed that other variables can also contribute to this framework. Furthermore, the framework must be further refined and adjusted to include other organizations and other countries, and a cross-country study may enhance the generalizability of the findings and may affect the results. Moreover, the data collection phase in this study occurred at a single point in time. Finally, the subjective measurements used (self-assessment) in the questionnaire have their own inherent limitations, although they have been previously used.

5.4 | Future research directions

Despite the limitations, this research may be extended to include other green HRM practices and to empirically investigate how each green HRM practice influences the different dimensions of sustainability. It should be noted that green HRM practices ought to be evaluated in terms of their different dimensions, either at the individual or organizational level. Further instruments of green HRM suitable for future testing have been developed by Pham et al. (2019), Roscoe et al. (2019), Paillé, Chen, Boiral, and Jin (2014), Al Kerdawy (2018), Dumont, Shen, and Deng (2016), Guerci, Longoni, and Luzzini (2016), Kim et al. (2019), Longoni et al. (2016), Masri and Jaaron (2017), Shah (2019),

Saeed et al. (2018), and Tang et al. (2017). Additionally, this study may be enhanced by using samples from other industries and firm sizes, using longitudinal data to establish causal relationships among independent and dependent variables, or using multiple cases to further investigate the relation between green HRM practices and sustainability. The possible associations with the triple bottom line of sustainability could be further explored, as well as the inclusion of constructs such as environmental knowledge and awareness, environmental concern, pro-environmental behavior, HR roles and competencies, stakeholder pressure, top management commitment, relative advantage, and green intellectual capital. Finally, given the time limitations of this study, as well as considering environmental aspects in the management of the organization, future frameworks could be explored by focusing on environmental performance as the ultimate goal.

We hope that this study will offer an alternative lens to those who study the impact of green HRM practices and sustainability.

5.5 | Conclusion

In Malaysia, the manufacturing industry is one of the main contributors to the country's economy, but it is also the highest contributor to environmental issues. Hence, aggressively pursuing the adoption of environmentally friendly activities, such as green HRM practices, is becoming crucial in order to mitigate environmental problems. The benefits of adopting green HRM, such as cost reduction and talent attraction and retention, have been examined in the literature (Sawang & Kivits, 2014).

Sustainability has become increasingly important to businesses as a result of rapid depletion of natural resources and concerns over environmental issues. Industry pioneers and global companies are now paying much more attention to sustainability. In order to deal with a challenging business climate, companies are seeking new approaches—such as green HRM—to remain competitive and sustainable in the dynamic business world of today. Human resources, with its key function in strategy planning, offers a new opportunity for companies in terms of cost reduction, value creation, and eventually achieving sustainability by adopting green HRM practices.

The present study examines the influence of green HRM practices (i.e., green analysis and job description, green recruitment, green selection, green training, green performance assessment, and green rewards) on sustainability, using the theoretical basis of RBV, and bridges an important research gap in the literature. On the basis of the aforementioned discussion, the findings reveal that only green recruitment and green training will lead to sustainability in the Malaysian manufacturing industry. This implies that, in order to achieve sustainability, HR managers should prioritize candidates with environmental knowledge during the recruitment process and also provide environmental-related training (i.e., waste management, recycling and energy management) for employees.

Despite its limitations, we hope that this first step, considering green HRM as a pathway to sustainability in Malaysia, is significant and merits further investigation. Also, many of the findings in the

present study throw up interesting contradictions to the existing literature. Thus, we encourage future researchers to study these relationships in different industries, using these findings as their reference for the Malaysian context.

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CONFLICT OF INTEREST

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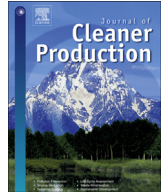
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Green Human Resource Management for organisational citizenship behaviour towards the environment and environmental performance on a university campus

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ABSTRACT

The slow and inefficient environmental performance of universities is drawing the attention of scholars towards behavioural change in employees rather than just relying on technological upgrades. Drawing upon the Ability-Motivation-Opportunity (AMO) theory, the purpose of this study is first to examine the influence of Green Human Resource Management (HRM) practices (green competence building practices, green motivation enhancing practices, and green employee involvement practices) on the organisational citizenship behaviour towards the environment (OCBE) of academic staff and, in turn, its impact on the environmental performance. Second, the mediating impact of OCBE between each of Green HRM practices and environmental performance is assessed. The data were collected from September until November 2017 on two campuses of a renowned public research university in Malaysia. Using quantitative research design, a structured questionnaire was used among the academic staff of the university. Convenience sampling was used to select the respondents from both campuses, and the Partial Least Squares (PLS) modelling technique was used to analyse the data, which comprised 122 respondents. Overall findings showed that three sets of Green HRM practices based on the Ability-Motivation-Opportunity framework had a significant impact on OCBE. Furthermore, OCBE had a significant relationship with environmental performance. For the mediation analysis, the results showed that OCBE exhibited by academic staff acted as a means through which the Green HRM practices of a university can positively influence the environmental performance of a university campus. The originality of this study rests in shedding light on Green HRM practices in the higher education sector and highlighting the critical role of academic staff's environmentally friendly behaviour for improving the environmental performance of a university.

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1. Introduction

Globally, researchers and environmental policymakers have agreed upon the fact that the reasons for environmental deterioration like resource deficits, increasing pollution and the loss of biodiversity are deep-rooted into human behaviour (Mtutu and Thondhlana, 2016; Renwick et al., 2013). In response to this, many organisations are inclined towards ensuring that their daily operations are less harmful to the environment through the

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implementation of environmental management systems (EMS) or green initiatives. Hence, an emerging need exists for understanding and shaping employee behaviour to minimize the negative environmental impacts of their activities in organisations.

In response to these concerns, the role of Green Human Resource Management (HRM) in influencing green employee behaviour in the workplace has emerged as a topic of study (Dumont et al., 2016). Green HRM is the inclusion of environment consciousness within the whole HRM process of hiring, training, rewarding and developing a green workforce that understands and values environment-friendly values, practices, and initiatives. Besides, contemporary researchers supporting the role of human resources in environmental performance have concentrated on environment-friendly employee behaviour as a crucial factor in successfully implementing environmental policies at the workplace (Kim et al., 2017).

The pro-environmental behaviours of employees, which are termed Organisational Citizenship Behaviour towards Environment (OCBE), are individual voluntary actions that lead to effective environment performance in an organisation (Boiral and Paillé, 2012). The environment-friendly behaviour of employees is becoming essential for all organisations, no matter the sector, including the tertiary education sector (Rayner and Morgan, 2017). Currently, Green HRM studies have focused more on the corporate sector as compared to educational institutes (Tairu, 2018). To name only a few, Green HRM has been studied in the context of multinational companies (Haddock-Millar et al., 2016), healthcare (Pinzone et al., 2016), sports complexes (Gholami et al., 2016), and manufacturing firms (Nejati et al., 2017; Yong et al., 2019a, b; Yusliza et al., 2019a, b; Yusliza et al., 2017). However, a research gap in Green HRM research exists in the context of sustainable higher education institutes, which is an emerging area of research (Dyer and Dyer, 2017; Rath and Schmitt, 2017). Besides, less attention has been paid to environmental management in Asian countries that are more prone to pollution and environmental degradation. However, owing to economic and environmental sustainability issues in developing Asian countries, studies should be developed to fill in the literature gap (Renwick et al., 2013).

As an emerging economy, Malaysia has pressing environmental issues. For example, the country is experiencing a more than 6% average annual growth of CO² emissions that is close to China's 7.42% emissions annual growth rate. Nonetheless, few studies of Malaysia have explored the ways to create environmental sustainability through Green HRM (Yusliza et al., 2019a). In addition, Saadatian et al. (2009) have claimed that Malaysian research universities have already taken responsibility for environmental sustainability and are engaged in initiating eco-friendly practices in university campuses, few comprehensive studies have highlighted the current state of sustainability efforts in institutions of higher education in the country. Mohamed et al. (2020) posited that in the higher education sector, employee behaviour is crucial in reducing environmental degradation and ensuring a successful environmental performance, which has a ripple effect on society.

Although universities are relatively lower in emitting pollution than the corporate sector, they bear considerable responsibility for environmental awareness and research and educating current and future generations about the importance of pro-environmental behaviour (Rayner and Morgan, 2017). Additionally, the need for environmental sustainability on university campuses has gained attention because their activities and operations have direct and indirect environmental impacts in terms of material consumption, waste generation, excessive circulation of people and vehicles on campus and usage of electricity (Alshuwaihat and Abubakar, 2008). Moreover, with the diversification of academic activities and the increased use of IT and sophisticated equipment,

universities have become major consumers of resources like energy and paper (Altan, 2010). Increased environmental pressure and the rising costs of resource consumption have spurred universities to promote pro-environmental behaviour for the sustainable use of resources (Mtutu and Thondhlana, 2016).

Realizing their environmental responsibility, an increasing number of universities are incorporating environmental management aspects into their policies, educational curriculum, research projects, building design, technology and other campus activities (Mikulik and Babina, 2009) and have been engaged in environmental declarations. Nonetheless, their progress toward sustainability remains very slow (Lozano et al., 2013). Until recently, environmental initiatives in universities have placed a greater emphasis on technical dimensions of environmental performance like an assessment of Greenhouse Gas (GHG) emissions and energy usage but have paid little attention to the behavioural aspects of environmental performance management in universities (Levy and Marans, 2012). The study of Green HRM's role on employee behaviour remains in its infancy (Yong et al., 2019b) and needs to be studied in a different organisational context, such as the higher education institutions. Tairu (2018) has highlighted that the greening of a campus requires the greening of HRM practices in a university.

According to Lozano (2006), a globally substantial proportion of university leaders and faculty member are unaware of sustainable development concepts and its implementation in universities and putting little effort in incorporating sustainability principles into courses, research and outreach programs. Furthermore, Lozano (2006) highlighted main stakeholders in universities, including academic directors, professors and students. Ideally, the concepts of sustainable development should be incorporated into the policies, procedures and learning of all members of these stakeholders; in practice, this is almost impossible in the early stages of incorporating environmental sustainability into the university's system. In addition, applying the multiplier effect can help in the early adoption of sustainability procedures; this can be achieved by identifying and encouraging some of the individuals involved in small projects to share their experiences and knowledge. The multiplier effect can also be achieved by educating educators to educate other educators and thus create a multiplier effect (Lozano, 2006). Identifying the factors that support sustainable development in universities, recently, Fichter and Tiemann (2018) emphasised that role of key persons in university management and faculty is of paramount importance as initiators, promoters and networkers.

In the emerging literature of campus environmental sustainability, some researchers have focused on top-down change from administrators, and others have emphasized bottom-up student-led green initiatives. However, these perspectives have neglected the consideration of an institution's middle-level participants, who are academic staff, and their roles in campus sustainability (Brinkhurst et al., 2011). Thompson and Green (2005) stated that the commitment and involvement of academic staff in university is an essential factor for institutionalizing environmental sustainability practices in universities. Environmental sustainability in higher education institutes requires adjustments in teaching courses and is also highly dependent on the capabilities of academic staff and their willingness to support such initiatives (Hegarty, 2008).

The role of academic staff is influential in the process of developing campus sustainability because of their knowledge, technical skills, and their direct relationships with the institution's top (management) and bottom (students). Being potential but oft unrecognized players in sustainability, a need exists to support and encourage the pro-environmental behaviour of academic staff for

achieving lasting progress towards campus environmental performance (Brinkhurst et al., 2011). Consequently, this current study focuses on Green HRM practices and academic staff behaviour for improving sustainability in higher education institutes.

The contributions of this current study are:

- No study, to the best of our knowledge, has so far explored the relationships herein considered;
- Examining the role of the tertiary education sector in environmental sustainability, which is a neglected sector;
- Examining the role of OCBE of academic staff in improving the environmental performance of a university;
- Examining the mediating influence of academic staff OCBE for implementing Green HRM practices to improve the environmental performance of a university; and
- Providing empirical evidence from Malaysia on the AMO framework and theoretical model in this study.

1.1. Research objective

The objective of this study was to examine the mediating effect of OCBE between Green HRM and environmental performance. To achieve this goal, a survey was conducted from September 2017 to up November 2017 among 122 academicians from two campuses of Universiti Teknologi Malaysia (UTM).

The remainder of this paper is organised as follows: Section 2 discusses the theoretical background and outlines the hypotheses. The details of the research methodology will be explained in Section 3, followed by a presentation of the results and analysis in Section 4. Section 5 will elaborate on the theoretical and practical implications, limitations, and possibilities for future research.

2. Theoretical background and hypotheses development

The greening of HRM and resulting environmental outcomes can be better comprehended in light of Ability-Motivation-Opportunity (AMO) theory, which is the most dominant theory in understanding the impact of HRM practices on organisational performance in empirical studies (Appelbaum, 2000; Boselie et al., 2005). AMO theory explains that High-Performance Work Practices (HPWS) are a set of distinct but interrelated HR practices that are grouped on based of three core aspects: ability, motivation, and opportunity (Appelbaum, 2000). Abilities are based on a set of practices including recruitment and selection, and training and development programs that ensure knowledge and skills required of employees to perform specific tasks. Similarly, motivation is based on practices such as performance appraisal and financial and non-financial incentives that are meant to boost the efforts of employees for accomplishing performance targets. Lastly, opportunity is a bundle of practices comprised of involvement, knowledge sharing and autonomy-enhancing practices that foster employee participation in activities (Marin-Garcia and Tomas, 2016).

The AMO framework that Appelbaum (2000) proposed explains that HRM practices that enhance employee's abilities, their motivation to do work and involvement in available opportunities lead to the organisational citizenship behaviour of employees, which further contribute to organisational performance. Hence, organisational citizenship behaviours of employees act as an underlying mechanism between HPWS and organisational performance (Appelbaum, 2000; Marin-Garcia and Tomas, 2016).

Using the lens of AMO theory, scholars have investigated Green HRM in various sectors (i.e., Cheema and Javed, 2017; Pham et al., 2019; Pinzone et al., 2016; Ragas et al., 2017, 2013; Singh et al.,

2020; Yu et al., 2020). For instance, Fawehinmi et al. studied the role of GHRM, environmental knowledge and green behaviour of academics in public research universities. Cheema and Javed (2017) examined the effects of corporate social responsibility, Green HRM and sustainable environment in textile sector. Pinzone et al. (2016) studied Green HRM practices, collective affective commitment to environmental management change, and collective organisational citizenship behaviour toward the environment in the health care sector. Pham et al. (2019) investigated the relationship between green training, green employee involvement, green performance management, and OCBE in the hospitality industry. Yu et al. (2020) conducted a study in automobile industry on GHRM, internal green supply chain management, environmental cooperation with customers and suppliers. Ragas et al. (2017) examined the relationship between implementation of GHRM practices, green lifestyle, and job performance in various private industries. Singh et al. (2020) examined how Green HRM, interplays on to the linkages amongst green transformational leadership, green innovation, and environmental performance in manufacturing sector small and medium enterprises.

Although AMO theory is the most comprehensive in understanding Green HRM contribution towards environmental performance, scant studies have applied the complete AMO framework in their research models. The linking mechanism between Green HRM practices and environmental performance through organisational citizenship behaviour is often neglected. Harvey et al. (2013) and Ren et al. (2017) have highlighted the need for studying the mediating processes through which Green HRM can produce long-term performance outcomes. Thus, this study is addressing two literature gaps 1) extending Green HRM research to university context, and 2) examining the mediating role of the academic staff's OCBE between a set of Green HRM practices and environmental performance of university based on AMO framework.

2.1. The relationship of green competence building practices and OCBE

Green competence building practices refer to green recruitment and selection, and green training and development programs for improving the environmental awareness and skills of employees (Teixeira et al., 2012) so that employees become able to identify environmental problems and take necessary actions to reduce negative environmental impacts at workplace (Vidal-Salazar et al., 2012).

Tang et al. (2017) said that Green recruitment and selection comprise three aspects, including employee green awareness, green employer branding, and green criteria for candidate selection. Employee green awareness is a core aspect of a green recruitment process because if an employee's environmental values match with that of the organisation, then he/she is more likely to respond positively towards the environmental concerns of their organisation. According to Renwick et al. (2013), job seekers prefer to work in organisations that have a good environmental reputation. Similarly, recruiters prefer to hire a candidate with environmental knowledge and positive environmental attitude because he/she is more willing to engage in eco-initiatives (Jabbour et al., 2010).

Also, environmental training and development programs are essential for improving an employee's skills and attitudes towards environment management (Teixeira et al., 2012). Green training helps improve an employee's understanding about the importance of environmental protection, enhances his/her ability to adapt to change and helps him/her to learn basic ways of conserving energy and reducing waste at the workplace (Jabbour, 2015). Green training provides knowledge management that helps in linking

environmental knowledge with environmental behaviour by providing abilities to solve environmental problems.

Based on the above arguments, the following hypothesis is posited:

H1. Green competence building practices is positively related to OCBE.

2.2. The relationship of green motivation enhancing practices and OCBE

Green motivation enhancing practices, including performance appraisal and rewards, is aimed at motivating an employee to align his/her behaviours with an organisation's environmental goals (Harvey et al., 2013). Incorporating environmental responsibilities in a performance management system provides an employee with clear information about what he/she is expected to do in environment management. Providing regular feedback to an employee about environmental performance helps him/her in improving his/her knowledge, skills, and ability in environment management (Jackson et al., 2011). In addition, rewarding an employee for good environmental performance enhances his/her commitment towards environmental responsibility (Daily and Huang, 2001) and encourages him/her to engage in organisational citizenship behaviour towards the environment (Govindarajulu and Daily, 2004).

Green rewards for promoting environmental citizenship behaviour among employees may include financial and non-financial benefits such as incentives for recycling, allowing flexible work schedules and telecommuting to reduce travel cost, providing free bicycles or pollution-free vehicles or linking promotion opportunities with environmental performance (Jackson et al., 2011). Furthermore, a combination of both monetary and non-monetary rewards is seen as more effective in boosting employee engagement in environmental activities (Renwick et al., 2013). However, for those employees whose performance does not comply with the green objectives of an organisation, using disincentives as negative reinforcement can push an employee to become more responsible towards the environmental concerns of that organisation (Tang et al., 2017).

Thus, the following hypothesis is posited:

H2. Green motivation enhancing practices is positively related to OCBE.

2.3. The relationship of green employee involvement practices and OCBE

Green employee involvement practices refer to providing opportunities to foster an employee's voice in environment management and suggest a solution for environmental problems in an organisation (DuBois and Dubois, 2012). Researchers support that empowering employees in decision making for environment management enhances the self-control and problem-solving skills of an employee (Govindarajulu and Daily, 2004; Renwick et al., 2008). Involvement opportunities help in developing a pro-environmental culture in an organisation through open discussions, the exchanging of ideas and the sharing of various viewpoints on environmental aspects (Alt and Spitzbeck, 2016).

Tang et al. (2017), has emphasized that articulating a clear environmental vision and disseminating information through various formal and informal communication channels guides employees to engage in environmental initiatives. In addition, the use of green teams is also an essential factor for organisations aiming at

improving their environmental management practices. Teamwork provides an opportunity for employees to work together, share knowledge, and propose new solutions for complex problems (Daily et al., 2007).

So, the following hypothesis is posited:

H3. Green employee involvement practices is positively related to OCBE.

2.4. The relationship between OCBE and environmental performance

According to Roy et al. (2001), OCBE is an essential factor for the successful implementation of environmental management systems and integrating environment policies with workplace practices. Boiral and Paillé (2012) have described pro-environmental behaviours under three dimensions, i.e., eco-helping, eco-civic engagement, and eco-initiatives. First, eco-initiatives are personal level initiatives of employees for reducing negative environmental impacts at the workplace like recycling paper, putting rubbish in proper dustbins, and avoiding waste of resources. Second, eco-civic engagement comprises organisational level initiatives of employees like participating in green events and projects that an organisation has created, promoting the green reputation of an organisation and voluntary joining organisation's environmental activities. Finally, eco-helping includes encouraging co-workers to care about the environment. This type of behaviour is based on mutual assistance of employees for environmental problems of an organisation like the voluntary sharing of ideas and expertise with each other and teamwork for the identification of pollution sources and preventive solutions.

Researchers have studied the OCBE of employees in different sectors. For example, Boiral et al. (2015) studied the impact of managers' OCBE in manufacturing companies and found a significant relationship between a manager's engagement in OCBE and the environmental management practices of his/her organisation. Similarly, Paillé et al. (2014) examined the pro-environmental behaviours of frontline workers in a Chinese manufacturing organisation and empirically proved that OCBE positively influences the environmental performance of that organisation.

Although the studies mentioned above have examined the OCBE-Environmental performance relationship in the context of manufacturing organisations, this link has not been tested for academic staff's OCBE for the environmental performance of a university. According to Rayner and Morgan (2017), it is unknown whether employees in universities engage in either more or less environmental behaviours compared to employees working in the industrial sector. Thus, based on the aforementioned discussion, the following hypothesis is formulated for this study.

H4. OCBE is positively related to environmental performance.

2.5. The mediating role of OCBE

In previous literature, researches have argued that organisational performance does not result directly from applying HR practices, but rather from the discretionary efforts of employees (Morrison, 1996). The role of HR practices is to create a context that fosters organisation citizenship behaviour among employees such that, when employees go above their role requirements to put forth an extra effort, help their co-workers and support organisational activities, then the level of organisational performance should be high (Messersmith et al., 2011). Similar to the role of OCB between HR-performance relationship, OCBE is proposed as a linking

mechanism between HR-environmental performance relationship (Paillé et al., 2014).

Paillé et al. (2014) studied the relationship between strategic human resource management, OCBE, and environmental performance. The results of the study found that HRM at the strategic level contributes to the environmental performance of an organisation, while OCBE was found to mediate the relationship between strategic HRM and environmental performance. Furthermore, Alt and Spitzbeck (2016) collected data from environmental managers in 170 cross-industry firms and found that high-performance HR practices such as employee involvement capabilities are translated into higher environmental performance through the manifestation of OCBE among employees. Moreover, Pinzone et al. (2016) proposed that Green HRM practices stimulated OCBE, while Daily et al. (2009) noted that OCBE leads to environmental performance. Hence, OCBE is advocated as a means to translate Green HRM practices to improvements in environmental performance.

The above-mentioned studies support the mediating role of OCBE. However, Paillé et al. (2014) tested mediation of OCBE between strategic HRM and environmental performance rather than Green HRM and environmental performance. Similarly, Alt and Spitzbeck (2016) focused only on the involvement capabilities of employees and did not include other HR practices. OCBE has not been yet tested empirically in relationship between Green HRM and Environmental performance, specifically in a university context. Thus, the following hypotheses are posited.

H5. OCBE mediate the relationship between green competence building practices and environmental performance.

H6. OCBE mediate the relationship between green motivation enhancing practices and environmental performance.

H7. OCBE mediate the relationship between green employee involvement practices and environmental performance.

Guided by the AMO framework, the theoretical discussion, the empirical results of previous studies and the proposed hypotheses mentioned above, the conceptual model for this study is shown in Fig. 1 below.

3. Research methodology

3.1. Sample and data collection

The five largest research universities in Malaysia have implemented campus greening initiatives that the Institute for Environment and Development (LESTARI) manages, which were established for boosting sustainability in academia and bridging researchers with policymakers (Reza, 2016). Previous studies have highlighted the environmental initiatives of Universiti Malaya, Universiti Putra Malaysia, Universiti Sains Malaysia, and Universiti Kebangsaan Malaysia (Hussin and Kunjuraman, 2017; Saadatian et al., 2009, 2011) but neglected the green initiatives at UTM. However, UTM is also striving best to achieve campus sustainability goals. According to Zen et al. (2016), UTM is the first university in Malaysia that has introduced the concept of living laboratories that is meant to implement sustainability initiatives including green office, sustainable food arcade, and sustainable energy management.

A cross-sectional survey was conducted with the academic staff of UTM, and a convenience sampling technique was utilized. Academic staff members from different faculties who were readily accessible and willing to participate in this research comprised the sample for this study. Data were collected between September 2017 and November 2017.

To determine the sample size for structural equation modelling,

power analysis is the most recommended approach in the PLS-SEM literature (Hair et al., 2017). According to Hair et al. (2016), the minimum sample requirement should be calculated using power analysis based on the constructs in a model with the greatest number of predictors. Hair et al. (2016) recommended the rule of thumb that Cohen (1992) developed for statistical power analysis of multiple regression models and the determination of sample size based on 80% statistical power, minimum R^2 value, significance level and complexity of path model. In PLS path model for this study, a minimum sample size of 103 was required to detect a minimum R^2 value of 0.10 at the suggested statistical power of 80% and 5% significance level.

Three hundred questionnaires were distributed personally to academic staff at their offices, of which 122 useable responses were collected. The effective response rate was 40.6% (122 useable responses). According to Mellahi and Harris (2016), no specific agreed-upon minimum response rate exists, and different academic views about the response rate. For example, Malhotra and Grover (1998) said that a response rate of less than 20% was undesirable for research, and Goudy (1976) suggested that an acceptable range for response rate could vary between 30% and 70%. In this current study, the 122 total responses fulfil the minimum sample size requirement for PLS-SEM analysis, as it is above the minimum threshold of 103, as Cohen (1992) suggested using power analysis.

3.2. Measures

The measurement items for all constructs were adapted from the literature. As the purpose of this study is to identify the relationship among Green HRM practices, OCBE, and Environmental performance based on academic staff's perception, the unit of analysis was at the individual level. Measurement items are provided in the Appendix.

The construct of Green competence building practices is formed by two dimensions, including green recruitment and green training. Similarly, the construct of Green motivation enhancing practices is based on two dimensions, including green performance and green rewards. All measurement items for green recruitment, green training, green performance, green rewards, and green employee involvement practices were adapted from Tang et al. (2017). A 5-point Likert scale ranging from 1 (not at all) to 5 (to a very great extent) was used. A total of 17 items were taken from Tang et al. (2017). An example of these items is: "My University provides environmental awareness programs or workshops to improve my environmental knowledge."

To measure organisational citizenship behaviours towards the environment, the 10-item scale that Boiral and Paillé (2012) developed was selected. These ten items cover three dimensions of OCBE, including eco-initiatives, eco civic engagement, and eco helping. The items were adapted to replace the word "organisation" with "university." An example of these items is, "I actively participate in environmental events organised by my university." Responses were rated on 5-point Likert scale ranging from 1 (Not at all) to 5 (To a very great extent).

Fourteen items were chosen from Larrán Jorge et al. (2016) to measure environmental performance on the university campus. Environmental performance dimensions included environmental policy and management, reducing energy consumption, reducing water consumption, waste management, reducing pollution, compliance with normative, biodiversity, and, environmental awareness, and research. An example of the items is "Energy conservation practices are promoted in my campus." A 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree) was used to rate the responses.

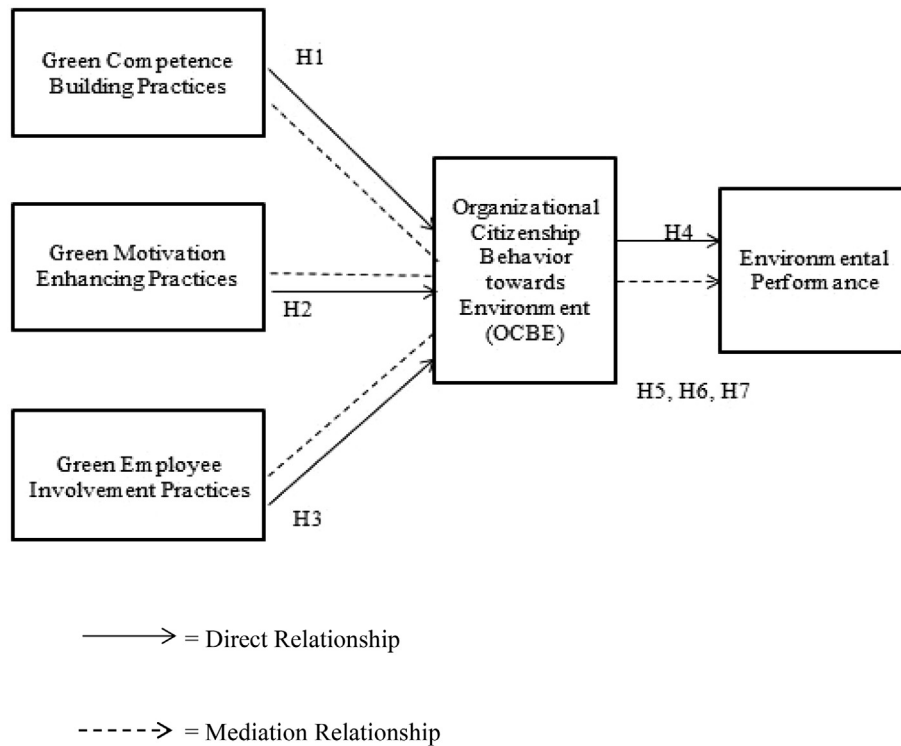


Fig. 1. Conceptual model.

4. Results

4.1. Demographic profile of the respondents

The demographic profile shows that respondents possessed adequate experience, education, and the correct position to respond to this study. Among the respondents, both males and females had approximately equal representation, including 49.2% male and 50.9% female academic staff. About 27.9% of the respondents were above the age of 46 years; only 4.9% of respondents were within the age range of 26–30 years. Most of the respondents held a Ph.D. degree (92.5%), while only 9% of respondents had a master's degree. Comparing the working position of respondents, 65% of respondents were senior lecturers, while 17.5% were associate professors, 10% were professors and 7.5% were lecturers. The analysis also showed that the highest percentage of respondents (24.2%) had more than 20 years of working experience while a few respondents (4.2%) had working experience of less than one year.

4.2. Data analysis

Partial least squares (PLS) modeling using the SmartPLS 3.2.8 version (Ringle et al., 2015) was used as the statistical tool to examine the measurement and structural model as it does not require an assumption of normality and survey research is often not normally distributed (Chin et al., 2003). Because the study used a complex model with mediation, regression using SPSS was not suitable as the model could not be tested together. Thus, structural equation modeling was used. Two choices exist to do structural equation modeling, either the use of covariance-based (CB-SEM) modeling utilising software like AMOS, MPLUS, and LISREL or the use the variance-based modeling utilising software like WarpPLS and SmartPLS. CB-SEM. Recently, scholars are increasingly using SmartPLS for the analysis of Green HRM studies (Fernando et al.,

2019; Pham et al., 2019; Yong et al., 2019a, b; Yong and Yusliza, 2016; Yusliza et al., 2019a, b; Yusliza et al., 2017).

Henseler et al. (2016) and Hair et al. (2019a; 2019b) highlighted the following advantages of using PLS-SEM:

- PLS-SEM can utilise a small sample size.
- Models with formatively specified constructs should be analysed with PLS-SEM.
- PLS-SEM is superior to regression analysis when assessing mediation.

Partial least squares modeling was adopted as the study had a complex model with 4 s-order constructs. The four second-order constructs were: 1) Green Competence Building Practices (2 dimensions), 2) Environmental Performance (8 dimensions), 3) Organisation Citizenship Behaviour towards Environment (3 dimensions), and 4) Green Motivation Enhancing Practices (2 dimensions). The study also had a mediation model. Hair et al. (2019b) and Urbach and Ahleman (2010) clearly stated that PLS-SEM is the most suitable for a complex model in which conditions relating to sample size, independence, or normal distribution are not met, and/or prediction is more critical than parameter estimation. Thus, the use of PLS-SEM in this study was justified.

Because the data were collected using a single source, the issue of Common Method Bias was addressed by testing the full collinearity following the suggestions of Kock and Lynn (2012), and Kock (2015). In this method, all the variables will be regressed against a common variable, and if the VIF is ≤ 3.3 , then no bias from the single source data is present. The analysis yielded a VIF of less than 3.3; thus, single-source bias was not a serious issue with these data (Table 1).

4.2.1. Measurement model

Following the suggestions of Anderson and Gerbing (1988), the

Table 1
Full collinearity testing.

COM	EP	INV	MOT	OCBE
2.259	1.578	2.481	2.388	1.694

Note: COM = Green Competence Building Practices, EP = Environmental Performance, INV = Green Employee Involvement Practices, MOT = Green Motivation Enhancing Practices, and OCBE = Organisational Citizenship Behaviour towards Environment.

model developed was tested using a two-step approach. First, the measurement model was examined to test the validity and reliability of the instruments used following the guidelines of Hair et al. (2019) and Ramayah et al. (2018). Then, the structural model was run to test the hypothesis developed.

For the measurement model, the loadings, average variance extracted (AVE), and the composite reliability (CR) were assessed. The values of loadings should be ≥ 0.5 , the AVE should be ≥ 0.5 , and the CR should be ≥ 0.7 . As shown in Table 2, the AVEs were all higher than 0.5, and the CRs were all higher than 0.7. The loadings were also acceptable, with only one or two loadings less than 0.708 (Hair et al., 2019). Because the study had 4 s-order constructs, namely, 1) Green Competence Building Practices, 2) Environmental Performance, 3) Organisation Citizenship Behaviour towards Environment, and 4) Green Motivation Enhancing Practices, the

Table 2
Measurement model for the first order constructs.

First Order Constructs	Items	Loadings	AVE	CR
Green Recruitment	GR1	0.799	0.665	0.856
	GR2	0.785		
	GR3	0.860		
Green Training	GT1	0.855	0.760	0.905
	GT2	0.884		
	GT3	0.876		
Green Performance	GP1	0.799	0.601	0.818
	GP2	0.738		
	GP3	0.787		
Green Rewards	GRW1	0.693	0.648	0.846
	GRW2	0.847		
	GRW3	0.864		
Green Employee Involvement Practices	GEIP2	0.847	0.685	0.897
	GEIP3	0.770		
	GEIP4	0.858		
	GEIP5	0.833		
Eco-initiatives	EI1	0.800	0.634	0.839
	EI2	0.819		
	EI3	0.769		
Eco-civic engagement	ECE1	0.845	0.691	0.899
	ECE2	0.853		
	ECE3	0.786		
	ECE4	0.840		
Eco-helping	EH1	0.902	0.846	0.943
	EH2	0.935		
	EH3	0.922		
Environmental policy and management	EPM1	0.948	0.881	0.937
	EPM2	0.930		
Reducing energy consumption	REC1	0.806	0.672	0.804
	REC2	0.833		
Waste management	WM1	0.859	0.715	0.834
	WM2	0.832		
Reducing pollution	RP1	0.810	0.633	0.837
	RP2	0.702		
	RP3	0.866		
Env. awareness & research	EAR1	0.901	0.793	0.885
	EAR2	0.880		
Biodiversity	BIOD	SIM	NA	NA
Compliance with normative	CAN	SIM	NA	NA
Reducing water consumption	RWC	SIM	NA	NA

Note: SIM = Single Item Measure; NA = Not Applicable.

validity and reliability of the second-order constructs were assessed as shown in Table 3. The second-order measurements were also valid and reliable.

Then, in step 2, the discriminant validity using the HTMT criterion was assessed as Henseler et al. (2015) suggested and Franke and Sarstedt (2019) updated. The HTMT values should be ≤ 0.85 (the stricter criterion) or ≤ 0.90 (the mode lenient criterion). As shown in Table 4, the values of HTMT were all lower than the stricter criterion of ≤ 0.85 . As such, the conclusion can be made that the respondents understood that the nine constructs were distinct. Taken together, these validity tests show that the measurement items were both valid and reliable (see Table 5).

4.2.2. Structural model

Following Hair et al. (2019) the path coefficients, the standard errors, t-values and p-values for the structural model using a 5,000-sample re-sample bootstrapping procedure were reported (Ramayah et al., 2018). Also, based on the criticism of Hahn and Ang (2017) that p-values are not a good criterion for testing the significance of hypothesis a combination of criteria including p-values, confidence intervals, and effect sizes were used. Table 2 shows a summary of the criteria used to test the hypotheses developed.

First, the effect of the three predictors on OCBE was tested. The R^2 was 0.409 ($Q^2 = 0.201$), which shows that all the three predictors explained 40.9% of the variance in OCBE. Green Competence ($\beta = 0.243$, $p < 0.01$), Green Motivation ($\beta = 0.273$, $p < 0.01$) and Green Employee Involvement ($\beta = 0.206$, $p < 0.01$) were all positively related to OCBE, thus H1, H2 and H3 were supported. Next, the effect on OCBE on Environmental Performance was examined. This had an R^2 of 0.169 ($Q^2 = 0.073$), which indicates that OCBE explains 16.9% of the variance in Environmental Performance which gives support for H4.

To test the mediation hypotheses, bootstrapping the indirect effect was conducted following the suggestions of Preacher and Hayes (2004, 2008). If the confidence interval does not straddle a 0, then the conclusion can be made that significant mediation exists. As shown in Table 6, Competence \rightarrow OCBE \rightarrow EP ($\beta = 0.100$, $p < 0.05$), Motivation \rightarrow OCBE \rightarrow EP ($\beta = 0.112$, $p < 0.05$) and Involvement \rightarrow OCBE \rightarrow EP ($\beta = 0.085$, $p < 0.1$) were all significant. The confidence intervals bias-corrected 95% also did not show any intervals straddling a 0, thus confirming the findings. Thus, H5, H6, and H7 were also supported.

5. Discussion

This study provided insights into Green HRM, which is a new area of research in the field of human resource management. Although much existing literature deals with the implementation of Green HRM in the corporate sector, a research gap exists in the study of Green HRM in the context of higher education, especially in Malaysia. In addition to human resource management literature, this study contributes to the literature of sustainable higher education by shedding light on what green initiatives have been taken in a university setting to improve environmental behaviour by focusing on human resource practices, which is a relatively unexplored area from a relational perspective. The findings of the study are of interest for both academicians and practitioners. The following presents the theoretical and managerial implications of this study.

5.1. Theoretical implications

From a theoretical perspective, this study contributes to the literature by advancing knowledge in green management that has emerged as a contemporary global concern. A growing number of

Table 3
Measurement model for the second-order constructs.

Second-Order Constructs	Indicator	Loadings	AVE	CR
Environmental Performance	EAR	0.835	0.607	0.925
	BIOD	0.795		
	CN	0.720		
	REC	0.769		
	EPM	0.728		
	RP	0.868		
	WM	0.754		
	RWC	0.750		
Green Motivation Enhancing Practices	GP	0.893	0.803	0.891
	GRW	0.899		
	GR	0.860		
Green Competence Building Practices	GT	0.900	0.775	0.873
	GR	0.860		
Organisation Citizenship Behaviour towards Environment (OCBE)	ECE	0.929	0.733	0.890
	EH	0.901		
	EI	0.723		

Table 4
Discriminant validity (HTMT).

	1	2b	3	4	5
1 Green Competence					
2 Environmental Performance	0.521				
3 Green Employee Involvement	0.677	0.549			
4 Green Motivation	0.655	0.533	0.693		
5 OCBE	0.561	0.411	0.560	0.575	

scholars have advocated the implementation of Green HRM policies for the achievement of environmental goals of an organisation, but little has been explored for the linking mechanism between Green HRM practices and environmental performance. This current study extends research on the conceptualization of Green HRM practices from the lens of the AMO theoretical framework and provides answers for how Green HRM can be linked to environmental performance via organisational citizenship behaviour towards the environment (OCBE).

In terms of the relationship between Green competence building practices and OCBE, the results found a significant relationship between these two variables. The findings suggest that environmentally conscious employees are more likely to behave in an environment-friendly manner at workplace voluntarily. [Yong et al. \(2019a\)](#) also emphasized that Green recruitment and selection processes strongly exhibit a firm's preference for potential candidates who are committed to the environment. Consequently, selecting employees who possess this concern is more likely to

reduce environmental risks to the organisation and the general public. Similarly, when employees are adequately trained for implementing environmental initiatives, they are more motivated to voluntarily participate in an organisation's environmental effort going beyond their prescribed job duties. The findings align with [Alnajdawi et al. \(2017\)](#) who found the positive influence of green recruitment and green training and development programs on OCBE. Green training and development programs equip employees with the necessary skills and expertise for environment management and increase their willingness to participate in environmental initiatives at the workplace.

The findings of the current study also revealed a significant relationship between Green motivation enhancing practices and organisational citizenship behaviour towards the environment. This finding suggests that sharing specific environmental targets with academic staff creates a sense of direction and enforcement towards environmental objectives of the university and increases their motivation to put extra effort into achieving those objectives. This finding is in alignment with [Pinzone et al. \(2016\)](#), which affirms that including environmental aspects in performance management tends to increase the willingness of employees to make discretionary environmental efforts ([Saeed et al., 2019](#)). The findings also suggested that employees are more motivated to take an environmental initiative when they are offered a reward for it. This suggests that when organisations support employees by providing them with clear guidelines for environmental actions and recognize their positive behaviours, then this will lead to employee engagement in prescribed environmental activities as well as informal and

Table 5
Hypothesis testing direct effects.

Hypothesis	Relationship	Std Beta	Std Error	t-values	p-values	BCI LL	BCI UL	f ²	VIF
H1	Competence → OCBE	0.243	0.085	2.868	0.002	0.093	0.377	0.047	2.102
H2	Motivation → OCBE	0.273	0.097	2.819	0.003	0.111	0.428	0.057	2.192
H3	Involvement → OCBE	0.206	0.105	1.957	0.025	0.016	0.372	0.031	2.311
H4	OCBE → EP	0.411	0.071	5.748	p < .001	0.295	0.527	0.203	1.000

Note: A 95% confidence interval with a bootstrapping of 5,000 was used.

Table 6
Hypothesis testing indirect effects.

Hypothesis	Relationship	Std Beta	Std Error	t-values	p-values	BCI LL	BCI UL
H5	Competence → OCBE → EP	0.100	0.041	2.454	0.014	0.028	0.189
H6	Motivation → OCBE → EP	0.112	0.044	2.568	0.011	0.036	0.202
H7	Involvement → OCBE → EP	0.085	0.046	1.829	0.068	0.006	0.197

Note: A 95% confidence interval with a bootstrapping of 5,000 was used.

voluntary environmental behaviour. This is because when employees are valued for their contributions, then they are more likely to return the gesture by engaging in OCBE (Raineri and Paillé, 2016).

Green employee involvement practices were found to influence OCBE significantly. This result is aligned with previous studies that have found a positive relationship between green involvement practices and OCBE (Alt and Spitzbeck, 2016; Pinzone et al., 2016). This finding shows that employees are more likely to adopt discretionary environmental behaviour if organisations provide them with opportunities to participate in environmental initiatives and encourage them to share suggestions for solving environmental issues (Boiral, 2009). Employees feel more empowered and supported when an organisation provides them with information about environmental activities and solicits their ideas for solving environmental issues. Ofstad et al. (2017) studied the intention for recycling behaviour of students and employees in a university setting and revealed that a sense of empowerment and opportunities for sustainability initiatives leads to the perseverance of pro-environmental behaviour at work.

This current study applied the AMO theoretical framework in the context of a university setting as compared to previous AMO-based studies in healthcare centre (Pinzone et al., 2016) and manufacturing organisations (Alnajdawi et al., 2017). In previous literature, the role of Green HRM was limited to corporate sector; thus, this study extends the Green HRM research in higher education in Malaysia. It contributes to campus greening literature from the behavioural perspective by shedding new light on the role of Green HRM practises as an enabler of pro-environmental behaviour of academic staff in the university. The findings of the study contribute to the literature that greening the three elements of AMO framework in the context of a university (ability, motivation and opportunity), Green competency, Green motivation, and Green opportunity were significant in influencing the OCBE of academic staff and the environmental performance of a university.

Next, this study showed that the OCBE of academic staff has a significant influence on the environmental performance of a university. The findings are consistent with previous studies that also reported strong ties between OCBE and environmental performance (Alt and Spitzbeck, 2016; Paillé et al., 2014; Pinzone et al., 2016). Furthermore, this finding also supported the theoretical stance of Daily et al. (2009), who first proposed the potentially positive role of OCBE in environmental performance. Employees who voluntarily embrace environmentally friendly behaviour in accomplishing their tasks such as recycling and conserving energy will help achieve the environmental objectives of an organisation. Accordingly, employees who assist their colleagues for engaging in pro-environmental behaviour will surely accelerate environmental performance efficiencies. Therefore, discretionary environmental behaviour of academic staff should be considered essential for achieving superior environmental performance in university.

Thus, this study also responded to the call of Ren et al. (2017) for further research on the mediating process through which Green HRM influences environmental outcomes. It adds to the literature by highlighting the less-researched mediating role of OCBE acting as a bridge between Green HRM practices and environmental performance. H5, H6, and H7 were tested for mediation analysis of OCBE. The results demonstrated a significant mediation of the academic staff's OCBE between all three sets of Green HRM practices and environmental performance of the university. The finding supported the theoretical perspective of Ramus (2002), who stated that employees feel more prepared for eco-initiatives when organisations share environmental responsibility with them and make environmental responsibility part of their performance evaluation. Similarly, when they are recognised and rewarded for fulfilling their environmental responsibilities, employees feel more

motivated to go beyond prescribed and repetitive behaviour and lead to better environmental performance.

The finding is also in line with Alt and Spitzbeck (2016) who also empirically proved that OCBEs acted as mechanisms of the relationship between strategic HRM and environmental performance. Providing green involvement opportunities signals employees that an organisation supports and values their contribution to environmental initiatives, hence stimulating their behaviour to go above the job description. This extra effort of employees leads to superior environmental performance (Raineri and Paillé, 2016).

5.2. Practical implications

The findings of the study provide evidence-based implications to university stakeholders about the relative importance and contributions of different Green HRM practices towards OCBE. The results will guide policymakers with HRM practices in the university that help in shaping the pro-environmental behaviour of academic staff. Green recruitment policies can accentuate the environmental stance of a university to attract candidates with an environmental mindset. In addition, training programs for increasing environmental awareness and knowledge is essential because employees with environmental abilities are more likely to engage in pro-environmental behaviour. However, other findings suggest that enhancing the motivation of academic staff by sharing environmental responsibilities with them and rewarding them for positive environmental gestures will stimulate them to put extra effort in favor of environmental initiatives of campus. Similarly, Green involvement opportunities can help policymakers to take advantage of the skills and expertise of academic staff in providing solutions for environmental issues on campus. Involvement activities such as recycling day, cleaning campaign, or a car-free day will provide a platform to academic staff for engaging in pro-environmental behaviours and encourage them to participate voluntarily in such activities in the future that will be beneficial for improving the environmental performance of the university.

Environmental issues are complex, and human interactions with the system and natural environment are complex and diverse. Formal practices to reduce emissions waste and energy usage cannot cover all the behaviours that would be desirable to enhance a university's environmental performance. The significant finding for the relationship between OCBE and environmental performance demonstrates to policymakers. When employees voluntarily carry out environmental actions in their daily official activities, actively participate in environmental events that the university has organised, stay informed about the environmental initiatives of the university, and also encourage their colleagues to adopt environment-friendly behaviour than such voluntary, informal and extra-role behaviour will lead to the improved environmental performance of the university.

5.3. Limitations and future research

Due to the methodological and theoretical limitations of this study, opportunities exist for future research work. First, this study is cross-sectional and obtained data at one point in time. Green HRM interventions may take time to maximize the influence on behavioural change. For a more in-depth understanding, future research may adopt a longitudinal research method by examining the changes to employee environmental citizenship behaviour and environmental performance over time from the implementation of Green HRM practices.

Second, other universities in Malaysia are also making substantial efforts to transition to a sustainable green campus, and future study should also consider other universities for generalising

results. Furthermore, replicating this study across boundaries in a cross-cultural setting will help develop globally relevant measures of Green HRM in higher education.

Future studies may focus on a mixed-method approach to investigate Green HRM and environmental outcome relationship. Because relying only on quantitative data based on close-ended questions provides limited information about the perceptions of respondents. A mixed-method approach could be used in future studies to provide a more in-depth analysis.

In this study, based on AMO framework, OCBE was tested as a mediating variable between Green HRM practices and environmental performance. However, OCBE is not the only mediating variable of value. Future studies should consider other mediating variables such as organisational culture (Levy and Marans, 2012), management support (Ramus, 2002) and employee attitude (Harvey et al., 2013). Furthermore, only five basic Green HRM practices, including green recruitment, green training, green performance management, green reward, and green involvement were examined in this study. Other Green HRM practices, including green work-life balance (Muster and Schrader, 2011) might also be considered in future studies of Green HRM.

The target population of this study was only academic staff in a university. However, universities involve a large population with complex activities that can influence the environmental performance of the campus. Transdisciplinary involvement of top management, faculty, students and other staff is essential for improving the overall environmental performance of the university. Future research should also consider non-academic staff, including administrative, technical and operational staff because of the variations in the perceptions of different employees. Furthermore, students are also essential stakeholders of a university as they are the future leaders and possess energy and motivation to learn and implement pro-environmental activities in campus and societal functions. This can provide an overall picture of coherent Green HRM system in the university.

6. Conclusion

With the recognition of increasing environmental responsibility, higher education institutions have realised the fact that not considering human or behavioural factors in their environmental initiatives will lead to inefficient environmental performance. However, limited research is available to guide the effective implementation of environmental measures in universities through behavioural interventions. Overall, this current study was an effort to join the nodes of Green HRM literature with university campus greening literature with a focus on academic staff OCBE. Universities, being leaders of knowledge creation, should not be judged only by the amount of environmental awareness they create but how much they are committed to promoting environmental citizenship behaviour at their doorsteps.

This study has spotlighted the burgeoning concept of “Green HRM” as a set of ability building, motivation enhancing, and opportunity providing practices that have the potential to influence environmental citizenship behaviours of employees. The findings of the study were able to demonstrate the positive consequences of Green HRM practices and OCBE for environmental performance. The findings provide food for thought to policymakers to consider environmental citizenship behaviour of academic staff and what triggers them to demonstrate such behaviour.

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CRedit authorship contribution statement

Nosheen Anwar: Writing - original draft. **Nik Hasnaa Nik Mahmood:** Supervision. **Mohd Yusoff Yusliza:** Conceptualization, Supervision, Project administration. **T. Ramayah:** Formal analysis, Validation. **Juhari Noor Faezah:** Writing - review & editing. **Waqas Khalid:** Project administration.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jclepro.2020.120401>.

Appendix

Green competence building practices

1. I am attracted by the environmental sustainability initiatives of my university.
2. My university prefers to hire employees who have environmental awareness.
3. I prefer to work at this university because of its environmental performance.
4. My university provides environmental awareness programs or workshops to improve my environmental knowledge.
5. In my university, integrated training to create the emotional involvement of employees in environmental management is provided (How to recycle; manage waste, sustainability programs or workshops arranged by UTM campus sustainability, etc.).
6. My university has green knowledge sharing to guide me about environmental behaviour (such as environmental K-sharing programs (Minda Lestari Kelas Pertama) by UTM campus sustainability, energy saving and water saving posters, etc.).

Green motivation enhancing practices

1. I have green performance indicators in my performance management system and appraisals.
2. My university sets environmental responsibilities for me (e.g., minimize the use of printed paper; set air conditioner at 24°C–26 °C, etc.).
3. In my university, non-compliance or not meeting environment management goals can bring dis-benefits for me (e.g., fine for smoking at campus).
4. In my university, I am offered green travel benefits (e.g., online meeting systems; on car-free day buggies, shuttle service or bicycles are available to commute within campus).
5. In my university, there are financial incentives for me to promote my environmental behaviour).

- In my university, recognition-based rewards are offered to encourage my participation in environment management (e.g., public recognition, awards, gift or certificates).

Green employee involvement practices

- My university has a clear developmental vision to guide my actions in environmental management.
- In my university, I am involved in a mutual learning climate among employees for green behaviour and awareness (e.g., cleaning campaigns, environmental-based community projects).
- In my university, I have observed a number of formal or informal communication channels to spread green culture (e.g., via email, posters, etc.).
- In my university, I am encouraged to involve in quality improvement and problem solving on green issues.
- In my university, I have opportunities to participate in environmental management such as suggestion schemes, community programs for environmental awareness, green initiatives).

Organisational citizenship behaviour towards the environment

- In my work, I weigh the consequences of my actions before doing something that could affect the environment (e.g., turn off light when leaving office, put recycle material in proper bins).
- I voluntarily carry out environmental actions and initiatives in my daily activities at work.
- I make suggestions to my colleagues about ways to protect the environment more effectively, even when it is not my direct responsibility.
- I spontaneously give my time to help my colleagues take the environment into account in everything they do at work.
- I encourage my colleagues to adopt more environmentally conscious behaviour.
- I encourage my colleagues to express their ideas and opinions on environmental issues.
- I actively participate in environmental events organized by my university.
- I stay informed about my university's environmental initiatives.
- I undertake environmental actions that contribute positively to my university's image.
- I volunteer for projects, endeavours or events that address environmental issues in my university.

Environmental performance

- In my university, initiatives are taken to implement long-term environmental policies (e.g., UTM sustainability campus policy).
- In my university, initiatives are taken to implement environmental management systems (such as ISO 14001 or other types of environmental management systems).
- Energy conservation practices are promoted in my campus (including reminders for energy savings, turning off computers and lights when not using.)
- In my university, initiatives are taken to provide alternative energy (such as solar energy panels).

- In my university, practices related to reducing water consumption is implemented (Including efficient showerheads and irrigation systems or rainwater harvesting systems).
- In my university, recycled products consumptions classified by type (such as using three types of dustbins, i.e., paper, glass, and plastic).
- In my university, waste from canteens is collected in food waste collector and properly disposed of (e.g., sustainable arcade campaign, composting program, etc.).
- In my university, practices related to reducing the use of private vehicles are implemented (such as bicycling or car-free day, etc.).
- In my university, practices related to reducing noise for each building are implemented (e.g., no use of vehicle horn on campus).
- In my university, initiatives are taken to reduce pollution from greenhouse gas emissions (such as green initiatives by UTM campus sustainability).
- In my university, non-compliance with environmental laws cause sanctions (e.g., fine on smoking or vaping on campus).
- In my university, biodiversity is protected from degradation (such as maintaining gardens, protecting animal species, avoid waste discharge in water bodies, etc.).
- In my university, activities to promote environmental awareness are arranged (for example energy saving campaigns, conferences, and community programs).
- In my university, research projects on environmental topics are conducted (environmental ethics, sustainable energy management, climate change, etc.).

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